About Nordic Ecolabelled

Bakeries and Bread



Background to ecolabelling

Version 1.0

Consultation version

Nordic Ecolabelling

Consultation document for:

Nordic Ecolabelled Bakeries and Bread, version 1

Background to ecolabelling

Product group 082, 2 January 2013

1 Summary 1
2 General facts about the criteria 2
3 The development of the criteria 3
4 The market 5
5 Relevance, potential and steerability 8
5.1 Production of ingredients 8
5.2 Bakeries 11
6 Structure of requirements 15
7 Motivation behind the requirement for bakeries 17
7.1 Manufacture 17
7.2 Ingredients in the bakery 19
7.3 Energy and refrigerators/freezers 27
7.4 Waste management 33
7.5 Transport 36
7.6 Chemicals – cleaning products, dishwashing and laundry 40
7.7 Use of ecolabelled products and services 43
7.8 Packaging 44
7.9 Working environment 47
8 Motivation behind the requirements for Nordic Ecolabelled bread 48
9 Summary of points 54
10 Legislation, regulatory requirements and other requirements 56
11 Requirements which have been evaluated but not included 60
12 New criteria 62
13 References 63
14 Terms and definitions 63

Appendices

Appendix 1. Description of bread manufacture

Appendix 2. Availability and use of organic ingredients in the Nordic countries

Appendix 3. Sustainability certification and traceability of ingredients

Appendix 4. Description of ingredients for fats, oils and sugar

Appendix 5. MECO analysis (Materials, Energy, Chemicals and Other)

Appendix 6. Current bread labels in the Nordic countries

1 Summary

These criteria enable bakeries and bread to be awarded the Nordic Ecolabel.

For an average consumer, it is cars, food and the home that are the factors which have the greatest environmental impact over a person's lifetime. Food is one of the product groups with the highest environmental impact. Production and consumption of food accounts for between 22% and 31% of the total greenhouse gas emissions of the EU countries. In the food category, bread is one of the products with the lowest environmental impact but at the same time it is a basic food that is consumed in large amounts in the Nordic countries.

In starting to label food, Nordic Ecolabelling is seeking to meet consumers' needs for a common, transparent Nordic label that has high recognition and inspires trust. There is no other successful Nordic label for food today that examines the entire life cycle. For this reason, in 2009 Nordic Ecolabelling conducted a study into the area of food. On the basis of this study, it was decided to carry out a pilot study into Nordic Ecolabelling of bakeries and bread. The pilot study run by Nordic Ecolabelling in 2010 showed that there are good opportunities for steerability towards production and products that are better for the environment. In Nordic Ecolabelling bakeries and bread, Nordic Ecolabelling is seeking to give consumers an opportunity to choose bread that is the best for the environment.

The bakery industry in the Nordic countries is dominated by large players responsible for the majority of bread production. These are supplemented by a significant number of medium-sized and small bakeries.

Nordic Ecolabelled bakeries and bread comply with stringent environmental requirements. Large and small bakeries, such as local bakeries and in-store bakeries, can be Nordic Ecolabelled. The criteria that cover the bakery cover the whole business. As the greatest environmental impact of the bread comes from its ingredients, requirements are set that encourage greater organic production of ingredients for bread and other bakery products. Nordic Ecolabelling will thus clearly reward organic production of grain for bread. Because today there is little steerability in terms of setting requirements for conventional, non-organic ingredients, this is not a focus point in the criteria. Energy use is the second important environmental aspect and therefore a requirement is set for a limit value on energy use and requirements on energy efficiency measures. The other areas covered by the requirements are use of chemicals for cleaning and dishwashing, waste management, packaging, transport and the working environment. The Nordic Ecolabel is not a health label, but because the product is a food, Nordic Ecolabelling's quality requirements here include a requirement in terms of nutritional content which is part of the bread's health value to the consumer.

The strength of the Nordic Ecolabel as a tool in this work lies firstly in the fact that the requirements are based on a life cycle perspective of the product and secondly that Nordic consumers are familiar with the label. Contact with the bakery industry shows that environmental issues have not been at the forefront in the industry as a whole and therefore Nordic Ecolabelling can be a good partner for producers seeking to steer their business towards processes and products that are better for the environment.

2 General facts about the criteria

Justification for Nordic Ecolabelling of bakeries and bread.

Food production plays a major role in the environmental impact of consumers. Approximately a quarter of the total environmental impact of humans comes from food consumption. Today's food production is moving towards more processed products, in which the food industry is taking on an increasingly large role.

New consumption patterns due to changing values in terms of the environment, ethics and health issues are becoming increasingly evident among consumers. A large number of surveys show that consumers want to take responsibility for their consumption and so to reduce their environmental impact. For example, Nordic Ecolabelling's consumer barometer from 2010 shows that interest in ecolabelling of food is high: A whole 61% of Nordic consumers would like there to be Nordic Ecolabelled food. Even if the the Nordic Ecolabel is not yet available for food, 49% of those interviewed said that they always, often or sometimes look for the Nordic Ecolabel when shopping for food. The majority (64%) say that it is important to choose environmentally friendly food, while 53% think that it is hard to find food today that is a good environmental choice.

For this reason, in 2009 Nordic Ecolabelling decided to produce a study into the area of food. On the basis of this, it was decided to carry out a pilot study for bread as a product group. This product group was chosen partly because bread is an item in the shopping basket of most consumers and the bakery industry showed an interest in ecolabelling. The preliminary study showed that there are excellent opportunities to improve the production and products in the bakery industry in terms of the environment. The strength of the Nordic Ecolabel as a tool in this work lies firstly in the fact that the requirements are based on a life cycle perspective and secondly that Nordic consumers are familiar with the label. Contact with the bakery industry shows that environmental issues have not been at the forefront in the industry as a whole and therefore Nordic Ecolabelling can be a good partner for producers seeking to steer their business towards processes and products that are better for the environment.

Products that can be labelled

These criteria enable bakeries and bread to be awarded the Nordic Ecolabel.

Bakery:
"Bakery" means a place of manufacture in which flour and other ingredients are used to produce bakery products such as bread, crispbreads, sweet breads, pasties and patisserie products. A bakery can be Nordic Ecolabelled it if meets the Nordic Ecolabel criteria for bakeries. Large and small bakeries, such as local bakeries and in-store bakeries, can be Nordic Ecolabelled. Only those bakeries where > 50% of production (calculated as kg/year) is bread or crispbread (e.g. loaves, crispbread, sliced bread (which may be fresh, frozen or bake-off) can be Nordic Ecolabelled. The remainder of the production may comprise bakery products such as sweet bread and crispbread, pastries, pasties, pies and similar.

In the criteria document, bread means bread baked from cereals and other ingredients, see the definition below.

The Nordic Ecolabelled bakery must make the dough for the bread itself. A site where products are produced from ready-made dough that is not manufactured at the site itself

cannot be Nordic Ecolabelled. A site which only bakes semi-finished goods such as bake-off products cannot be Nordic Ecolabelled either.

Bakeries that serve food and drink/run a café in conjunction with their bakery operations can also apply for a bakery licence. If the café wants to market itself as Nordic Ecolabelled, however, it must apply for a licence under the Nordic Ecolabel's criteria for restaurants.

Bread:
In these criteria bread is defined as bread baked from cereals and other ingredients such as water, yeast, salt, spices, fat, etc. Cereal species are wheat (including spelt, durum wheat) rye, oats, barley, rice, maize, millet, durra and other sorghum species. Examples of bread include rye bread, different types of loaves and rolls, sweet breads, flatbread (lefsa, tunnbröd), bread for toasting, baguettes, crispbreads, etc.

Bread can be Nordic Ecolabelled if it is fully baked and meets the Nordic Ecolabel's criteria for Nordic Ecolabelled bread. This means that part-baked bread cannot be Nordic Ecolabelled. Ready-baked bake-off bread can be Nordic Ecolabelled and must in such cases comply with particular energy requirements.

Version and validity of criteria

This is the first version of the criteria for bakeries and bread.

3 The development of the criteria

Purpose of developing the criteria

The project order for developing the criteria for bakeries and bread set out the following objectives for the work of the project group:

In the first version of the criteria it is important to include large and small players in the industry and have a good environmental profile. The purpose of criteria is that the bakeries that have the best environmental profile should be able to be Nordic Ecolabelled.

A number of life cycle assessments show that the production of ingredients, and particularly flour, accounts for the dominant portion of the environmental impact of bread and bakeries.[1] Nordic Ecolabelling sets its ingredients requirements by using other trustworthy and official certifications of ingredients which set high environmental criteria from a holistic perspective. Therefore it is required that a proportion of the ingredients in the Nordic Ecolabelled bakery and the Nordic Ecolabelled bread must be organically grown. Increasing the amount of agricultural land used for organic production is of the

[1] Saarinen, M., Katajajuuri, J-M., Pulkkinen, H. & Thun, R. (2010). "Life Cycle Screening of Environmental Impacts of Bread". Background study for Nordic Ecolabelling.

utmost importance in terms of biodiversity and a closed ecocycle. Because use of chemical plant protection products is not permitted in organic farming, the environmental impact is lower. Because there is little steerability in terms of setting requirements for conventional, non-organic ingredients, this is not a focus point in the project. Requirements are set for ingredients by securing a sufficient proportion of organic ingredients. Energy use is the second major environmental factor in the life cycle of bread. For this reason high requirements are set for the energy use of bakeries, and there are also special requirements for bake-off products because life cycle analyses show that the production of these demands more energy than traditionally baked bread.

The requirements governing chemicals are assessed on the basis of the characteristics and amounts of the inputs. As these criteria are being developed for food, it is natural for Nordic Ecolabelling to also cover the characteristics of the bread from a health point of view. Nordic Ecolabelling therefore sets requirements on the bread's nutritional content by requiring that the Nordic Ecolabelled bread fulfils the criteria for the official Keyhole label. Furthermore, all bakery products must be free of trans fats and the fat in Nordic Ecolabelled bread may contain a maximum 20% saturated fat of its total fat content.

The aim is for as high a proportion as possible of the Nordic Ecolabelled bakeries' production of bread to be Nordic Ecolabelled.

About the development of these criteria

In 2009 Nordic Ecolabelling produced a study of the area food. On the basis of this, it was decided to carry out a pilot study for bread as a product group. The pilot study published in 2010 led to Nordic Ecolabelling launching a project to develop criteria for Nordic Ecolabelling of bakeries and bread in November 2011.

The project group consisted of:

Area coordinator: Karin Bergbom, Finland

Project manager Maria Göransson, Sweden

Participant from Sweden: Eva-Lotta Lindholm

Participants from Finland: Niina Tanskanen, Harri Hotulainen and Antti Lehmuskoski

Participant from Norway: Marte Thommesen

Ecolabelling Denmark has not participated in drawing up these criteria but will send the proposed criteria for consultation in Denmark, so obtaining comments from Danish stakeholders.

The project group have been in contact with bakeries in every participating Nordic country. These have served as pilots in the project and contributed information on bakery processes, energy use, purchasing ingredients, etc.

The consultancy firm Pöyry in Finland has carried out an energy survey as part of the project.

The project group has also been in contact with a number of different players in the industry and meetings within the sector in Norway, Sweden and Denmark are planned during the consultation period of 2 January 2012 to 1 March 2013.

4 The market

The Nordic bread market in general

Bread is produced in a number of different ways. Everything from small local bakeries where the bread is baked in principle in the same way as in our homes, to the large industrial processes, which are automated and where staff work shifts round the clock. Between these two extremes there are a number of variants where craft baking is combined with process manufacture.

The bakery industry in the Nordic countries is dominated by large players responsible for the majority of bread production. These are supplemented by a significant number of medium-sized and small bakeries.

Considering the bakery industry from a European perspective, internationalisation is increasing and the larger players are in several cases part of large food groups.

To hold their own in this competition, more and more large companies are choosing to limit the number of products and brands. This opens up opportunities for smaller bakeries which are able to gain a foothold in a small niche locally and respond to increased demand on part of consumers for locally produced/freshly baked bread, often with a special character.

In the future there is likely to be continued dominance from the larger players in the industry, while small and medium-sized companies strengthen their position in their local market. The proportion of bread baked via bake-off methods is growing and is likely to continue to increase (Bake-off = products that are not ready baked and must be baked before consumption). Most bake-off sites are found in supermarkets, but can also be found in other places such as petrol stations, kiosks, small cafés, etc.

In the Nordic countries the industry can be divided into four different segments

- Nationwide bakeries (also sell to a certain extent across the Nordic borders, although their main markets are national), main distribution supermarkets and catering
- Regional bakeries, main distribution supermarkets and catering
- Local bakeries, main distribution local supermarkets and own bakers' shops
- Store bakeries / Bake-off sites

Producers and turnover in the Nordic countries

The information in this section is taken from Nordic Ecolabelling's pilot study on the feasibility of Nordic Ecolabelling bread, 2010.

Denmark
The bakery industry in Denmark consists of approximately 850 craft bakers. In addition between 150 and 200 bakeries are registered linked to supermarkets (Danmarks Bageri og konditorlaug 2010). In 2002 there were around 15 industrial bakeries covering approximately 85% of the market[2].

Finland
The bakery industry in Finland consists of about 850 bakeries. The two largest players have a market share of approximately 60%. The market share of small and medium-sized companies (10-20 employees) is approximately 20%, small bakeries account for 16% and import accounts for 4% of the market.

Norway
In 2008 718 companies were registered in the industry "produksjon av bakeri- og pastavarer" in Norway. The three largest producers have a turnover of almost three billion a year and an estimated market share of approximately 55% of the market for bread and bakery products. In 2009 imports of bread and bakery products amounted to 56.8 million, which means a market share of approximately 1.2% (calculated on turnover at point of sale, and therefore the proportion is presumably considerably larger).

Sweden
The bakery industry in Sweden currently consists of approximately 1,500 companies, where approximately 10% of the companies are responsible for approximately 75% of turnover. In other words a large proportion of the sector consists of small businesses. Approximately 10% of the bread market is produced by small and medium-sized companies (15-25 employees). Store bakeries are responsible for approximately 5% of the market.

Retailers and consumers

Distribution and purchasing of bread can roughly be divided into three main lines:

1) bakery - wholesaler/retailer - consumer
2) bakery - wholesaler - hotel/restaurant/catering - consumer
3) bakery - consumer

A strong concentration of retail chains in the Nordic countries has today led to approximately 4-6 dominating chains in the respective national markets. The retail chains have strongly centralised their purchasing in the Nordic countries, which also affects the

[2] Saarinen, M., Katajajuuri, J-M., Pulkkinen, H. & Thun, R. (2010). "Life Cycle Screening of Environmental Impacts of Bread". Background study for Nordic Ecolabelling.

bread market. Several of the retail chains have also built up strong cooperation with producers and develop their own brands of bread which are major sellers.[3].

Consumption trends

In the Nordic countries wheat and rye are primarily used in baking bread. Oats and barley can be used but because they cannot give volume to the bread, they are sometimes added to give flavour and to increase nutritional content.

Bakery products are strongly linked to tradition and national food culture. This can be seen, for example by the fact that coarse rye bread is popular in Finland, while in Norway high-fibre bread with different mixes of cereals is preferred. Finland and Denmark have a strong tradition of baking sourdough rye bread. In Sweden bread is traditionally baked from a mixture of wheat and rye, while crispbread is made from rye. In Sweden bread is known for being slightly sweet. An increased interest in health and variation has led to more bread, including in Sweden, containing bran, grains, flakes, crushed cereals and whole grains.

In recent years bread imports have increased and the national trends are not as clear cut, especially not in the major cities. Recent interest in low GI food (glycaimic index) has led to a lower demand for bread.

In all they Nordic countries consumers are generally displaying general increased interest in the links between food and health. This is also true for bread and here we are primarily seeing greater interest in freshly baked bread, ideally with organic ingredients and/or some whole grain ingredients and special ingredients such as nuts, dried fruit, etc.

Other labels

There are various opportunities to certify/label both the production of food and input ingredients. In general bread labelling can be divided into:

- life cycle-based ecolabelling under ISO 14024 Type 1 – the future Nordic Ecolabel for bread is one example
- ingredient labelling as organic labelling is based on an EU Regulation[4] or for conventionally grown produce, e.g. Swedish Sigill with local adaptations such as KRAV, Debio and Luomu
- labelling that takes into account health aspects, such as the Keyhole symbol
- labelling of origin, such as Hyvää Suomesta/Gott från Finland

Appendix 2 contains an overview of sustainability certification systems relevant to ingredients in bread production. An overview of the commonest certification systems/labels for bread is shown in Appendix 5.

[3] Nordic Ecolabelling 2009: Area study – food

[4] Council Regulation (EC) No 834/2007

5 Relevance, potential and steerability

This section examines the environmental impact of bread production from a life cycle perspective.

In general it can be said that food is a very difficult area in which to assess environmental impact. This is because the life cycle of food is influenced by such a large amount of widely varying factors. A reasonably fair analysis of environmental impact is only possible to achieve if a well-defined, carefully delimited and analysed food production system is studied. For this reason, this analysis of relevance, potential and steerability (RPS) does not claim to be scientifically exhaustive. It should instead be seen as a general summary of the most important factors.

Consumption of food is a major element in the environmental impact of humans. The largest proportion of the environmental impact from food usually arises in primary production and in conjunction with inputs used on the farm. Impact may, however, be local (land use, tropospheric ozone), regional (acidification and eutrophication) and global (greenhouse gases).

In conjunction with the development of these criteria, a rough MECO analysis (Materials, Energy, Chemicals and Other) has been carried out to clarify where the largest environmental impact lies for this product group[5]. The MECO analysis is in Appendix 5.

This shows that what most affects the environmental impact is the production of ingredients and energy use.

5.1 Production of ingredients

Life cycle analysis of bread shows that the flour accounts for the dominant environmental impact of bread manufacture. More Nordic studies have shown that the climate impact is dominated by primary production[6] [7] [8]. Other ingredients have less of an impact on the total environmental impact of bread. Significant final ingredients used in production are phosphorus in artificial fertiliser and fossil energy.

When comparing organic and conventional cereal production, it is difficult to decide that one is better than the other. This is due to large variation and uncertainty because organic production systems are among the most complex systems there are, due to major uncertainty in input data, uncertainty regarding calculations of biogenic emissions and

---

[5] Pommer, K., Bech P., Wenzel, H., Caspersen N. & Olsen, SI. 2001. Håndbog i miljøvurdering af produkter – en enkel metode (Handbook in environmental assessment of products - a simple method). Danish Environmental Protection Agency. Miljønyt Nr. 58 2001.

[6] Stadig, M., Wallén, E. & Nilsson, B. 2001. Livscykelanalys av hamburgerbröd (Life cycle analysis of hamburger buns) SIK – the Swedish Institute for Food and Biotechnology

[7] Angerwall & Sonesson. 2011. Förenklad metod för klimat-/GWP-beräkningar av livsmedel (Simplified method for climate/GWP calculations of food Final report, ver 1. SIK – the Swedish Institute for Food and Biotechnology

[8] Wanhalinna, Viivi. 2010. Leivän hiilijalanjälki (Carbon footprint of bread). EKTsarja 1491, Helsinki University.

choice of methodology[9]. However, it is possible to make certain generalisations in terms of growing grain for bread, as set out in the assessment below.

Land use

Organic farming uses more land than conventional farming. Studies from Sweden show that organic grain harvests are between 50-70% of corresponding conventional harvests[10]. In Sweden the harvest is highest in the fertile soils on the open flat lands and at lowest on the edges of forests[11]. In England and Wales land use in conventional wheat farming is a third of that in organic farming[12] and in Germany it has been calculated as 65% of that of organic farming[13]. The cause of the lower harvests in organic farming is the low concentration of nutrients, particularly nitrogen, which makes for lower yields[14].

Biodiversity

The Swedish National Food Administration has in the report "På väg mot miljöanpassade kostråd" (Towards eco-friendly dietary advice) made a general assessment that organic farming leads to higher biodiversity than conventional farming[15]. In four European studies it was found that the diversity of species of both plants and animals such as birds, beetles, spiders, butterflies and worms was greater in organic production systems[16]. The conclusion was that it was partly chemical plant protection products that reduce diversity and the amount of flowering plants in conventional farming. More varied crop rotation in organic farming and a larger proportion of banks in cereal-dominated areas also played a role. The results of a study which carried out a statistical analysis of the results of 66 published studies show that organic farming systems on

---

[9] Cederberg, Wallman, Berglund & Gustavsson. 2011. Climate footprint of organic agricultural products. SIK report No. 830. SIK – the Swedish Institute for Food and Biotechnology

[10] Ibid.

[11] Swedish Board of Agriculture (2011). Skörd för ekologisk och konventionell odling 2010. (Harvests in organic and conventional farming 2010) Official Statistics of Sweden, SJV JO 16 SM 1102

[12] Williams, A. G. Audsley, E. & Sandars, D. L. 2006. Determining the environmental burdens and resource use in the production of agricultural and horticultural commodities. Defra project report IS0205.

[13] Braschkat, J. Patyk, A. & Quirin, M. 2004. Life cycle assessment of bread production - a comparison of eight different scenarios. Life cycle assessment in the agri-food sector. Proceedings from the 4th International Conference, 6-8 October 2003, Bygholm, Denmark. DIAS Report. Animal Husbandry 61, 9-16.

[14] Florén, B. Flysjö, A. & Lorentzon, K. 2006. Ekologiska produkters miljönytta (The environmental benefit of organic produce) SIK report 749. SIK – the Swedish Institute for Food and Biotechnology

[15] Lagerberg-Fogelberg. 2008. På väg mot miljöanpassade kostråd - vetenskapligt underlag inför miljökonsekvensanalysen av Livsmedelsverkets kostråd (Towards eco-friendly dietary advice - scientific data for the environmental impact analysis of the Swedish Food Administration's dietary advice). Report, 2008:9. The Swedish National Food Administration.

[16] Drake, L. & Björklund, J. 2001. Effekter av olika sätt att producera livsmedel – en inventering av jämförelser mellan ekologisk och konventionell produktion (Effects of different ways of producing food – an inventory of comparisons between organic and conventional production). Centre for Sustainable Agriculture, SLU.

average have 30% more species[17]. The study also shows that organisms were 50% more abundant in organic agriculture compared with conventional farming.

Growing of oil palm, sugar cane and soya are often extreme monocultures that have a negative impact on biodiversity.

Energy use in the production of ingredients

Several studies showed energy use in the production of ingredients as the most significant, followed in size by the energy consumption of bakeries.

Energy use in cereal cultivation is dominated by the production of mineral fertiliser. Organic farming often uses no mineral fertiliser, which leads to energy use being lower when a good harvest is produced, as has been shown in model studies[18].

Energy use during the production of conventionally grown bread wheat can be higher than other cereals because the protein content of bread wheat is an important quality aspect and is dependent on higher nitrogen inputs. Nitrogen in artificial fertiliser is extremely energy demanding to produce[19]. For other cereals where nitrogen inputs are not so high, the difference in energy use between conventional and organic farming is probably not as great.

Environmental impact

The conventional growing of ingredients uses different plant protection products. The environmental impact of these is difficult to estimate. In a European perspective Denmark, Sweden and Finland are characterised by low use of plant protection products in cereal growing[20] which is likely to also be the case for Norway. In Belgium and Germany use of plant protection products was 2 to 3 times higher than in Sweden during the 2000s. The growing of palm oil and soya in Asia and South America can often lead to the use of plant protection products that are prohibited in Europe due to their toxicity.

In primary production, emissions of nitrous oxide (laughing gas) from agricultural land and the production of artificial fertiliser have a significant climate impact. The climate impact of organic cereal production compared with conventional agriculture is primarily dependent on the amount of harvest and the nitrogen fertiliser strategy. As when comparing energy use, conventionally grown bread wheat can have a higher climate impact than other cereals because the protein content of bread wheat is an important quality aspect and depends on higher nitrogen inputs. A recently published study from the Swedish Institute for Food and Biotechnology (SIK) in Sweden which compares organic crop rotation with rotation in conventional culture shows that the good organic harvest level combined with a reasonable input of nitrogen fertiliser leads to a generally

---

[17] Bengtsson, J. Ahnström, J. & Weibull, A.-C. 2005 The effects of organic agriculture on biodiversity and abundance: a meta-analysis. J Applied Ecology 42, 261-269.

[18] Lagerberg-Fogelberg. 2008. På väg mot miljöanpassade kostråd - vetenskapligt underlag inför miljökonsekvensanalysen av Livsmedelsverkets kostråd (Towards eco-friendly dietary advice - scientific data for the environmental impact analysis of the Swedish Food Administration's dietary advice). Report, 2008:9. The Swedish National Food Administration.

[19] Ibid.

[20] Ibid.

lower climate impact per kg grain than for conventional cereals[21]. The same study shows that the low harvest levels for organically grown oil plants means that climate impact per kg product is at the same level as for conventionally grown plants.[22] It can thus be said that in certain systems organic farming can generally lead to a lower climate but in others it does not.

The impact of bread on acidification and eutrophication is dominated by primary production. Eutrophication is affected by leaks of nitrate nitrogen and phosphorus to water.

5.2 Bakeries

Environmental work in the bakery industry

Industry contacts point to differences between bakeries in terms of their work for the environment. In general it can be said that environmental issues in the bakery process and the environmental requirements set for suppliers have not been in focus. Some of the players involved have however had extensive environmental procedures in place for some time and some have environmental certification (ISO/EMAS) for their bakeries, while others are still only at the start of this process.

Energy use in bakeries

Energy use has a major influence on the environmental impact of bread from a life cycle perspective. Energy use in ingredient production is the most important, followed by energy use by bakeries [23]. Other factors that have an impact are storage, transport and waste.

This is shown in figure 1 from the bakery industry's own study in 2010[23].

[21] There are major variations and uncertainties because organic production systems are among the most complex system analyses there are, due to major uncertainty in input data, uncertainty in calculating biogenic emissions and choice of methodology (Cederberg et al., 2011).

[22] Cederberg, Wallman, Berglund & Gustavsson. 2011. Climate footprint of organic agricultural products. SIK report No. 830. SIK – the Swedish Institute for Food and Biotechnology

[23] Swedish Bread Institute. 2010. http://www.brodinstitutet.se/

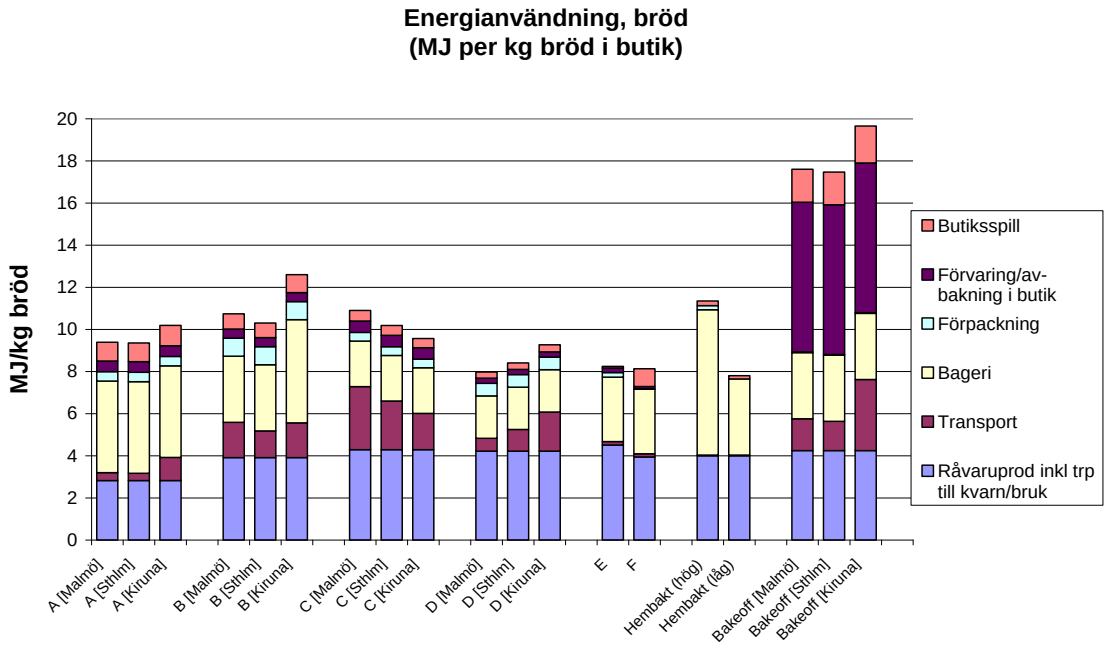


Figure 17. Energy use (MJ per kg bread, retail). Point of sale: Malmö, Stockholm and Kiruna.

A-D = type I, E-F = type II, Home baked = type III, Bake-off = type IV.

[key]
MJ/kg bröd = MJ/kg bread

Store waste
Storage/bake-off in store
Packaging
Bakery
Transport
Ingredient production including transport to mill/processor

Type I	Manufactured on an industrial scale, ready-baked bread, national market.
Type II	Manufactured by smaller units, ready-baked bread, local market.
Type III	Bread baked in the home
Type IV.	Manufactured on an industrial scale, bake-off bread, national market.

The systems of types I, II and IV include production of ingredients, packaging and transport of ingredients to the bakery, bakery processes, long-distance transport, frozen storage, where used, local distribution, retail including baking off where applicable, and management of waste and by-products.
The system of type III includes production of ingredients, packaging and transport of ingredients to the mill, retail, baking in the home, and management of waste and by-products.

The results of the Swedish Bread Institute's study (see figure 1 above) show that the total energy use for bread from Swedish bakeries varies between 8-12 MJ/kg bread (2.2–3.3 kWh/kg) compared with approximately 18-20 MJ/kg bread for bake-off bread. For bake-off bread energy use is dominated by in-store bakeries. It is uncertain how freezing

bread in industrial bakeries affects total energy use because no differentiated data is available for this.

Bakeries generally lack steerability of the energy used in producing ingredients but are able to influence their own energy use. For this reason the Nordic Ecolabel's requirements on energy in this first version of the criteria focus on the energy use of bakeries.

There is an opportunity to reduce energy use in bakeries in various ways, partly through optimum use of ovens and through energy recovery from the various stages of the production process.

Choice of ingredients in the bakery

Because the production of ingredients has the greatest environmental impact (see previous section) the ingredients the bakery chooses for its products have a major effect on the total environmental impact of the bakery. Steerability for bakeries in purchasing ingredients is, however, limited and varied. It is due to a number of different factors, including the size and geographical location of the bakery, the products it makes (different types of bread have different requirements in terms of flour quality), access to organic flour, (see Appendix 2 Availability and use of organic ingredients in the Nordic countries) and access to other organic ingredients. In the pilot study the answers from pilots showed that bakeries rarely have traceability at sufficiently detailed level for flour from conventionally grown cereals.

The use of organic ingredients in Nordic bakeries is low. The small bakeries that sell organic products use a large proportion of organic ingredients. Larger players cite availability and varying quality of organic flour as an obstacle. The bakeries that mainly sell organic products today state that the availability of organic sugar and jam is limited.

It has not been established how high the potential production of organic cereals of a quality that meets the requirements of bakeries is in the Nordic countries. As things stand today, a small amount of organic cereal is imported from outside Europe.

The growing of oil palm and sugar cane has a major impact on the environment from a global point of view. When choosing fats, steerability for bakeries is good. The Nordic bakeries' consumption of sugar does not come from sugar cane but is usually based on sugar beet.

Packaging

Products such as bread that are sold in large volumes also involve large volumes of packaging material. In general where packaging is concerned, the environmental impact depends on the raw materials used, what the production process involved (emissions, chemicals, energy, etc.), how functional the packaging is for the product (correctly optimised packaging provides optimum transport and storage conditions) and how the packaging is dealt with in the waste phase. From previous studies we know that the energy used in manufacturing packaging is relatively low. For cost reasons the bakeries have long worked to reduce their packaging. Steerability for bakeries when choosing packaging varies. If products are sold via the bakery's own distribution and own shops, steerability is high but if products are mainly sold through retail chains, it is the retailers' requirements that matter.

Plastic bags made of polyethylene/polypropylene are common. Paper bags are also common and in recent years paper bags with a plastic window have also become common. The bread is packed in these bags, closed with a clip or other closure and then the packs are packed into corrugated cardboard boxes/plastic trays. The corrugated cardboard boxes/plastic trays are then stacked on top of each other on EU pallets and some large manufacturers then seal the pallets with plastic film. After use the corrugated cardboard boxes are sent for recycling or reuse in the stores while the plastic trays are returned to the bakery and washed before being used again. Nordic Ecolabelling has no LCA information to indicate that any of these transport packaging options would be better from an environmental point of view.

It is estimated that just over 75% of all bread manufactured in Sweden and Finland is packed in the manner described above. It is likely that the percentage is slightly lower in Norway where bread tends to be sold unpackaged or in open bags to be sliced in store.

Steerability as to whether the bread is packaged in plastic or cardboard trays is very low for the individual bakery. This is due to the established systems that are part of the bakery's packaging line. The packaging solutions are also influenced by many factors including the retailer's requirements, the transport systems developed and long-term transport contracts.

Waste

In bakeries the following forms of organic waste arise in the production process: dough, flour, bread. The bakeries have a large degree of steerability regarding this waste because they can reduce it by optimising their production processes. Because flour, dough and bread waste means ingredient costs without production income, it is essential for the bakeries to keep these levels as low as possible. In addition bread thrown away means unnecessary energy costs in the production process. Other waste that arises in the bakeries, but to a lesser extent, is packaging materials such as plastic, corrugated cardboard and cardboard.

Transport

Transport is an important part in the life cycle of most products. For bread, however, transport tends to be of less importance in terms of its total environmental impact. An exception is bake-off products where dough or semifinished products can be transported long distances in frozen/refrigerated transport.

The ingredients and the finished products are transported to and from the bakery. The logistics costs will vary considerably depending on whether the bakery is a small bakery operating in a local market or has national or international distribution. Transport for small local bakeries mainly involves transporting ingredients, while large bakeries may have extensive transport networks to ship their products.

The steerability of transport varies considerably between different bakeries. Large bakeries do often have longer distribution routes, but on the other hand they have better opportunities to set up their own transport systems through their own procurement processes, and to use their own distribution channels and vehicles. Smaller bakeries have shorter distances but fewer transport choices.

Chemicals – cleaning products, dishwashing and laundry

Chemicals in bakeries are predominantly the cleaning products used to clean premises and equipment and the pesticides necessary to combat pests.

Because bakeries are part of the food industry, EU legislation sets major requirements on the scope and quality of hygiene procedures, how hygiene inspections are carried out and the training all staff must undergo and only substances approved for the food industry may be used. Like the rest of the food industry, bakeries are also subject to regular inspections carried out by authorities. Cleaning of food premises is carried out in accordance with the cleaning plan which is part of the own checks demanded by the authorities. According to the cleaning plan, material safety data sheets for all cleaning products must be available, for example. From an environmental point of view, the chemicals used in bakeries do not involve a major environmental impact.

There is no great potential for environmental benefits by imposing chemicals requirements for cleaning in this product group. The environmental impact of cleaning chemicals used in bakeries is very small compared, example, with the environmental impact of the production of ingredients and energy consumption. There is a certain amount of steerability in that the bakeries (or the companies responsible for cleaning) can choose ecolabelled cleaning products where possible.

Dishwashing chemicals are used by bakeries to a varying extent. In general ordinary bakeries do not use large amounts of dishwashing chemicals. Where plastic trays used to transport bread to points of sale, these need to be washed. Dishwashing can take place at the bakery or the bakery can send the plastic trays to another bakery/central washing facility.

Because the hygiene requirements throughout the food industry are very high, staff wear clean workwear every day. Workwear is often washed on-site at small bakeries, while larger bakeries contract their laundry out to external laundries.

6 Structure of requirements

Nordic Ecolabelling has drawn up a requirement structure for bakeries and bread with obligatory requirements combined with points score requirements. This structure of requirements is used in criteria where we ecolabel the product – the bread – and the service – the bakery. One example of this is the criteria for printing houses which has been successfully used by Nordic Ecolabelling for over 10 years. This structure was also recommended in Nordic Ecolabelling's feasibility study on Nordic Ecolabelling bread[24].

The total requirement level has been set such that the Nordic Ecolabelled bakery has to be better than the average bakery on an overall evaluation from an environmental perspective. The requirement level is judged to be reasonable to achieve by bakeries that have a good system for environmental work in place. This assessment has been made by

[24] Forstudie om muligheden for at Svanemærke Brød (Pilot study on the feasibility of Nordic Ecolabelling bread), September 2010.

Nordic Ecolabelling and is based on information from our pilot bakeries and available data from the industry.

The structure of requirements comprises:

- Obligatory requirements which must be met by the Nordic Ecolabelled bakery and special obligatory requirements for the Nordic Ecolabelled bread.
- A points system that rewards measures/choices that are better in terms of the environment. The requirement is for a minimum number of points, with a focus on ingredients and energy. The points system applies to the entire bakery and to the Nordic Ecolabelled bread. All bakery processes are included in the same point system, which means that values are calculated in the same way for all bakeries.
- Particular marketing requirements and requirements for information texts on Nordic Ecolabelled bread.

The bakery's environmental requirements cover requirements on ingredients, energy use, cleaning chemicals, packaging, waste, transport, the working environment and the choice of ecolabelled products used in the bakery. In addition requirements are set on compliance with quality and regulatory requirements.

Besides the fundamental requirement that bread is produced in a Nordic Ecolabelled bakery, the requirements for bread also include specific requirements on ingredients, nutritional content and energy (for bake-off products).

The points system provides a good overview of how Nordic Ecolabelling grades the importance of different areas based on the RPS analysis. The points system also enables flexibility, which is needed in the first version of criteria as extensive information on the energy use of bakeries, for example, is not yet available.

Functional unit

In the criteria the functional unit is related to the bakery's total production, unless otherwise stated. The functional unit is selected such that it covers the entire bakery, because Nordic Ecolabelling seeks to achieve a holistic approach in its criteria. In addition it can be difficult for the bakeries to separate out data for individual products.

Energy consumption and waste are related to this unit. In these criteria, "the bakery's total production" means the bakery's entire prime production of fresh bread, semi-finished products, frozen bread and other products such as sweet bread and other bakery products (fresh, semi-finished products and frozen). Prime production means the production that meets the quality requirements the bakery has in place for its products for sale. This production concept does not thus include the bakery products that go to waste, such as spoiled bread and seconds.

7 Motivation behind the requirement for bakeries

7.1 Manufacture

Nordic Ecolabelling bases its criteria on a life cycle perspective, where the product's environmental impact is examined from ingredients to waste. For this reason, requirements have been drawn up for the production plant itself; the bakery and for the product; bread.

For a general description of bread manufacture, see Appendix 1.

Requirement for a description of the bakery's products (O1)

Background to the requirement
In order to assess the bakery's application it is necessary for Nordic Ecolabelling to obtain an overall picture of the bakery's production. The bakery must describe its business, the ingredients used and the products manufactured on annual basis. This information is important for correct licensing and as information for use in future revisions of the criteria.

Because Nordic Ecolabelling has chosen to focus on bread and give bakeries an opportunity to have their bread Nordic Ecolabelled, special information is needed about the ingredients used in bread production. This information must include a description of the ingredient and the bakery's suppliers (name and location) of these ingredients.

Requirement text in the criteria document

O1 General description of the bakery and its products

The bakery must provide a general description of its business, including

- Whether the company is part of a bakery chain or group
- Whether food and drink is served in conjunction with the bakery
- Product range

The bakery must provide a detailed description of its production (on an annual basis, tonnes or kg):

- bread, divided into types of bread: fresh bread, semi-finished, frozen bread, other bread
- other products divided by type: sweet bread, pastries, pies, pasties, other products
- total use of flour, divided by types of flour: rye flour, wheat flour, other cereal flour products
- all other ingredients, e.g. fat, sugar, yeast, liquids, spices and other additives
- summary of all ingredients used in bread production. For these the names of the suppliers must be stated.

☒ Description of the bakery's products and ingredients as above. Appendix 1 can be used as a supplement.

Description of the property and the production process (O2)

Background to the requirement

The bakery's environmental impact is largely dependent on what the bakery's production plant is like. In which physical property is the work carried out, what production equipment is used, what production processes are used, etc.? For energy use, the year of manufacture of the ovens (and year of renovation where applicable) are of major importance because technological developments have led to more energy-efficient oven solutions coming on the market.

Requirement text in the criteria document

O2 Description of the property and the production process

The bakery must describe its production space and the production process stating the various steps of the process and the equipment used.

- Whether the property is independent or included in a larger property (e.g. an in-store bakery)
- Description of the spaces used for production (buildings, warehouse space, refrigerated or freezer space) must be stated (area in m^2 , volume in m^3 , year built, purpose).
- Other spaces adjoining the bakery, which are not used for bread production (e.g. office premises)
- Year of manufacture of ovens and year of renovation if applicable
- Description of year of refurbishment/renovation of production, heating, ventilation, or refrigeration/freezing facilities
- Description of production lines and their sources of energy (type of dough made: semi-automated, fully-automated, equipment, type of oven, washing returned plastic trays in the bakery, energy sources of production lines and ovens)
- Overview of ventilation and management of heat emissions

☒ Description of production space and production processes as above.

Requirement on the production of Nordic Ecolabelled bread (O3)

Background to the requirement

For an average consumer, it is cars, food and the home that are the factors which have the greatest environmental impact over a person's lifetime. Food is one of the product groups with the highest environmental impact. Production and consumption of food accounts for between 22% and 31% of the total greenhouse gas emissions of the EU countries. In the food category, bread is one of the products with the lowest environmental impact but at the same time it is a basic food that is consumed in large amounts in the Nordic countries.

In starting to label food, Nordic Ecolabelling is seeking to meet consumers' needs for a common, transparent Nordic label that has high recognition and inspires trust. In Nordic Ecolabelling bakeries and bread, Nordic Ecolabelling is seeking to give consumers an opportunity to choose bread that is the best for the environment. Nordic Ecolabelling does not only include environmental requirements but also quality requirements, in this case requirements governing nutritional content, which is part of the bread's health value for the consumer. The requirement that the Nordic Ecolabelled bakery must always include at least one Nordic Ecolabelled bread in its product range (not a seasonal product) is an important requirement from a consumer point of view, as it ensures that Nordic Ecolabelled bread is regularly available for sale. Nordic Ecolabelling is thus not limited merely to labelling bakeries, which provides a relatively low level of visibility to the consumer.

Requirement P11 reward bakeries with additional points if their range includes several Nordic Ecolabelled bread products.

Requirement text in the criteria document

O3 Production of Nordic Ecolabelled bread

The bakery's product range must always include at least one Nordic Ecolabelled bread.

The Nordic Ecolabelled bread must be produced in a Nordic Ecolabelled bakery.

✉ Documentation verifying compliance with the criterion.

7.2 Ingredients in the bakery

The largest amount of ingredients used by a bakery, in order, are: 1) flour, 2) sugar and 3) fat. The difference in size between these depends on how much bread the bakery produces in relation to patisserie products/biscuits, etc. The requirements set for ingredients seek to reduce the environmental impact of bakeries and bread. RPS and MECO analyses show that the production of ingredients, particularly of flour account for a dominant proportion of the environmental impact of bread and bakeries.

Requirement for flour and grain from conventionally grown cereals (O4)

Background to the requirement

Nordic Ecolabelling sets the requirement that conventionally grown cereals must be able to be traced to the country in which they are grown and processed. In this first version of the criteria we have not set any more requirements for conventionally grown cereals. This cereal requirement will help to develop the requirements for conventionally farmed ingredients in the future. In general it can be said that the energy use and environmental impact of growing cereals primarily depends on the yield at harvest and the nitrogen fertiliser strategy. Because these vary from farm to farm, it is necessary to be able to trace ingredients to farm level in order to set requirements governing their production.

In 2010 a pilot study was commissioned by Nordic Ecolabelling. In the pilot study the answers from pilots showed that bakeries rarely have traceability at sufficiently detailed level for flour from conventionally grown cereals. In most cases the cereals can be traced to the supplier of grain to a mill, but in the mill traceability is at mass balance level (see Appendix 2 for a definition of mass balance). In this first generation of the criteria Nordic Ecolabelling has therefore decided not to set any environmental requirements for conventionally grown ingredients, other than traceability to country of origin and place of processing. The purpose of the requirement is that it enables any errors in the products to be traced. It can also act as a guarantee to show that the product is of the correct quality. Therefore the requirement is set that conventionally grown cereals must be able to be traced to the country in which they are grown and where they are processed.

Requirement text in the criteria document

O4 Flour and grain from conventionally grown cereals

Flour and grain/flakes from conventionally grown types of cereal must be able to be traced to the country in which it is grown and where it is processed.

For a definition of types of cereal, see Terms and definitions.

✉ Supplier's declaration verifying the criteria.

Requirement for organic ingredients in Nordic Ecolabelled bakeries (O5)

Background to the requirement

Nordic Ecolabelling has chosen to set a requirement that a certain proportion of the ingredients must be organically grown (see section 3, Purpose of developing the criteria). If the criteria are received positively by the industry, Nordic Ecolabelling may contribute towards greater demand for organic cereal production for bread through requirements on organically grown ingredients. Organic ingredients also means that the traceability of these ingredients is guaranteed.

A strict requirement on the proportion of organic ingredients can make it too difficult for the licence holders to achieve, particularly in the years where the harvest or the quality of organic cereal is low and the price is high. This could lead to the undertaking becoming too risky for the licensee and the environmental benefit failing to be achieved.

Nordic Ecolabelling has chosen to set a requirement that three percent of the ingredients used in the Nordic Ecolabelled bakery must be organically grown, supplemented by a points score requirement if additional organic ingredients are used. Liquid may not be included because this would make it too easy to meet the requirement. The percentage for organic ingredients is set slightly higher than the use of organic cereal for flour and grain in Finland, Norway and Sweden. Nordic Ecolabelling judges that the opportunity to import organic cereals is equal in all countries. For this reason Nordic Ecolabelling has chosen to set the same requirement level for organic ingredients in all countries although organic cereal production may vary between them.

The requirement for organic ingredients in Nordic Ecolabelled bakeries is set relatively low. This is because access to organic cereals of bread quality is limited in the Nordic countries. Based on the data shown in Appendix 2 (Availability and use of organic

ingredients in the Nordic countries) it can be stated that there is currently a shortage of organic cereal in northern Europe. In 2011 there was a lack of organic cereals in Sweden[25,26] and approximately 25% of Lantmännen's[27] sale of organic grain was imported[28]. Because the same customs code is used for organically grown and conventionally grown cereals, there are no official statistics on imports of organic cereal to the Nordic countries.

In 2010 the proportion of organic flour and grain sold in Norway was approximately 0.7% (2,035 tonnes) of total food consumption[29]. It is not possible to determine how much is imported but this amount is a large proportion of the amount sold. It has not proved possible to obtain corresponding information from Sweden and Finland. The official statistics in Finland and Sweden combine the total amounts of organic cereals produced but do not state their quality or how they are used. In Sweden Nordic Ecolabelling estimates the consumption of organic cereals in food as between 0.7 and 1.2%. This estimate does not include imports. No data is available for Finland but based on organic harvest yields, the level should be about the same as in Norway and Sweden. If it is assumed that the introduction and import of organic cereals today is approximately 0.5% of total cereal use, it can be roughly estimated that availability of organic flour in the Nordic countries currently lies at around 0.7 to 1.7% i.e. very low.

The relatively low obligatory requirement for the proportion of organic ingredients used in a Nordic Ecolabelled bakery is combined with a points score requirement if additional organic ingredients are used and if the bakery produces organic products. The purpose of the points score requirement is to report the use of organic ingredients but also to open up a certain amount of freedom for the bakeries. The opportunity to increase the requirement on organic ingredients will be evaluated in the next version of the criteria.

Requirement text in the criteria document

O5 Organic ingredients in Nordic Ecolabelled bakeries

The amount of certified organic ingredients in Nordic Ecolabelled bakeries must be at least 3% (weight) of the total amount of ingredients used in the bakery over a year, not including the amount of liquid.

✉ List of the total amount of organic ingredients used in the bakery. This list is compared with the documentation from requirement O1.

---

[25]. Ryegård & Ryegård. 2012. Ekologisk livsmedelsmarknad (The organic food market). Ekoweb & LRF. (http://www.lrf.se/PageFiles/64119/Marknadsrapport_eko_20120126.pdf (downloaded 28.02.2012)

[26] KRAV 2012. Market report 2012. http://www.krav.se/Documents/Marknadsrapporter/marknadsrapport2012/Marknadsrapport_2012.pdf (13.03.2012)

[27] Lantmännen is owned by 35,000 Swedish farmers and is one of the largest groups in the Nordic countries in food, machinery, energy and agriculture.

[28] Anneke Svantesson, Lantmännen Cerealia, personal communication (30.01.2012)

[29] See Appendix 2 for further information about the availability and use of organic grain and cereals in the Nordic countries.

P1 Organic points for Nordic Ecolabelled bakeries (max. 6 points)

If the amount of organically certified ingredients over a year (not including the amount of liquid) is more than requirement O5, points are awarded as below:

The bakery uses 4 - 10% (weight) organically certified ingredients: 1 point

The bakery uses 11 - 15% (weight) organically certified ingredients: 2 points

The bakery uses 16 - 20% (weight) organically certified ingredients: 3 points

The bakery uses more than 20% (weight) organically certified ingredients: 4 points

The bakery produces one organically certified product: 1 point

The bakery produces 2 or more organically certified products: 2 points

✉ See O5.

Requirements on fat and oil

Nordic Ecolabelling sets a requirement that all the palm oil used by the bakery must be sustainability certified and that palm oil must be traceable at mass balance level. A more detailed description of sustainability certification and traceability of ingredients can be found in Appendix 3.

In addition it is required that fat used in bakeries must be free from industrially manufactured trans fats.

Fat is the third largest ingredient used in a bakery, in terms of amount. The fat content in bread varies, but is generally 2-6 g fat per 100 g[30]. Vegetable fats and oils and vegetable margarine are the fats most often used in bread. Large bakeries primarily use rapeseed oil in bread in Sweden. Sunflower oil, olive oil and palm oil are used but to a lesser extent. Rapeseed oil contains unsaturated fat which is healthier than saturated fat. Rapeseed oil is also more locally grown than other fats and remains liquid even at low temperatures (i.e. is easy to handle even in the winter).

Products with a high fat content, such as patisserie products, require a more solid fat than rapeseed oil. The solid fat is needed, partly to enable the dough to be handled in a production line and partly because the fat (fat crystals) stabilises the air bubbles and otherwise the volume of the product would be reduced. The solid fat options are primarily palm oil, shea[31] and butter. Of these, palm oil is a considerably cheaper option for bakeries. It is also possible to hydrogenate oils, for example rapeseed oil can be hydrogenated, which means that no trans fats are formed. Some bakeries do not want to use hydrogenated rapeseed oil because then the ingredients on the packaging must state "hydrogenated fat" which consumers interpret as meaning trans fats.

In the baking industry it is common to use mixtures of fats of various kinds, e.g. margarine, shortening and pure rapeseed oil. Margarine blends contain many different ingredients, with rape seed and palm oil as the largest proportion as a percentage but also shea. Coconut and palm kernel fat are other ingredients. The percentage mixture of these varies depending on the application the margarine is to be used for. Shortening is a blend

[30] Swedish Bread Institute, 2012. I http://www.brodinstitutet.se/allt-om-brod/ingredienser-i-brod/ (10.01.2012)

[31] The shea nut comes from the shea tree, which grows wild in West Africa.

of 100% fat compared with margarine which is 80% fat plus water, emulsifiers, etc. A shortening can be a solid fat delivered in boxes or pumpable shortening delivered in a tanker or container. Further information about different fat ingredients can be found in Appendix 4.

The type of fat that has the greatest environmental impact is palm oil because oil palm is grown in extreme monocultures, often on land which was formerly rainforest. Cultivation is expected to increase in the future, which may lead to major environmental consequences both globally and regionally/locally.

Requirement on certified palm oil (O6)

Background to the requirement
Nordic Ecolabelling sets the requirement that the palm oil used in Nordic Ecolabelled bakeries must be certified under a standard approved by Nordic Ecolabelling. Nordic Ecolabelling sets requirements for the certification systems and standards according to which the production of palm oil is certified. The requirements for certification systems and standards correspond to those set by Nordic Ecolabelling for forest certification. When Nordic Ecolabelling receives an application in which palm oil is certified under a particular standard (e.g. RSPO), an assessment is made of whether the standard and certification system fulfil the requirements presented in Appendix 2 of the criteria.

The requirement thus applies to all palm oil used in the bakery. Palm oil is used in bakeries but is only used to a minor extent in bread.

Approximately 90% of all the palm oil produced and traded worldwide comes from Malaysia and Indonesia[32] [33]. Oil palm is primarily grown in areas that were originally rainforest [34]. The expansion of palm oil plantations in South West Asia is the largest cause of destruction of the rainforests or draining of peat beds[35]. This leads to fragmentation and reduction in habitats for biodiversity. When the natural ecosystem disappears, this also affects ecosystem services such as carbon storage, the production of clean water and barriers to soil erosion. The way palm oil is cultivated and the use of plant protection products can lead to major problems with soil erosion. The felling of the rainforests and cultivating peat beds releases large amounts of greenhouse gases.

Setting a requirement for sustainability certified palm oil means that Nordic Ecolabelled bakeries will be contributing less towards demand for new oil palm plantations. Although bakeries in the Nordic countries are not the driving factor, it is important that a Nordic Ecolabelled bakery is not contributing towards unsustainable development.

---

[32] WWF. 2011. Palm Oil Buyers' Scorecard 2011 – Measuring the Progress of Palm Oil Buyers.

[33] Thoenes 2006. Biofuels and Commodity Markets – Palm Oil Focus. FAO, Commodities and Trade Division.

[34] Ministry of Food, Agriculture and Fisheries of Denmark: Jorden – en knap ressource, Fødevareministeriets rapport om samspillet mellem fødevarer, foder og bioenergi (The earth – a scarce resource, Ministry of Food, Agriculture and Fisheries report on interaction between food, feed and bioenergy), January 2008.

[35] UNEP. 2009. Towards sustainable production and use of resources: Assessing biofuels. http://www.unep.org/pdf/biofuels/Assessing_Biofuels_Full_Report.pdf

Nordic Ecolabelling has not managed to obtain information on the amounts of palm oil used in bakeries in the Nordic countries because there are so many different suppliers. Palm oil is directly imported from Southwest Asia and also imported via Europe.

Nordic Ecolabelling requires traceability at mass balance level to ensure that Nordic Ecolabelled bakeries do not contribute to demand for new palm oil plantations. Certification must be carried out by an accredited and qualified third party.

The traceability requirement is included in all environmental requirements for Nordic Ecolabelling where vegetable ingredients account for a large proportion of the environmental impact of the Nordic Ecolabelled product. In the majority of criteria documents, this constitutes a requirement on traceability and guaranteeing the origin of the ingredient. Internationally there is a strong focus on ensuring that palm oil originates from legal and sustainable sources.

Aarhus Karlshamn Sweden AB (AAK) is a major player in the market. Aarhus Karlshamn Sweden AB (AAK) aims to ensure that all palm oil handled in AAK's production facilities must be certified under the Roundtable on Sustainable Palm Oil (RSPO) by the end of 2015[36]. Appendix 3 to this background document contains a detailed explanation of sustainability certification of ingredients and traceability methods, while Appendix 4 describes ingredients for fats.

Requirement text in the criteria document

O6 Certified palm oil

At least 95% of the palm oil used in the bakery must be certified according to a standard and certification system that meets the requirements of Appendix 2 and which has been examined by Nordic Ecolabelling. Fats from palm oil must be traceable from the supplier back to the grower through mass balance.

For a definition of mass balance, see Terms and definitions.

☒ Certification must be carried out by an independent third party. Copies of certificates signed by a third party.

☒ A list of the amount of palm oil used in the bakery. Appendix 3 can be used.

☒ Copies of relevant certificates from suppliers of ingredients that meet the guidelines for chain of custody certification (CoC) as described in Appendix 2 can be used to monitor this requirement.

Requirement on trans fats (O7)

Background to the requirement

Nordic Ecolabelling has chosen to require that the ingredients used in the bakery are free of industrially manufactured trans fatty acids due to the health aspects of trans fats.

Like saturated fat, trans fats increase the risk of cardiovascular disease. Trans fats also lead to raised levels of bad LDL cholesterol in the blood and reduce the content of good HDL cholesterol. Trans fats are often found in food that also contains a large amount of

[36] http://www.aak.com/en/CSR/Supply-chain/Palm-oi l/ (accessed 02.03.2012)

saturated fat. The amount of industrially manufactured trans fats has fallen considerably in recent years and today the amount in food is very low[37]. Trans fatty acids can be formed when vegetable oil is converted into partially hydrogenated fat. If the oils are completely hydrogenated, the unsaturated fatty acids in the oil are transformed into saturated fatty acids and if hydrogenation is incomplete, trans fatty acids are formed. The food industry uses hydrogenation to make the fat more solid so that the products achieve the desired crispness, solidity and melting point. Hydrogenation also increases shelf-life. Trans fats also occur naturally in small amounts in milk fat. Because bread contains little fat and because the use of trans fats in bread is minimal, very little bread contains trans fats, but the requirement is included to ensure that products from Nordic Ecolabelled bakeries are free of trans fats.

Requirement text in the criteria document

O7 Trans fats

Fats and oils used as food ingredients in the bakery's production must be free of industrially manufactured trans fatty acids.

✉ Declaration from suppliers stating that all fats and oils are free of industrially manufactured trans fatty acids.

Requirement on genetically modified (GM) ingredients (O8)

Background to the requirement

Nordic Ecolabelling has chosen to ban the use of ingredients that come from pesticide and insect resistant GM plants based on the precautionary principle and due to the parallel negative environmental effects. Genetically modified means that one or more foreign genes are added using gene technology.

GMO (genetically modified organism or plant, animal or microorganism) is a much discussed subject in the areas of food safety and land use. The positive effects of GM crops are higher yields/harvests over the short term. Knowledge of the consequences in the slightly longer term is slightly more uncertain[38]. The foremost negative environmental consequences related to GM crops are pollution (chemical and genetic)[39]. It has, for example, led to a major increase in the development of herbicide-resistant weeds[40]. Herbicide-resistant weeds can lead to an increase in the use of herbicides. In the longer term it can also lead to the use of much more dangerous plant protection products. Biotechnology companies are also starting to develop new sorts of genes which add

---

[37]The Swedish National Food Administration, 2012. (http://www.slv.se/sv/grupp1/Mat-och-naring/Vad-innehaller-maten/Fett/Transfett/) (27.06.2012)

[38] IAASTD International Assessment of Agricultural Knowledge, Science and Technology for Development. 2009. Agriculture as the Crossroads Synthesis Report. Island Press, Washington DC

[39] Ibid.

[40] Heap, I. 2012 The International Survey of Herbicide Resistant Weeds. Online. www.weedscience.com (10.05.2012).

resistance to more herbicides [41]. Other negative consequences related to growing GM crops are a risk of reduced[42]:

- biodiversity
- local food supply,
- knowledge about seeds and the right to seeds,
- the preservation of locally adapted varieties.

Due to these uncertainties Nordic Ecolabelling has chosen to ban the use of ingredients that come from pesticide and insect resistant GM plants. The ban is based on the precautionary principle.

The GM crops grown most in the world are soya, maize, rape and cotton[43]. GM plants are used in agriculture because using gene technology in plant breeding enables agricultural plants to be given properties which cannot be achieved using other breeding methods. The most important such added characteristics are making a plant tolerant to herbicides and making a plant more resistant to insects. The purpose is partly to reduce the use of plant protection products and to enable plough-free cultivation. Gene technology is also used to produce crops with a better nutritional content. Other areas where gene technology is exploited with the help of genetically modified microorganisms (GMM) is in the manufacture of vitamins, amino acids and enzymes which are then used in the food industry.

Both the EU and Norway have been judged to have the strongest legislation on GMOs[44]. There are some types of plant that are approved for use in food production in the EU, such as soya, maize, rape and sugar beet. In total there are just under a hundred products that contain ingredients from approved genetically modified plants in the EU. The EU's legislation on GMO products requires, for example that the European Food Safety Authority, EFSA, carries out a risk assessment in which it determines whether a GMO product is as safe to eat as the conventional alternative. A similar assessment is carried out of the negative consequences that growing a particular GM crop may have on the environment[45].

There are some types of plant that are approved for use in food production in the EU, such as soya, maize, rape and sugar beet. In Europe genetically modified maize is grown in France, Poland, Portugal, Romania, Slovakia, Spain, the Czech Republic and Germany.

---

[41] Meyer & Cederberg. 2010. Pesticide use and glyphosate resistant weeds – a case study of Brazilian soybean production. SIK report No 809. SIK. Gothenburg.

[42] IAASTD International Assessment of Agricultural Knowledge, Science and Technology for Development. 2009. Agriculture as the Crossroads Synthesis Report. Island Press, Washington DC.

[43] http://www.gmo-compass.org/eng/agri_biotechnology/gmo_planting/144.gmo_cultivation_area_crop.html (08.05.2012)

[44] Catacora-Vargas, 2011. Genetically Modified Organism – A summary of Potential Adverse Effects Relevant to Sustainable Development. Biosafety Report 2011/02. Genok – Centre for Biosafety Tromsö, Norway.

[45] The Swedish National Food Administration. 2012. http://www.slv.se/sv/grupp1/Markning-av-mat/Genmodifierad-mat-GMO/ (07.05.2012)

In total there are just under a hundred products that contain ingredients from approved genetically modified plants in the EU.[46]

EU legislation also sets stringent requirements on the labelling of genetically modified organisms, GMOs. All products that consist of, contain or have been made from GMOs must be labelled. A product may state, for example "made from genetically modified soya". Additionally, food that is made from a GMO but which via various processes no longer contains any DNA from a GMO must be labelled, for example tomato purée, maize starch and rapeseed oil. However, additives such as enzymes, amino acids and vitamins need not be labelled when they have been manufactured in a closed system using GMM and where the specific additive has been purified and does not contain any microorganisms in the end product[47] [48]. Note that Nordic Ecolabelling does not ban these ingredients.

Requirement in the criteria document

O8 Genetically modified ingredients.

The use of ingredients from pesticide-resistant and insect-resistant genetically modified plants is not permitted in Nordic Ecolabelled bakeries or Nordic Ecolabelled bread.

✉ Declaration from the bakery stating that the requirement is met. Appendix 4 can be used. Nordic Ecolabelling retains the right to demand additional documentation should doubt arise as to whether the requirement is met.

7.3 Energy and refrigerators/freezers

Energy use has a major influence on the environmental impact of bread from a life cycle perspective. Energy use in ingredient production is the most important, followed by energy use by bakeries[49]. Bakeries generally lack steerability of the energy used in producing ingredients but are able to influence their own energy use. For this reason the Nordic Ecolabel's requirements focus on energy in this first version of criteria for the energy use of bakeries.

As Nordic Ecolabelling sets an absolute limit value on energy use, this must be related to a relevant key ratio. This key ratio could be, for example, the size of the bakery or the amount of ingredients purchased, etc. Nordic Ecolabelling has chosen to use the key ratio "energy use per the bakery's total production (kWh/kg production)" because it is a simple way of comparing the energy use a different bakeries and it is relevant to all types of bakery.

The term "production" here refers to the bakery's total production of prime products manufactured. The bakery's total production has been chosen instead of bread production alone because no detailed information is available on the specific energy use

[46] Ibid

[47] Ibid

[48] GMO Compass. 2005. http://www.gmo-compass.org/eng/database/e-numbers/206.citric_acid.html (09.05.2012)

[49] Swedish Bread Institute. 2010. http://www.brodinstitutet.se/

of bakeries per different types of product (bread, sweet bread/patisserie products, etc.). Limiting the product group, whereby over half of the production must be bread, ensures that the energy limit value is relevant for bread.

In general published information on energy use in bakeries is limited. A consultancy report was commissioned in drawing up the criteria[50] in order to obtain data on energy use. The report was based on a questionnaire sent to some bakeries in Finland, Sweden and Norway and also on information from previous energy surveys. The description of the bakeries' energy use below is largely based on the results of this consultancy report and other information gathered while work was in progress.

Requirement on description of energy use in the bakery (O9)

Background to the requirement

As described above, the data available on the energy use of bakeries is limited. Therefore it is important to set requirements that ensure that information is gathered to correctly document the energy requirements and which can also be used in future revisions of the criteria. To gather more information a requirement is set that the bakery must report its energy use (O9).

Requirement text in the criteria document

O9 Description of energy use in the bakery

The bakery must report the total energy use of the bakery

- Total energy use per year divided into different energy sources (electricity, oil, gas, district heating/district cooling, etc.)
- If possible, divided into different purposes of use (e.g. baking, ovens, freezing, ventilation, heating, lighting, café operations) and different types of products (e.g. bread, sweet bread, pastries , cakes, etc.)
- How energy use is monitored (in total, per production premises or sub-processes, by hourly metering or daily/monthly/annually)
- Whether energy use has been analysed (when)
- Whether there is an energy recycling system in use (heat recycling of process heating/ventilation air, etc.)

☒ Account of energy use in the bakery as above.

Requirement on the energy use of bakeries (O10)

Background to the requirement

The Nordic Ecolabel's energy requirement covers absolute requirements on the bakery's energy use (O10). In addition to the obligatory limit value on energy, a points score requirement has also been introduced (P2) which rewards those bakeries whose energy

[50] Pöyry 2012. Energy use in the bakery. Consultancy report for Nordic Ecolabelling (confidential report).

use is low compared to the limit value. The idea is that the points requirement for energy will be heavily weighted in assessing the environmental performance of the bakery. The maximum total of points that the bakery can score for energy is 11.

According to Nordic Ecolabelling's energy guidelines, energy requirements must primarily focus on energy use. The idea is that the energy efficiency requirement is to ensure that only the products and companies that perform best in terms of energy can be ecolabelled.

Energy use in the bakery is primarily due to ovens (35-45% of total energy use)[51] [52] [53]. The bakeries also need energy for the various baking processes (kneading dough, refrigeration, freezing, etc.). Energy is also used to heat the property, for lighting and ventilation, etc. The energy is used in the form of electricity and/or fuel, depending on the type of ovens the bakery has and the processes used to make steam and heat. The energy source used by the ovens is usually electricity, gas or oil.

According to Nordic Ecolabelling's consultancy survey, it is possible to obtain information on the total energy use of bakeries based on metering and invoicing of electricity and fuel. In some cases the specific measured energy use of the ovens was reported. In general, however, detailed information is not available on the specific energy use of the bakery per production line, sub-processes (such as kneading, refrigeration/freezing) or for different types of products.

According to data gathered during this work, total energy use in the bakeries varies between 0.54 and 5.4 kWh/kg product, on average 1-2 kWh/kg product[54,55,56,57,58,59,60]. Therefore it is proposed that in the first version of the criteria, a limit value is set for the bakery's total energy use per 1.5 kWh/kg production. The actual energy use of the business must be compared with the limit value. The applicant must therefore be able to report their actual energy use over a complete year and relate this to the total production of the bakery.

---

[51] Motiva 2009. Energianeuvontamateriaalia energiateollisuudelle (Energy advice material for the energy industry).

[52] Pöyry 2012. Energy use in the bakery. Consultancy report for Nordic Ecolabelling (confidential report).

[53] Nepas 2007. Store energipotensialer i næringsmiddelindustrien. Energieffektivisering i næringsmiddelindustrien– en potensialstudie. (Greater energy potential in the food industry. Energy efficiency in the food industry – a study of potential) Enova report 2007:6.

[54] Pöyry 2012. Energy use in the bakery. Consultancy report for Nordic Ecolabelling (confidential report).

[55] Enova 2011 https://industrinettverk.enova.no/reports/BenchmarkAnalysisIndustry.aspx?Bransje=f026c62c-d66c-4b85-9c07-46064340cd50

[56] http://www.vaasan.com/portal/fi/vaasan-konserni/yritysvastuu/

[57] http://www.polarbrod.se/Miljoredovisning.pdf

[58] Saarinen, M., Katajajuuri, J-M, Pulkkinen, H. & Thun, R., Lorentzon, K & Berlin, J. Life cycle Screening of Environmental Impacts of Bread. Background study for Nordic Ecolabelling. MTT report.

[59] VTT 1982. Leipomoiden energiansäästöopas. (Energy saving guide for bakeries) Publications 84.

[60] SIND 1979. Energiekonomi i bagerier. En skrift om energihushållning och driftsekonomi. (Energy economy in bakeries. A paper on energy management and operational finances) Statens Industriverk.

The limit value is a way of ensuring that bakeries whose energy use is clearly higher than the average of the bakeries studied cannot be Nordic Ecolabelled. The limit value for energy and the ability to set specific required limits for different types of product will be examined in the next revision of the criteria.

Energy use at the bakery covers energy used in production (the baking process, ovens, refrigeration, freezing, etc.) and in the property (lighting, ventilation, heating, etc.). In order to place different bakeries on a level playing field, the bakery is able to use metering equipment or separate invoices to separate out any specific uses such that these are not included in the calculation. One example of this is washing returned plastic trays. A bakery which has washing lines for washing its own returned plastic trays, and possibly those of other bakeries, will use more energy than bakeries which pack their bread in cardboard trays. This opportunity places bakeries which wash their own trays on an equal footing with bakeries which pack the bread in cardboard trays or use an external washing service. In the same way a frozen storage facility can be discounted, in order to place the bakery on an equal footing with bakeries which contract external frozen storage. Freezing which is part of the bakery's production line cannot be ignored.

A separate formula to calculate the bakery's total energy use has been introduced for bakeries that manufacture bake-off products. Bake-off products are products that are completely or partly baked and frozen, and subsequently quickly defrosted and baked off at point of sale/by the consumer. From a life cycle perspective, bake-off products use more energy than traditional bakeries due to freezing, storage and baking off.[61] [62]. For the bakeries that manufacture bake-off products a factor (times 2) is added to take into account the fact that the product is not finally baked when it leaves the bakery (i.e. bake-off products receive an energy penalty in order to place ready baked and semi-finished products on an equal footing). Alternatively, the actual energy use for the production of bake-off bread in the bakery and actual energy use for baking off bake-off bread at the bake-off site is used. The absolute limit value for energy use is the same as for bakeries that do not manufacture bake-off products i.e. energy use may not exceed 1.5 kWh per kg production. If the bake-off bread is to be Nordic Ecolabelled, a separate energy requirement O19 has been introduced (see section 8 for more detail).

Appendix 5 to the criteria shows how the calculations should be carried out and also provides heat values for different fuels.

Requirement text in the criteria document

O10 Energy use

Total energy use in the bakery calculated as purchased energy may not exceed 1.50 kWh per kg production.

For a definition of production, see Terms and definitions.

If the bakery, using metering equipment or separate invoices, can separate out energy use for the following processes/areas, these are not included in the calculation:

- washing returned plastic trays

[61] Swedish Bread Institute. 2010. http://www.brodinstitutet.se/

[62] http://eu-freshbake.eu/eufreshbake/FRESHBAKE-GUIDE%20GOOD%20PRACTICE-V-1-4th%20jan10.pdf

- shops and cafés in conjunction with the bakery
- office premises in conjunction with the bakery
- frozen storage at the bakery

For the bakeries that manufacture bake-off products (which are not Nordic Ecolabelled) a factor (times 2) is introduced which takes into account the fact that bake-off products are not completely baked when they leave the bakery. The energy calculation formula

$$E_{BOB} = E_B * ((1 * B_K) + (2 * BO_A))$$

where

E_{BOB} = Energy use in a bakery that manufactures bake-off products (kWh/kg production)

E_B = Actual energy use in the bakery (kWh/kg production)

B_K = Proportion of non bake-off products in the bakery's total production

BO_A = Proportion of bake-off products in the bakery's total production

Alternatively, the actual energy use for the production of bake-off bread in the bakery and actual energy use for baking off bake-off bread at the bake-off site is used.

See separate energy requirement O19 which concerns Nordic Ecolabelled bake-off bread.

✉ Account of the bakery's energy use (e.g. with invoices) in relation to the bakery's production (kWh per kg production). The starting values used for the calculation must be clearly shown. The calculations must be carried out and documented as in Appendix 5.

P2 Points for energy use

Points are scored if the total energy use of the bakery is lower than set out in requirement O11.

Energy use is a maximum 0.50 kWh/kg production: 5 points

Energy use is between 0.51 – 0.75 kWh/kg production: 4 points

Energy use is between 0.76 – 1.00 kWh/kg production: 3 points

Energy use is between 1.01 – 1.25 kWh/kg production: 2 points

Energy use is between 1.26 – 1.49 kWh/kg production: 1 point

✉ Account of the bakery's energy use (e.g. with invoices) in relation to the bakery's production (kWh per kg production). The calculations must be carried out and documented as in Appendix 5.

Requirement on control of energy use (P3)

Background to the requirement

In addition to the requirements on the bakeries' energy use, the Nordic Ecolabel's energy requirements include points score requirements which reward bakeries that have taken

steps to improve energy efficiency (P3). These measures are energy analysis, plus recycling heat from the various steps of the process and ventilation air. These are the measures identified as the most important in energy surveys[63] [64]. Metering energy use in the various stages of the process makes it easier to focus on the measures which are as effective as possible.

The energy efficiency of bakeries primarily depends on the plant and the process[65]. There is an opportunity to reduce energy use in bakeries, primarily by using the ovens as efficiently as possible and by recycling heat from ovens and other steps of the process. There are also many other potential energy savings. Optimising compressed air, efficient use of ventilation and lighting control are also important in reducing bakeries' use of electricity.

The bakeries can also save energy by replacing old ovens with newer technology. Replacing ovens does involve a major investment, however, in an industry facing tough competition, small margins and where many companies are small and medium-sized businesses and consequently have limited resources to invest. It is not unusual for the bakery's ovens to be 30-40 years old.

Requirement text in the criteria document

P3 Control of energy use (max. 4 points)

Survey of energy use by an energy expert independent of the business: 2 points

The survey must set out the total consumption of heating, fuel and electricity. The survey must also include suggestions for measures, e.g. potential savings and potential costs plus a plan for improving energy efficiency with annually measurable targets. The report must at least contain information from the most energy-intensive activities, e.g. ovens, ventilation and extractor fans, lighting and electronic equipment. The survey may not be more than 5 years old.

Measuring of the sub-processes in the bakery 0.5 points per meter (max. 1)

The bakery measures and accounts for a clearly delimited part of the bakery's energy use such as ovens, refrigeration/freezing facilities, heating and ventilation.

The bakery has an energy monitoring system for the parts measured: 0.5 points per part

(max. 1 point)

At least 30% of the process heating (calculated as kWh) is linked to heat recycling: 1 point

At least 50% of the ventilation (calculated on the basis of air flow) is linked to heat recycling: 1 point

Other energy efficiency arrangements have been introduced that have reduced energy use, e.g. lighting control, optimising compressed air: 0.5 points

---

[63] Pöyry 2012. Energy use in the bakery. Consultancy report for Nordic Ecolabelling (confidential report).

[64] Motiva 2009. Energianeuvontamateriaalia energiateollisuudelle (Energy advice material for the energy industry).

[65] Nepas 2007. Store energipotensialer i næringsmiddelindustrien. Energieffektivisering i næringsmiddelindustrien– en potensialstudie. (Greater energy potential in the food industry. Energy efficiency in the food industry – a study of potential) Enova report 2007:6.

✉ Account of the metering, energy monitoring systems, energy surveys and measures carried out. Copy of energy survey carried out. The business must be able to show that relevant measures have been carried out or are planned. See also O9.

☺ The requirement is partly checked on site.

Requirement on refrigerants (P4)

Background to the requirement
The motivation for the requirement regarding refrigerants is that there is a clear link between the refrigerant used and the greenhouse effect and depletion of the ozone layer. Although progress has been made in legislation in this field and the refrigerants that lead to the worst greenhouse effect have now been banned, it continues to be worth rewarding the use of refrigerants with a low greenhouse effect. For this reason a points score requirement has been introduced (P4) which awards points depending on the refrigerant used in the refrigeration and freezing system. Refrigerants with a low global warming potential (GWP) and ozone depletion potential (ODP) have a low environmental impact and reduce the potential risk of the refrigerant leaching out. For further information about GWP and ODP-factors, see the section on transport/requirement P9 on refrigerants in refrigerated and freezer vehicles.

Requirement text in the criteria document

P4 Refrigerants (max. 2 points)

The refrigerant in refrigeration and freezing equipment has a global warming potential (GWP) factor of a maximum of 1 and ozone depletion potential (ODP) factor of 0: 2 points

More than 50% by weight of refrigerants in the refrigeration and freezing facilities has a GWP factor of a maximum of 1 and an ODP factor of 0: 1 point

The refrigerant in the refrigeration and freezing facilities has a GWP factor of a maximum of 5 and an ODP factor of 0: 0.5 points

No refrigerants are used: 2 points

For a definition of GWP and ODP, see Terms and definitions.

✉ Account of types and amounts of refrigerants. Appendix 7 can be used.

7.4 Waste management

Nordic Ecolabelling's requirement regarding waste seeks to minimise amounts of waste. The waste that arises must be sorted to facilitate reuse and recycling. The background to the move towards sorting into several fractions is motivated by the EU's Waste Framework Directive (2008/98/EC).

The Nordic Ecolabel's requirement on the waste arising in bakeries covers an obligatory requirement and points score requirements. The bakery can score a total of 4 points on the waste requirements.

Requirement for a waste plan (O11)

Background to the requirement

The obligatory requirement states that the bakery must report a waste plan (O12) to facilitate sorting and satisfactory disposal. The bakery must report its waste fractions and amounts, how the waste is sorted and subsequently managed.

Requirement text in the criteria document

O11 Waste plan

The bakery must have a plan for sorting waste and for handling waste fractions.

✉ Account of waste fractions and how waste fractions are managed.

☺ The requirement is partly checked on site.

Requirement on waste from production (P5)

Background to the requirement

In addition to the obligatory requirement on waste, a points score requirement (P5) is also introduced, which rewards bakeries with a low amount of organic waste.

Waste is organic waste arising in the bakery in the form of flour, dough and bread and which constitutes a significant part of the bakery's total amount of waste[66,67,68]. Bread returned from stores and other points of sale is not included in the amount of waste in these criteria, because bakeries have poor steerability over amounts of bread returned. The extent to which the bakeries receive returned bread also depends on their location and contracts with retailers.

Other waste fractions do not play as large a role compared with organic waste at the bakery. Therefore the Nordic Ecolabel's requirement primarily focuses on minimising organic waste and on treatment methods that are the best from an environmental standpoint.

According to the bakeries contacted while work was in progress, organic waste in the form of rejected products, dough and baked end products in the bakery amounts to approximately 5-6% of the bakery's total production. Nordic Ecolabelling wishes to reward the bakeries that minimise the amount of waste compared with average bakeries (requirement P5). The purpose is to steer behaviour so that as little waste as possible is caused. The amount of organic waste is related to the total production of the bakery .

Requirement text in the criteria document

P5 Waste from production

Points are awarded if waste from production is less than 4.5% of the bakery's production

---

[66] http://www.fazer.com/fi/Yritysvastuu/Yritysvastuun-osa-alueet/Vastuu-ymparistosta/Nollajate/

[67] http://www.polarbrod.se/Miljoredovisning.pdf

[68] http://www.vaasan.com/portal/fi/vaasan-konserni/

The proportion of waste is a maximum of 2.0%: 2 points

The proportion of waste is 2.1% - 3.0%: 1.5 points

The proportion of waste is 3.1% - 4.5%: 1 point

For a definition of waste and production, see Terms and definitions.

✉ Summary of the amount of waste from production. The proportion of waste is calculated in relation to the total annual production of the bakery.

Requirement on management of organic waste (P6)

Background to the requirement

The bakery can also score points (P6) depending on how they handle organic waste and waste products. According to the EU's waste management hierarchy [69] prevention of waste is the top step in the waste hierarchy, followed by reuse if possible, and then followed by recycling. Recycling can be done by recycling the material or recovering the energy or incorporating the nutrients into an ecocycle. Recycling methods, for example, include various biological treatment methods such as composting, and incineration with energy recovery in specially adapted incineration plants.

In general waste management varies depending on the type of waste concerned and on the basis of local and geographical conditions (e.g. traditional treatment methods in the different Nordic countries). From an environmental point of view the choice of treatment method depends on how the waste is used, in other words which raw materials or energy sources are replaced by the use of the waste. This means that there is no single solution which can be seen as being better in general terms when choosing a management method[70].

Nordic Ecolabelling has chosen to award points to to the bakeries that sort organic waste (e.g. in the form of bread waste) to be reused in other production, e.g. as animal feed (requirement P6). This is a good way of minimising the amount of waste and of returning nutrients taking the ecocycle into account.

Recently new methods such as the production of second-generation biofuels, for example, have[71] entered the picture. Examples include ethanol production from waste products from the food industry[72] and biogas production from waste food through composting[73,74]. Composting is the microbiological breaking down of organic materials in an oxygen-free environment[75]. The biogas created in the process mainly comprises methane and carbon dioxide. The energy rich component in biogas is methane, and biogas therefore has roughly the same characteristics as natural gas. Biogas can be used as

---

[69] the EU's Waste Framework Directive (2008/98/EC)

[70] http://www.avfallsverige.se/

[71] Second generation biofuels are produced from raw materials which are not used for human consumption or animal feed, e.g. waste and waste products.

[72] http://www.st1.fi/index.php?id=5806

[73] http://www.fordonsgas.se/Svenska/Om_gas/Vara_produkter

[74] http://www.gasum.fi/tuotteet/biokaasu/Sivut/BiokaasuaKouvolasta.aspx

[75] http://www.avfallsverige.se/

a vehicle fuel, for example. Other areas of use are electricity and heat production. The use of biogas instead of fossil energy sources helps to reduce the net emissions of greenhouse gases in the atmosphere. When these methods above are combined with subsequent composting, nutrients and energy are extracted, providing greater environmental benefits. For this reason, 2 points are awarded if the organic waste is sorted and if it is sent for biofuel production, i.e. where the waste is recycled as materials and as energy.

According to the same logic, a bakery which sorts out its organic waste for biological treatment, e.g. compost, scores one point because here the material is recycled but not the energy. Composting is nature's own method of breaking down organic waste using oxygen and microorganisms, primarily bacteria and fungi[76]. Compost is a fertiliser with a long-term effect and is therefore most often used as a soil improver in gardens, parks and in land improvement.

Direct incineration of organic waste in incineration plants does not score points because Nordic Ecolabelling considers that better recycling methods are available.

Requirement text in the criteria document

P6 Management of organic waste (max. 2 points)

The bakery separates organic waste which goes for biofuel production (biogas, ethanol etc.) or is used as animal feed: 2 points

The organic waste goes to other biological treatment, e.g. compost: 1 point

In this document no points are awarded for incineration of organic waste in incineration plants.

✉ Reporting sorting for processing.

7.5 Transport

Transport is part of the life cycle of the majority of products. This is also true of bread. Ingredients are transported to the bakery, sometimes over long distances. From the bakery the finished and semi-finished products are distributed out to the market. Some bakeries have a limited local market, while others are producing products for national and international markets. This means that the distribution systems may vary considerably from one bakery to the next.

As shown by section 5 on relevance, potential and steerability, transport in the life cycle of a bread product is of less importance in terms of its total environmental impact. Life cycle analyses of products in general also show this is often the case, also for products transported over long distances. The exception in this product group is bread products with a need for refrigeration or freezing in the distribution phase or products which need to be subsequently baked (bake-off bread) at home by the consumer. Life cycle analyses show that energy use increases substantially for these products [77].

[76] http://www.avfallsverige.se/

[77] Swedish Bread Institute. 2010. Attp://www.brodinstitutet.se/

The results of the RPS analysis of the importance of the transport phase in a life cycle perspective is reflected in the transport requirements set for Nordic Ecolabelled bakeries. The scope is less than the requirements set for other parts of the life cycle and all the requirements are points-based.

Transport of ingredients to the bakery

A bakery receives a number of different ingredients and in the majority of cases the ingredient supplier is responsible for the transport, or this may be carried out by a subcontractor. Transport is largely by road. Part of the route of some ingredients is by rail/sea. The bakeries have limited steerability in terms of the way their ingredients are transported. In this first version of a criteria document for bakeries and bread it is important that the requirements focus on the parts of the bread's life cycle in which the relevance, potential and steerability of the environmental requirements is greatest. For this reason these criteria only set requirements for the transport of products leaving the bakery.

Transport of finished/semi-finished products from the bakery to sale

It varies from bakery to bakery whether they own the vehicles that transport their goods or whether they use contractors for transport. Where bakeries use subcontractors, their steerability is less than if the bakery itself is responsible for transport. However, in most cases, the bakeries have an opportunity to influence their subcontractors through the procurement process. This steerability tends to be greater the larger the bakery is.

The negative environmental consequences associated with transport are exhaust emissions, which can impact on the greenhouse effect, and emissions of toxic compounds and particles. It is the combination of the vehicle and the fuel that together determine how high the emissions are. The transporters themselves are able to affect the vehicle's fuel consumption by driving efficiently. Nordic Ecolabelling wants to reward actions that are documented to result in lower emissions.

Requirement on Euronorm vehicles (P7)

Background to the requirement

The European Emissions Standards define acceptable limits for emissions of pollutants in the exhaust of new vehicles sold in the EU. The limit values cover levels for NOx, HC, CO and for particles. The standards are constantly being tightened up. Today all heavy vehicles sold must meet the requirements of Euronorm level 5[78]. However, transporters cannot be expected to have a large proportion of vehicles which fulfil this criterion at the current time. For a long time ahead vehicles will be used which only comply with the lower requirements of the standard.

Requirement text in the criteria document

[78] Website Wikipedia: http://en.wikipedia.org/wiki/European_emission_standards, 09.10.12

P7 Euronorm - vehicles (max. 2 points)

The bakery's 3 largest transporters or the transporters that cover more than 70% of the bakery's goods transporters have more than 50% vehicles that meet Euronorm 5: 2 points

The bakery's 2 largest transporters or the transporters that cover more than 30% of the bakery's goods transporters have more than 30% vehicles that meet Euronorm 5: 1 point

Transport concerns goods from the bakery, via a warehouse to stores, measured as volume or weight transported.

✉ List of the bakery's transporters

✉ Declaration from transporters on the proportion of vehicles that meet Euronorm 5.

Requirement on vehicle fuel (P8)

Background to the requirement

A trend can be seen towards increased use of renewable fuels in the transport sector. Renewable fuels are mainly used as low blends in traditional petrol and diesel products but there are also high blend products such as biogas mixed with CNG, and petrol mixed with ethanol. The move towards greater use of renewable fuels is not unambiguously positive. Attention has been drawn to several examples of products which cannot be called sustainable either because they have higher emissions of climate gases from a life cycle perspective than conventional fuels or because they demand more resources in other ways.

Nordic Ecolabelling has developed criteria for renewable fuels. Nordic Ecolabelled fuel guarantees that the product is sustainable, but availability is still low. Therefore this first version of the criteria does not set an obligatory requirement for the use of Nordic Ecolabelled fuel, but instead sets a points score requirement which rewards its use.

Electricity is only an energy carrier Whether or not it is a sustainable product depends on how it is produced. However high the emissions are from the production of electricity, it has the advantage that its use eliminates local emissions. For this reason using electric vehicles is a good way of distributing goods in densely populated areas and over short distances.

Requirement text in the criteria document

P8 Vehicle fuel (max. 2 points)

At least 40% of the bakery's production is transported with vehicles that run on Nordic Ecolabelled fuel: 2 points

At least 30% of the bakery's production is transported in electric vehicles: 1 point

At least 20% of the bakery's production is transported with vehicles that run on Nordic Ecolabelled fuel: 1 point

✉ The bakery's summary of vehicles and types of fuel or declarations from transport companies verifying the requirement.

Requirement on refrigerants in refrigerated and freezer vehicles (P9)

Background to the requirement

The old and traditional refrigerants such as CFCs and HCFCs had major negative consequences for the climate and the ozone layer. The concept GWP (global warming potential) and the measurement unit CO_2 equivalents is used to measure the effect on the climate of individual refrigerants. The measurement unit describes how many kg CO_2 one (1) kg of the refrigerant in question is equivalent to. The concept ODP (ozone depletion potential) is used as a measurement of the effect of the refrigerant in question on depletion of the ozone layer. The reference value for ODP is the refrigerant CFC11 which has an ODP value of 1.

Refrigerants of the CFC type have been phased out, while HCFCs are in the process of being phased out. Both of these have been replaced by HFCs. In addition the use of refrigerants such as CO_2 and ammonia is increasing which have considerably lower GWP and OPD values than the traditional refrigerants[79]. Nordic Ecolabelling wants to reward the use of refrigerants with a GWP value equal to 1 and an OPD value equal to 0. It is likely that these refrigerants are not common in transport vehicles but Nordic Ecolabelling wishes to reward those transporters who are ahead of the field on green initiatives.

Requirement text in the criteria document

P9 Refrigerants in refrigerated and freezer vehicles (max. 0.5 points)

One of the bakery's three largest transporters for refrigerated or frozen goods uses at least 95% refrigerants with a global warming potential (GWP) of 1 and an ozone depletion potential (ODP) of 0: 0.5 points

No refrigeration/freezing is required in transporting the bakery's products: 0.5 points

Transport concerns goods from the bakery, via a warehouse to stores, measured as volume or weight transported.

✉ List of the bakery's transporters for refrigerated and frozen goods.

✉ Declaration on refrigerants used from transporters of frozen and refrigerated goods.

Requirement on courses in EcoDriving (P10)

Background to the requirement

Eco-driving is about adapting the driving style to the engine technology and traffic situation in question. Following the rules for optimum driving can considerably reduce fuel consumption [80]. A course in correct driving techniques is the easiest way of reducing

[79] Greenpeace website: http://www.greenpeace.org/international/Global/international/planet-2/report/2009/5/natural-refigerants.pdf, 09.10.12

[80] Ecodriving Finland Website: www.ecodriving.com, 09.10.12

fuel consumption. In addition the rules for optimal driving also cause a reduction in the number of accidents and road noise.

Eco-driving is about driving as steadily as possible without violent braking/acceleration. The rules are simple to follow, but without professional guidance it can be difficult for experienced drivers with many years behind the wheel to change their driving patterns.

Estimates of the saving potential of completing an EcoDriving course vary. Some sources give figures between 5% and 10%. Others state that fuel consumption can be reduced by 20%[81]. However, the reduction in fuel consumption is considerable and therefore Nordic Ecolabelling has chosen to set a points score requirement for attending a course in EcoDriving. To ensure the quality of the course, reference is made to the course model developed in Finland, which is patented and called EcoDriving.

Requirement text in the criteria document

P10 Courses in EcoDriving

More than 20% of the bakery's own or external drivers have completed a certified course in EcoDriving: 1 point

10% of the bakery's own or external drivers have completed a certified course in EcoDriving: 0.5 points

The transporter annually monitors the rules for EcoDriving by means of a course or by checking fuel consumption per driver: 0.5 points

When monitoring EcoDriving courses, at least 75% of the bakery's drivers should have taken part.

✉ Certificate from an EcoDriving course or equivalent showing that the course was completed.

✉ Procedures that show that a follow-up course has been completed or that fuel consumption has been monitored annually.

7.6 Chemicals – cleaning products, dishwashing and laundry

Due to the special conditions in the bakery industry, cleaning methods differ from those in dairies or meat processing, for example. The use of chemicals in bakeries is on average considerably lower than in meat processing, for example. The bakeries which wash their own plastic trays naturally use a considerably larger amount of cleaning chemicals than those that do not.

In the actual production of bakery products, water should be avoided as far as possible in cleaning in order to prevent microbial growth. Dry cleaning methods such as vacuuming, dry mopping and sweeping are therefore typical. Previously a large amount of compressed air was used but now the aim is to avoid this due to the spreading of mould spores.

[81] Website of the Swedish Association of Driving Schools: http://www.str.se/Miljo/Ecodriving/Korsatt/, 09.10.12

Different types of cleaning chemicals are used regularly in daily cleaning, for disinfection and the pest control (biocides). Disinfected detergent is something which Nordic Ecolabelling cannot influence because this infection is necessary and is required under food legislation for safety reasons.

Cleaning products

Bakeries are encouraged to choose ecolabelled cleaning products for general cleaning. General cleaning products used in the baking industry are generally the same kind of cleaning products used in all professional cleaning.

Cleaning of food premises is carried out in accordance with the cleaning plan which is part of the own checks demanded by the authorities. According to the cleaning plan, material safety data sheets for all cleaning products must be available, for example.

Dishwashing

A small amount of washing of various pieces of equipment takes place in a bakery, but the majority involves washing plastic trays, if the bakery uses these and has its own washing equipment for the purpose. The environmental impact of this washing equipment for plastic trays will be examined in the next revision.

Washing workwear

Workwear in bakeries is changed frequently and either washed internally or by a laundry. Points are awarded for the use of Nordic Ecolabelled laundries.

Disinfectants

Different types of disinfectants are used in bakeries, both in the production premises and in, for example, premises for storing and managing waste. Legislation requires that staff disinfect their hands on entering the production premises. Disinfectants can also be used in office premises in small amounts, e.g. in epidemic situations. Disinfectants are typically based on alcohol, reactive chlorine compounds or peracetic acid. One reason for unnecessary use of disinfectants is that mechanical cleaning of floor drains, for example is often poorly carried out. Solid dirt which collectives in drains is a good breeding ground for many harmful insects.

Some parts of the production equipment (e.g. pipe systems and spirals) can become contaminated and are therefore cleaned using products which contain reactive chlorine as a disinfecting component.

Pest control

Pests such as flour beetles, mice, rats, cockroaches and birds can spread infection in bakeries. Salmonella can be spread through bird droppings, for example. The premises must be built in a preventive manner, but even so action is sometimes required. In most cases pests are controlled on an annual schedule, and visits are planned in advance because the premises to be treated must be empty. Typically pest control visits take place four times a year in large bakeries. Where necessary visits are made more often.

Biocides are regulated under Directive 98/8/EC of the European Parliament and of the Council concerning the placing of biocidal products on the market. This means that even pesticides which can be used for pest control must be approved by the authorities before

they can be sold, used, imported and stored in the EU countries, Norway and Switzerland.

The biocide products themselves are approved separately in each Member State and the active substances included in these products are approved at Community level. The Commission maintains lists of permitted active substances in Annex I and Annex IA of the Biocidal Products Directive.

According to suppliers, in principle only three active substances are used in pest control products in bakeries. These are pyrethrin, deltamethrin and permethrin, which are used against insects. Rodents such as rats and mice are ideally tackled out of doors.

There are no requirements on pest control in these criteria because the regulatory requirements are sufficient.

Reactive chlorine compounds (O12)

Background to the requirement

Chlorine compounds in cleaning products can be corrosive, such as hypochlorite, or harmful to the environment, such as dichloroisocyanurates. Sodium hypochlorite is hazardous to health and skin contact and if eaten, and poisonous to aquatic organisms. Chemical compounds which contain active chlorine can form organochlorides, which are dangerous, at high temperatures and high dirt levels. Organochlorides can also be formed in the drainage system. These can be poisonous, hard to break down and bioaccumulable. Alternative chemicals, which are less harmful to the environment, are available today. The use of active chlorine compounds is prohibited in Nordic Ecolabelled bakeries. Exceptions are made if the authorities require the use of such products for hygiene reasons

Requirement text in the criteria document

O12 Reactive chlorine compounds

Reactive chlorine compounds (such as chlorine) may not be used for cleaning, with the exception of cleaning where the authorities recommend the use of disinfectant.

✉ Declaration that reactive chlorine compounds are not used for cleaning in the bakery.

Requirements regarding cleaning, dishwashing and laundry chemicals (O13)

Background to the requirement

Reducing the environmental impact of chemicals is a priority area for Nordic Ecolabelling. Therefore an obligatory requirement is set that a large proportion of cleaning chemicals must be ecolabelled. Because the requirement is linked to availability, Nordic Ecolabelling wants to set the requirement at 70% of use (calculated based on the total amount of cleaning, dishwashing and laundry chemicals). In addition Nordic Ecolabelling wishes to use points score requirements to encourage further reductions in the environmental impact of chemicals and to draw attention to the volumes used.

Requirement text in the criteria document

O13 Cleaning, dishwashing and laundry chemicals

70% of the bakery's cleaning, dishwashing and laundry chemicals calculated in kg or litres, must be ecolabelled with the Nordic Ecolabel or the EU Ecolabel.

The requirement covers the following areas of use at the bakery:

- floor cleaning
- sanitary cleaning
- general cleaning
- dishwashing
- washing plastic trays
- washing workwear

Exception: Chemical products for special cleaning are not included in the requirement (e.g. drain cleaner, grease removal, oven cleaning, disinfectant)

✉ Lists and safety data sheets of all cleaning products covered by the requirement.

✉ Total amount (kg or litres) of chemicals and proportion of ecolabelled products. Licence number of ecolabelled products.

✉ "Ecolabelled" here means products labelled with the Nordic Ecolabel or the EU Ecolabel.

P11 Score for ecolabelled chemical products

At least 80% of cleaning, dishwashing and washing chemicals are ecolabelled: 1 point

At least 95% of cleaning, dishwashing and washing chemicals are ecolabelled: 2 point

✉ Documentation is provided in O13.

7.7 Ecolabelled products and services

Use of ecolabelled products and services (P12)

Background to the requirement

In striving to reduce environmental impact in the life cycle of bread, Nordic Ecolabelling seeks to encourage greater use of products labelled with the Nordic Ecolabel and the EU Ecolabel. Another important reason is that ecolabelling increases awareness of the environment and environmental priorities generally. The bakery scores up to 3 points for using various ecolabelled products and services.

Requirement text in the criteria document

P12 Use of ecolabelled products or services (max. 3 points)

"Ecolabelled" here means products/services labelled with the Nordic Ecolabel or the EU Ecolabel.

Products	
At least 90% of tissue/toilet paper is ecolabelled	0.5 points
At least 90% of fabric towel reels are ecolabelled	0.5 points
100% of hand/shower soap is ecolabelled	0.5 points
At least 90% of copying paper is ecolabelled	0.5 points
At least one set of bought-in workwear for staff is ecolabelled	0.5 points
At least 90% of the cloths and mops used are ecolabelled	0.5 points
At least 20% of bought-in car tyres are ecolabelled	0.5 points
Other ecolabelled goods, following approval from Nordic Ecolabelling	0.5 points
Services	
At least 90% of external laundry services bought in are ecolabelled	0.5 points
At least 50% of purchased car washing is ecolabelled	0.5 points
At least 50% of purchased cleaning services is ecolabelled	0.5 points
At least 90% of printed materials ordered from printers are ecolabelled	0.5 points
Other ecolabelled services, following approval from Nordic Ecolabelling	0.5 points

✉ Summary of products and services and licence number according to the table.

7.8 Packaging

Products such as bread that are sold in large volumes also involve large volumes of packaging material. Plastic bags made of polyethylene/ polypropylene are most common. Paper bags are also common and in recent years paper bags with various types of coatings and plastic windows have gained ground. The bread is packed in bags, sealed with a clip and then the bags are packed in corrugated cardboard boxes/plastic trays. The corrugated cardboard boxes/plastic trays are then stacked on top of each other on EU pallets and some large manufacturers then seal the pallets with plastic film.

Requirements on packaging (O14)

Background to requirement
Nordic Ecolabelling wants to make it possible to recycle or reuse the material in transport and sale packaging.

Halogenated plastics, PVC, are not a major problem in the bakery industry. Nordic Ecolabelling wants to make it possible to recycle or reuse the material in transport and sale packaging. However, PVC has been found to occur in clips and various labels, for example, and this requirement is included for that reason.

The most important problem areas for PVC are waste treatment, the use of additives and dioxin emissions, partly during manufacture. When manufacturing chlorine (the chloralkali process) and in the production of PVC small amount of dioxins can be formed and these are toxic. If the technology and safety at the production plant are good,

the Danish PVC Information Council considers that the majority of dioxin emissions are dealt with, but not all.[82] Dioxin emissions may be higher in less modern facilities[83].

PVC needs to be stabilised to withstand temperatures necessary for producing PVC products (e.g. production via extrusion). Stabilisers can be based on lead, metal mixtures (such as barium-zinc and calcium-zinc) or tin. The PVC industries in northern Europe have phased out lead in stabilisers and a plan has been drawn up to phase out lead Europe-wide by 2015. Between 2000 and 2009 the use of lead as a stabiliser had fallen by 68%[84]. It is now forbidden to use cadmium compounds to stabilise or dye plastics [85].

Approximately 50% of the chlorine ions in incineration plants in Europe comes from PVC. The greatest environmental problem that arises in incinerating PVC is emissions of dioxins and the waste that arises when neutralising the hydrogen chloride that is formed. Within the EU the Waste Directive (91/689/EC) sets limits for emissions of dioxins from incineration plants. In total the environmental impact from PVC production, use and waste treatment is falling but there are still major environmental problems associated with PVC.

Requirement text in the criteria document

O14 Packaging

Materials in transport and sales packaging must be able to be recycled or reused. The producer must describe the packaging.

Halogenated plastics must not be included in the primary packaging or its components such as clips, closures and labelling materials.

For a definition of primary packaging, see Terms and definitions

✉ Description of the packaging, its composition and how it is handled.

✉ Declaration from producers of primary packaging and its components that halogenated plastics are not included.

Requirement on coatings and impregnation (O15)

Background to the requirement

This requirement only applies if the bakery uses primary packaging that is coated/impregnated.

Coating and impregnation chemicals may not contain chromium or fluorine compounds. This is to prevent the spread of perfluorinated compounds such as PFAS (perfluoroalkyl sulfonates). PFAS is a term that covers different types of fluorinated compounds that are

[82] Danish PVC Information Council. http://www.pvc.dk/t2w_172.asp (22.03.2005).

[83] Life Cycle Assessment of PVC and of principal competing materials, EU Commission 2004, http://ec.europa.eu/environment/waste/studies/pvc/lca_study.htm

[84] Vinyl 2010, Progress Report
http://www.stabilisers.org/documents/Vinyl%202010%20Progress%20Report%202010.pdf

[85] http://www.kemi.se/templates/Page____3734.aspx

persistent and have the ability to bioaccumulate[86]. It has also been shown that different fluorinated compounds such as PFOS and PFOSA can migrate from paper and cardboard in contact with food. A study "Polyfluorinated surfactants (PFS) in paper and board coatings for food packaging" showed that DiPAPS and S-diPAPS (polyfluorinated alkylphosphates) migrated from paper and cardboard in contact with food in five out of 14 samples[87]. The requirement that coating and impregnation chemicals may not contain chromium compounds is due to the fact that chromium compounds are highly toxic, hard to break down and can accumulate in organisms to various degrees. Hexavalent chromium compounds are classified as very toxic to aquatic organisms. Trivalent chromium compounds are less toxic in general but individual species can also be particularly sensitive to these. Chromium compounds can cause undesired long-term effects in aquatic environments. Trivalent chromium can also become hexavalent chromium in certain special conditions. It is therefore not desirable for chromium to be released into any stage of the waste system.

The ban on the siloxanes octamethylcyclotetrasiloxane (D4) and decamethylcyclopentasiloxane (D5) in chemical products used for silicone treatment is due to the fact that siloxanes are hard to break down and have the ability to accumulate in the environment. Siloxanes are volatile and easily concentrate in sludge from waste water. A Nordic study found low levels in the environment but due to their low degradability, the impact of these compounds still gives cause for concern. Concentrations of these substances are mainly discovered close to sites where siloxanes are used industrially and close to population centres. A study carried out by the Norwegian Climate and Pollution Agency published in spring 2007 showed, however that D5 has also been found in seagulls on Bjørnøya. This shows that the substances can be spread over a wide area. D4 and D5 are the two siloxanes that give the greatest cause for concern. D4 is classified as harmful to the environment and "Possible risk of impaired fertility" (R62). D5 has been on the priority list of the Norwegian authorities since autumn 2006 (list of substances where the aim is reduced use and lower emissions).

Requirement text in the criteria document

O15 Coatings and impregnation

This requirement only applies to primary packaging that is coated/impregnated.

Coating and impregnation chemicals may not contain chromium or fluorine compounds.

Octamethylcyclotetrasiloxane, D4, (CAS 556-67-2) and decamethylcyclopentasiloxane, D5, (CAS 541-02-6) may not be included in chemical products used for silicone treatment of primary packaging of bakery products.

D4 and D5 which are included as pollutants are an exception to the requirement.

Primary packaging which is eco-labelled in accordance with Nordic Ecolabelled disposable items is considered to fulfil the requirement.

---

[86] Guo et al. "Alternative fluropolymers to avoid the challenges associated with perflourooctanoic acid". Ind. Eng. Chem. Res Vol. 47, no3, pp. 502-508 (2008)
[87] Environmental Performance Agreement ("Agreement") Respecting Perfluorinated Carboxylic Acids (PFCAs) and their Precursors in Perfluorochemical Products Sold in Canada. http://www.ec.gc.ca/epeepa/default.asp?lang=En&n=AE06B51E-1

✉ Declaration from the chemicals supplier that coating or impregnation chemicals do not contain chromium or fluorine compounds.

✉ Declaration from the chemicals supplier that octamethylcyclotetrasiloxane, D4 and decamethylcyclopentasiloxane, D5, are not included in the chemical products used for silicone treatment of components.

Requirement on packaging for bread sold loose by weight (P13)

Background to the requirement
For consumers to be able to transport their bread home hygienically, packaging is needed which surrounds the bread. The requirement for Nordic Ecolabelled (disposable) packaging has been drawn up so as to reward the best products from an environmental point of view. The packaging can be Nordic Ecolabelled according to the criteria for greaseproof paper or under disposable items for food.

Requirement text in the criteria document

P13 Packaging for bread sold loose by weight

All bread sold loose by weight is placed in Nordic Ecolabelled disposable packaging at point of sale: 1 point

✉ Description of the packaging and the licence number.

7.9 Working environment

Background to the requirements
Exposure to flour dust is an important working environment factor in bakeries.

In 2002 – 2003 the Swedish Work Environment Authority carried out a measuring project to survey exposure to flour dust in bakeries. In the project, measurements were taken at approximately 60 bakeries and from 197 bakery workers. 46% of personal measurements were above the hygienic limit value of 3 mg/m^3. This occupational group accounts for a dominant proportion of reported industrial injuries caused by asthma and other allergy symptoms[88].

Since the survey the industry has taken significant action to improve the situation, but flour dust is without doubt a very important parameter to monitor in working with health and safety at bakeries.

For this reason Nordic Ecolabelling wishes to set an obligatory requirement to control flour dust and to reward good initiatives to reduce exposure to flour dust by awarding points.

[88] Walding, M. 2003. Rapport över mjöldammsmätningar genomförda i samtliga distrikt inom Arbetsmiljöverket 2000-2003 (Report on flour dust measurements taken in all districts by the Swedish Work Environment Authority 2000-2003) Marianne Walding. Swedish Work Environment Authority.

The bakery can considerably affect levels of flour dust through different types of vacuum extraction, working procedures and limitation measures. The measures can involve everything from cleaning procedures to dividing the bakery into sections (large bakeries) or sealing in or installing vacuum equipment in sections of the process where dust arises (e.g. handling ingredients, rolling). The right ventilation system can have a major impact on reducing the spreading of dust. In all cases it is of great importance that there are procedures for regularly measuring dust levels in the bakery premises.

Requirement text in the criteria document

O16 Flour dust

The bakery has carried out an internal overview of the working environment focusing on dust exposure and allergy risks. The requirements of the authorities setting hygienic limit values for inhalable dust in production premises must be met.

The bakery must have procedures in place to reduce exposure to flour dust.

✉ Report on flour dust measurements carried out (measurement report enclosed) and procedures for minimising exposure. Any reports from the authorities on the working environment at the production site must be enclosed.

P14 Working environment, max. 3 points

- There is an external audit of the working environment and a report of planned and carried out follow-up work. The audit must at least include a general assessment of flour dust, chemical exposure, noise, ergonomics and heavy lifting. 2 points
- The bakery has its own working environment audit and accounts for follow-up work planned and carried out. The audit must at least include a general assessment of flour dust, chemical exposure, noise, ergonomics and heavy lifting: 1 point
- Lids, capsules and enclosing sections of the process (for example, making dough, rolling, cutting out) are used or vacuum systems or similar are fitted to limit the contents of flour dust and particles in the air: 1 point
- Procedures are in place for measuring flour dust when emptying ingredients, making dough and other elements of the process: 1 point
- The ventilation systems have infiltration air from the ceiling with vacuum extraction at floor level: 1 point
- The premises are divided into sections to reduce the risk of dust spreading 1 point

✉ Account of the working environment audit. Copy of the audit report. Description of procedures and measures.

8 Motivation behind the requirements for Nordic Ecolabelled bread

Nordic Ecolabelling sets specific requirements for Nordic Ecolabelled bread because Nordic Ecolabelling wishes to ensure that the Nordic Ecolabelled bread and bread products are the best of the bakery's products in environmental terms, so that the consumer can choose these.

Requirement O3 states that the bakery must have at least one Nordic Ecolabelled bread in production in its product range. The requirements in this chapter only apply to the bread that the bakery chooses to Nordic Ecolabel and not the bakery's total production.

Organic ingredients in Nordic Ecolabelled bread

The production of ingredients, particularly flour accounts for a dominant part of the environmental impact of bread and bakeries according to the MECO and RPS analyses. In the first generation of the criteria Nordic Ecolabelling is choosing to set a requirement that Nordic Ecolabelled bread contain a certain proportion of organic ingredients. No specific environmental requirements are set for conventionally grown ingredients in Nordic Ecolabelled bread. Requirements O8 (ban on GM-plants) and O4 (traceability to country of origin) set criteria for the conventionally grown cereal products used in a Nordic Ecolabelled bakery. This is because the bakery cannot have traceability at a sufficiently detailed level to set requirements for the growing of conventionally grown cereals.

Nordic Ecolabelling has chosen to set a relatively low absolute requirement (15%) for organic ingredients in Nordic Ecolabelled bread. The reason for this is that access to organic cereal is very limited, see Appendix 1 for more details. Information from the bakeries contacted confirms that this is a major obstacle to increased production of organic bread. In order, nevertheless, to stimulate increased production and consumption of organic ingredients in the longer term, Nordic Ecolabelling has chosen to initially set a realistic but quite low requirement to steer towards greater demand for organic bakery ingredients and thus increased organic cultivation. The aim is to evaluate the opportunities for increasing the requirement on organic ingredients in the next version of the criteria. Nordic Ecolabelling has evaluated different opportunities for stimulating organic cultivation by Nordic Ecolabelling bread. Meetings have been held with several of the organic organisations in the Nordic countries and with food agencies in an attempt to find the best method.

Nordic Ecolabelling judges that the best option in the current circumstances is to set the following requirement: at least 5% of the ingredients must be certified organic in the Nordic Ecolabelled bread's list of ingredients, and in total at least 15% of the ingredients in the Nordic Ecolabelled bread must be organic. The purpose of the requirement that at least 5% of ingredients must be organically certified is that this gives Nordic Ecolabelling an opportunity to highlight to consumers that the brand rewards organic ingredients. In other words, a least one ingredient in the Nordic Ecolabelled bread must be organic. This slightly complicated set up is due to the fact that legislation means it is not possible to write the word organic on the product packaging unless all the ingredients or the entire product is organic. It is only possible to market the product as organic if it is a certified organic product, i.e. a product which does not contain at least 95% organic ingredients cannot be marketed as organic or as containing organic ingredients. However, it is possible to state that there are organic ingredients in the list of ingredients of a product which is not organically certified through ingredient labelling:[89]. According to the ingredient labelling regulations, an organic ingredient may not be present together with the same ingredient in non-organic form or an ingredient originating from conversion. One consequence of this requirement may be that products based on only one ingredient

[89] Council Regulation (EC) No 834/2007, Article 23(4)(b).

(e.g. certain rye breads) may find it difficult to meet the requirement. Combining a low requirement for the organic proportion with the points score required if additional organic ingredients are used, means that bakeries gain a certain amount of freedom.

Requirement text in the criteria document

O17 Organic ingredients in Nordic Ecolabelled bread

The Nordic Ecolabelled bread must contain at least 15% certified organic ingredients by weight, of which:

1. at least 5% must be certified organic ingredients declared in the list of ingredients on the product's packaging. These ingredients must fulfil the regulatory requirements in Council Regulation (EC) No 834/2007 which means that a third party must check that these ingredients are organic.
2. The remainder of the ingredients in the list of ingredients must be organic such that the total proportion of certified organic ingredients in the bread is at least 15%.

Liquid added according to the recipe must not be included in the proportion of organic ingredients.

For a definition of ingredient labelling, see Terms and definitions.

✉ Documentation verifying that the amount of organic ingredients bought in matches the amounts used in the Nordic Ecolabelled bread. Recipes, list of ingredients and packaging text for the Nordic Ecolabelled bread.

✉ Audit report from an organic certification organisation verifying the organic ingredients stated on the ingredients label according to the requirements of Council Regulation (EC) No 834/2007.

P16 Score for production of Nordic Ecolabelled bread and a high proportion of organic ingredients (max. 7 points)

Points are awarded if the organic proportion of ingredients in the Nordic Ecolabelled bread is higher than in O17.

The following points are awarded for the production of Nordic Ecolabelled bread:

Proportion of Nordic Ecolabelled bread produced per year	Proportion of organic ingredients in Nordic Ecolabelled bread		
	15.5 – 50%	50 – 95%	>95%
< 10%	1	2	3
10 – 30%	2	3	4
30 – 50%	3	4	5
50 – 75%	4	5	6
>75%	5	6	7

✉ See O17. When several Nordic Ecolabelled breads are produced, the proportion of organic ingredients in Nordic Ecolabelled bread is calculated by a weighted annual average of the organic proportion of the amount of Nordic Ecolabelled bread produced. The annual average is based on the sales for the previous year of Nordic Ecolabelled bread or on forecast future annual sales.

Requirements for fat, salt, sugar and dietary fibre (O18)

Background to the requirement
Nordic Ecolabelling has chosen to set a requirement that only bread products that fulfil the criteria for Keyhole labelling can be Nordic Ecolabelled. The reason for this is that junk food or "unnecessary food" such as snacks, cakes, buns and pastries merely take ground away from more nutritious food because we are only able to eat a certain amount every day. Because the need for junk food is secondary and the environmental impact of its production is not justified, Nordic Ecolabelling chooses to set a requirement that the criteria of the Keyhole label must be met.

Nordic Ecolabelling has also decided that the fat contained in Nordic Ecolabelled bread must comply with the Keyhole label's criteria for oils and liquid margarines and edible fat blends. The requirement is set because saturated fat increases the amount of cholesterol in the blood, which in turn can increase the risk of cardiovascular disease. Unsaturated fat, on the other hand lowers cholesterol and blood and can so reduce the risk of these diseases.[90]

The Keyhole label aims to point consumers towards healthier foods. The Keyhole label has been used since June 2009 by the food agencies in Sweden, Norway and Denmark. The criteria are set jointly by the food agencies of the three countries.[91] The criteria for being able to label food with the Keyhole label include fibre and whole grain, fat and fat quality, sugar and salt. There is also a requirement that oil and/or other fat used in the products may contain a maximum total of 2 g industrially manufactured trans fatty acids per 100 g oil and/or fat. The Keyhole symbol can be used for 25 different groups of food and the conditions are different for different groups. As far as bread is concerned, there are separate rules for bread and crispbread. Only soft bread that is ready packaged can carry the Keyhole label. Using the Keyhole label on food is voluntary for food producers. If the label is used, it must follow the regulations of the respective Nordic country, e.g. in Sweden LIVSFS 2005:9 [92]. The Keyhole label is a self-declaration and is covered by public food controls. It is not necessary to undergo an application process, etc. in order to be able to use the Keyhole symbol.

The Keyhole requirements for soft bread are:

- at least 25% whole grain calculated on the dry matter of the product
- fat maximum 7 g/100 g
- sugars total maximum 5 g/100 g

---

[90] WHO. 2007. Guidelines Prevention of Cardiovascular Disease: guidelines for assessment and management of cardiovascular risk. World Health Organization. Geneva. Switzerland.

[91] The Swedish National Food Administration. 2012. http://www.slv.se/sv/grupp1/mat-och-naring/nyckelhalet/ (2012-05-16)

[92] The Swedish National Food Administration, 2009. Regulations amending the National Food Administration's Regulations on the Use of a Particular Symbol (LIVSFS 2005:9). LIVSFS 2009:6. Livsmedelsverkets författningssamling.
http://www.slv.se/upload/dokument/lagstiftning/2009/LIVSFS%202009_6%20nyckelh%c3%a5l.pdf

- sodium maximum 0.5 g/100 g
- dietary fibre at least 5 g/100 g

The Keyhole requirements for crispbread are:

- at least 50% whole grain calculated on the dry matter of the product
- fat maximum 7 g/100 g
- sugars total maximum 5 g/100 g
- sodium max. 0.5 g/100 g
- dietary fibre at least 6 g/100 g

The Keyhole requirements for oils and liquid margarines and edible fat blends (group 10 in the Keyhole requirements) are that they must contain a maximum of 20% saturated fatty acids of the total fat content. Examples of fats in this group include olive oil, sunflower oil, corn oil, rapeseed oil and soy oil. Examples of products which are not in this group include solid frying and baking margarines, palm oil, coconut fat.

The Keyhole labelling requirements must be verified by a declaration of nutritional value. According to the Swedish National Food Administration the values in the declaration of nutritional value must be stated as average values based on one of the following options[93]:

1. analysis of nutritional content,
2. calculated on the basis of known or actual average values for the ingredients included in the product, or
3. calculation based on generally accepted and approved information.

The concept "average value" is interpreted as "the value that best represents the amount of nutrients that this particular food contains taking into account seasonal variation, consumption patterns and other factors (for example the nutritional content of milk) which can mean that the actual value varies" (SLVFS 1993:21).

According to guidelines for the Keyhole label, tolerances for every average value collected under similar process conditions should be identified, including measurement uncertainty. For sodium this is judged to be +15%, provided that the same recipe, manufacturing process and analysis method have been followed. The limit "maximum" stated in the Keyhole labelling criteria means that the average content of the nutrient, i.e. the value stated in the declaration of nutritional value, may not exceed the value states as "maximum". The measured value within the tolerance limit for the average value given for the company including measurement uncertainty, for sodium + 15%, should. however, be accepted. This means that individual values in a series of measurements may

[93] The National Food Administration Regulations and General Advice Regarding Nutritional Information Declarations SLVFS 1993:21 including amendments up to and including LIVSFS 2009:9. (http://www.slv.se/upload/dokument/lagstiftning/1990-1995/1993_21.pdf) (17.10.2012)

be above the "maximum" value declared if this is simultaneously within the tolerance limits.[94]

Requirement in the criteria document

O18 Requirements for fat, salt, sugar and dietary fibre

The Nordic Ecolabelled bread must meet the requirements for fat, salt (sodium), sugar and dietary fibre as set out below for bread and crispbreads.

Bread must contain at least 25% wholegrain calculated based on the dry matter in the product, fat maximum 7 g/100 g, sugars total max 5 g/100 g, sodium max 0.5 g/100 g, dietary fibre at least 5 g/100 g.

Crispbreads must contain at least 50% wholegrain calculated based on the dry matter in the product, fat maximum 7 g/100 g, sugars total max 5 g/100 g, sodium max 0.5 g/100 g, dietary fibre at least 6 g/100 g.

Fat and oils used in the Nordic Ecolabelled bread must contain max. 20% saturated fat of the total fat content.

For a definition of the Keyhole label, cereal and wholegrain, see Terms and definitions.

✉ Declaration of nutritional value of the product that must be carried out according to the guidelines for the Keyhole label. The declaration of nutritional value must be stated as average values based on one of the following options: 1) analysis of nutritional content, 2) calculation on the basis of known or real average values of the ingredients included in the product or 3) calculation based on generally determined and approved information. The bakery must be able to show documentation to justify how the values in the declaration of nutritional value have been produced.

✉ For fats and oils the declaration of contents must be reported.

Requirement on energy use in manufacturing Nordic Ecolabelled bake-off bread (O19)

Background to the requirement:
Bake-off products are products that are completely or partly baked and frozen, and subsequently quickly defrosted and baked off at point of sale/by the consumer. Contact with the bakery industry showed that baking off sites and in-store bakeries have increased in recent years. The smell of freshly baked bread attracts consumers and it is easy for in-store bakeries to adapt production to demand. For the consumer, it is important to be able to find more environmentally friendly products within the bake-off range too.

From a life cycle perspective, bake-off products use more energy than traditional bakeries due to freezing, storage and baking off in store.[95] [96]. Nordic Ecolabelling has chosen to allow bake-off bread to be Nordic Ecolabelled provided that the energy used in

---

[94] Guidance for control authorities, etc. Nyckelhålet 25.05.2010. http://www.slv.se/upload/dokument/livsmedelsforetag/vagledningar/Vagledning_nyckehalet.pdf) (17.10.2010)

[95] Swedish Bread Institute. 2010. http://www.brodinstitutet.se/

[96] http://eu-freshbake.eu/eufreshbake/FRESHBAKE-GUIDE%20GOOD%20PRACTICE-V-1-4th%20jan10.pdf

producing the bake-off bread is at the same level as the energy used in bakeries which do not produce bake-off products. A separate requirement has been introduced to take into account energy use in the production of Nordic Ecolabelled bake-off bread. The absolute limit value for the energy use of the bake-off bread is the same as for the bakeries, i.e. energy use may not exceed 1.50 kWh per kg product.

The calculation is carried out as follows: Energy consumption during baking off (ovens that bake bake-off bread) is added to the bakery's energy use for producing the bake-off bread, i.e. for the bake-off line. Only the energy use of the ovens at the bake-off site needs to be included. Energy use from any refrigerators, freezers, rising cabinets, etc. at the bake-off site need not be included because the energy use primarily involves ovens and other factors which can be difficult to document. In order to calculate the energy use of ovens at the bake off-site, an average energy value for baking off can be used. The average energy value can be used because it is difficult to obtain information about all bake-off sites. Guidelines for the calculations are provided in Appendix 6 to the criteria.

Requirement text in the criteria document

O19 Energy use in manufacturing Nordic Ecolabelled bake-off bread

Energy use in manufacturing Nordic Ecolabelled bake-off bread calculated as purchased energy may not exceed 1.50 kWh per kg product.

The baking off of bake-off bread at the bake-off site is added to the bakery's energy use for the production of bake-off bread. It is sufficient to only document the energy use of the ovens at the bake-off site.

Where there are several bake-off sites, an average energy value for baking off bake-off bread can be used to calculate the energy use of the ovens. The energy calculation formula is

$E_{BO} = E_{BB} + E_U$

E_{BO} = Total energy use for Nordic Ecolabelled bake-off bread (kWh/kg production)

E_{BB} = Actual energy use for the production of bake-off bread in the bakery (kWh/kg production)

E_U = Actual energy use for baking off bake-off bread at the bake-off site (kWh/kg production). An average value can be used for the energy use of the ovens at the baking site.

✉ Account of the bakery's energy use for the production of bake-off bread (kWh per kg production). The input values used for the calculation must be clearly shown. The calculations must be carried out and documented as in Appendix 5.

9 Summary of points

Background to the requirement

The criteria seek to offer flexibility which means that the bakery need not be best in every area (ingredients in the bakery and in the bread, energy, waste, transport, cleaning chemicals, ecolabelled products, packaging, working environment and serving food). Points have been awarded for the different areas in line with the table in requirement O20. The minimum requirement is that the bakery scores at least 40 % of the maximum number of points.

Because ingredients and energy are the most important factors in terms of the environment, Nordic Ecolabelling requires that the bakery scores at least 50% of the maximum number of points for ingredients and energy.

The maximum achievable number of points is selected such that the areas covered and the environmental impact in the best case can score the maximum number of total points. The percentage weighting of the points system is based on life cycle analysis and relevance, potential and steerability analysis (RPS). The actual total weighting of the requirements in the criteria can, however, not be determined from the points system. The most important areas in terms of the environment have one or more obligatory requirements outside the points system.

Requirement text in the criteria document

O20 Summary of points requirements

At least 12 points must be scored for requirements P1-P4 and P16 (ingredients and energy).

A bakery without transport, which does not serve food, must score at least 15 points to be Nordic Ecolabelled.

A bakery with transport, which does not serve food, must score at least 16 points to be Nordic Ecolabelled. The same applies to a bakery without transport, which serves food, it must at least score 16 points to be Nordic Ecolabelled.

A bakery with transport, which serves food, must score at least 17 points to be Nordic Ecolabelled.

	Application points	Potential maximum points
Ingredients at the bakery (P1)		Max. 6 points
Ingredients in the Nordic Ecolabelled bread (P16)		Max. 7 points
Energy and refrigerators / freezers (P2 – P4)		Max. 11 points
Waste (P5-P6)		Max. 4 points
Transport (P7 – P10)		Max. 3 points
Cleaning (P11)		Max. 2 points
Use of ecolabelled products (P12)		Max. 3 points
Packaging (P13)		Max. 1 point
Working environment (P14)		Max. 3 points
Serving food (P 15)		Max. 2 points
Total for bakeries without transport, which do not serve food		Max. 37 points
Total for bakeries without transport, which serve food		Max. 39 points
Total for bakeries with transport, which do not serve food		Max. 40 points
Total for bakeries with transport, which serve food		Max. 42 points

✉ Summary of points in line with the table above. Contact Nordic Ecolabelling if you want to use a formula to calculate points.

10 Legislation, regulatory requirements and other requirements

Laws and regulations

The licensee shall ensure compliance with the applicable regulations with regard to safety, working environment and the environment, as well as all site-specific terms/concessions at all production facilities where Nordic Ecolabelled products are manufactured.

O21 Laws and regulations

The licensee shall ensure compliance with all applicable local laws and provisions at all production facilities for the Nordic Ecolabelled product, e.g. with regard to safety, working environment, environmental legislation and site specific requirements/concessions.

Documentation is not required. However, Nordic Ecolabelling may revoke the licence if the requirement is not fulfilled.

Licence administrators

It is necessary for Nordic Ecolabelling that there is a person responsible and a contact person for the licence at the company. Therefore the applicant company should appoint a person who is responsible for ensuring that the Nordic Ecolabel requirements are met throughout the licence period. During the licence period it is the contact person who is responsible for communication with Nordic Ecolabelling.

O22 Licence administrators

The company shall appoint an individual responsible for ensuring the fulfilment of Nordic Ecolabel requirements, and a contact person for communications with Nordic Ecolabelling.

✉ Organisational chart showing who is responsible for the above.

Documentation

The licensee must retain copies of all documentation sent in to Nordic Ecolabelling in conjunction with the processing of the application. The reason for this requirement is that it must be possible for the licensee's licence administrator to check the documentation and to communicate with Nordic Ecolabelling about the documentation.

O23 Documentation

The licensee must be able to present a copy of the application and factual and calculation data supporting the documents submitted with the application (including test reports, documents from suppliers and suchlike).

☺ On-site inspection.

Quality management in the food industry

Different quality standards have been developed to support food companies in working to constantly improve quality, product safety and hygiene. In recent years the demands made by the retail sector of food producers have increased in terms of quality and environmental management.

It is crucial for a licence that the quality of products remains the same throughout the licence period. Therefore there is a requirement that the applicant submit documentation of what is being done to ensure this. It is also important that the licensee has procedures in place for registering and dealing with complaints about products.

O24 Quality management system

The licensee must guarantee that the quality of production in the Nordic Ecolabelled bakery and the Nordic Ecolabelled bread does not deteriorate during the period of validity of the licence.

✉ Procedures to summarise and where necessary tackle complaints regarding the quality of the Nordic Ecolabelled bakery and the Nordic Ecolabelled bread.

✉ Procedures for how the bakery safeguards the quality of the Nordic Ecolabelled bread that is fully baked at an external site.

Planned changes

Changes in the production or to Nordic Ecolabelled products may be significant to the licence. For this reason a written procedure must be drawn up by the company in which the company contacts Nordic Ecolabelling in the event of changes which may have an impact on the requirements for ecolabelled bakeries or products.

O25 Planned changes

Written notice of planned product and marketing changes that affect the Nordic Ecolabelling requirements must be given to Nordic Ecolabelling.

✉ Procedures detailing how planned product and marketing changes are dealt with.

Unforeseen non-conformities

If unforeseen non-conformities arise in Nordic Ecolabelled production or in the production of Nordic Ecolabelled products, this can have consequences for the Nordic Ecolabel licence. Therefore a procedure must be in place to ensure that Nordic Ecolabelling is informed should such events occur. It will then be possible for Nordic Ecolabelling to evaluate the consequences of unforeseen non-conformities and provide advice on the steps the licensee should take.

O26 Unforeseen non-conformities

Unforeseen non-conformities that affect Nordic Ecolabelling requirements must be reported to Nordic Ecolabelling in writing and logged.

✉ Procedures detailing how unforeseen non-conformities are handled.

Traceability

It is important that the Nordic Ecolabelled product cannot be mixed with other products during the licence period.

O27 Traceability

The licensee must have a traceability system for the production of the Nordic Ecolabelled bread.

✉ Description of/procedures for fulfilment of the requirement.

Take-back system

Packaging must be included in the national take-back system.

O28 Take-back system

Relevant national regulations, legislation and/or agreements within the sector regarding take-back systems for products and packaging shall be complied with in all the Nordic countries where the Nordic Ecolabelled bakery markets its products.

✉ Declaration from the applicant regarding affiliation to existing recycling/processing agreements.

Annual follow-up

Nordic Ecolabelling will carry out annual follow-ups of selected requirements in order to check compliance with the requirements.

O29 Annual follow-up

Every year a follow-up of the environmental requirements must be made in line with instructions from Nordic Ecolabelling. In the annual follow-up the focus will be on requirements related to energy and ingredients.

✉ The documentation for the annual follow-up must be signed by the person responsible for the Nordic Ecolabel licence and then be sent to Nordic Ecolabelling.

Marketing

The rules on marketing ecolabelled products must follow the most recent version of Nordic Ecolabelling's "Regulations for the Nordic Ecolabelling of Products" which can be downloaded from the web.

O30 Marketing

Marketing of the Nordic Ecolabelled bakery and the bread must comply with the "Regulations for the Nordic Ecolabelling of Products" dated 22 June 2011 or later versions.

✉ Duly completed Appendix 8.

✉ Enclose examples of product labelling/information on primary packaging.

Design of the Nordic Ecolabel

The design of the Nordic Ecolabel is as follows:



licence number

Each licence has a unique six-digit licence number that must be displayed along with the label.

Use of the Nordic Ecolabel on products:
Licensed bakeries must use the Nordic Ecolabel logo on the products that are Nordic Ecolabelled. The logo may not be used on other products.

If the bakery manufactures Nordic Ecolabelled bread which is also organic: Any additional labelling stating that the product is organic is regulated by legislation on the labelling of organic products: **Council Regulation (EC) No 834/2007 on organic production and labelling of organic products.**

Use of the Nordic Ecolabel in other marketing:
Bakeries with a licence can state that the bakery is Nordic Ecolabelled and market the entire business with the Nordic Ecolabel. If the bakery wishes to state that the bakery is Nordic Ecolabelled, the Nordic Ecolabel can be used on signage, posters or similar. When the bakery uses the Nordic Ecolabel in this other marketing (i.e. not on products) one of the following additional texts must be used (other terms can be used with the agreement of Nordic Ecolabelling):

Danish: Bageri

Swedish: Bageri

Finnish: Leipomo

Norwegian: Bakeri

Icelandic: Bakari

English: Bakery

In addition the licensee can market the bakery with advertisements and advertising in other media and in campaign material. Irrespective of the instructions in "Regulations for the Nordic Ecolabelling of Products" dated 22 June 2011, or subsequent versions, the additional text must also be shown in marketing.

It is permitted to refer to the Nordic Ecolabel in conjunction with the name of the bakery but not use the logo on all products produced at the Nordic Ecolabelled bakery if the bakery's licence number is stated. For example, it is permitted to write "Nordic Ecolabelled bakery" or similar and add the bakery's licence number.

11 Requirements which have been evaluated but not included

Requirements on conventionally grown ingredients.

An assessment has been carried out as to whether it is possible to impose requirements on the production of conventionally grown ingredients. Nordic Ecolabelling has judged that as the situation currently stands, it is too problematic for bakeries to be able to trace flour back to its point of cultivation at a sufficiently detailed level for conventionally grown cereals. In most cases cereals can be traced to suppliers of cereal to a mill but in the mill traceability is at mass balance level (for a definition of traceability via mass balance, see Terms and definitions).

In this first version of the criteria for bakeries and bread no requirement has been introduced on traceability of conventionally grown cereals, other than that the country of origin and place processed must be known. Development in this area takes place quickly and life cycle calculations in the food industry are becoming increasingly common. In future criteria it may therefore be reasonable to introduce environmental requirements which also cover conventionally grown ingredients.

Requirements for sugar

Nordic Ecolabelling has chosen not to impose requirements on sugar in this first version of the criteria because it is judged that it is not sugar consumption in the Nordic countries that is driving the expansion of sugar cane growing in the tropics. Furthermore, the amount of sustainability certified sugar available on the market is judged to be too small for it to be possible to set such a requirement for sugar.

Nordic Ecolabelling however does impose an indirect requirement that also covers sugar through the requirement on GMOs (O8). Genetically modified (GM) sugar beet developed to withstand herbicides is grown commercially in the USA and Canada but only in trials in the EU[97]. GM sugar cane is not yet grown commercially and is only currently being grown in trials[98]. Nordic Ecolabelling does not want the ban on ingredients from pesticide resistant and insect resistant GM plants to lead to demand for GM sugar beet and sugar cane.

Certified soya

Fat from soya is used in bakeries but is only used to a minor extent in bread. In bakeries it is common that soya is used in chocolate and in different fat blends, but according to information received, this is very limited in bakeries in the Nordic countries. Cultivation of soya beans is expected to increase in the future, which may lead to major environmental consequences both globally and regionally/locally.

---

[97] GMO Compass. 2010. http://www.gmo-compass.org/eng/database/plants/13.sugar_beet.html (09.05.2012)

[98] GMO Compass. 2010. http://www.gmo-compass.org/eng/database/plants/76.sugar_cane.html (09.05.2012)

Soya oil is used to a limited extent in bread but is common in margarines and chocolate. Sustainability certification of soya production for direct food consumption is not advanced in the Nordic countries, which is why it is judged to be too early to set a requirement for sustainability certified soya fat. Requirement O8 on ingredients from pesticide-resistant and insect-resistant GM plants indirectly introduces a requirement on fat from soya. They requirements on soya will be re-evaluated in the next version of the criteria.

Use of primary energy factors

From a life cycle perspective, the source of energy has a major impact. By including primary energy in the energy limit value, for example, bakeries which use energy sources with a low primary energy factor could be encouraged. In the bakeries energy is used in the form of electricity and/or fuel, depending on the type of ovens the bakery has and the processes used to make steam and heat. The distribution of energy sources in the bakery industry in Norway, for example is as follows: 71% electricity, 21% oil and 9% gas according to Enova's data[99] which covered 31 bakeries.

Primary energy factors are used in many of Nordic Ecolabelling's criteria, for example, in the retail and textile service criteria. The use of primary energy factor criteria for bakeries and bread has been evaluated during the process of drawing up the criteria. As this is the first version of the criteria and the data on the bakeries' use of energy and energy sources is very small, using primary energy factors would not be justified, despite the fact that this would be more correct from a life cycle perspective. Data is not yet available to set a limit value which would take into account primary energy.

It should also be stated that bakeries' opportunities to influence their source of energy are limited, partly due to ownership of property or the location of the bakery. In many cases, for example the bakery lacks an opportunity to choose energy sources with a low primary energy factor, such as district heating/cooling or natural gas, because these require that the business is located close to a district heating or gas network.

The use of primary energy factors will be re-evaluated in future versions of the criteria.

Requirement on CO_2 emissions

According to Nordic Ecolabelling's guidelines energy sources with a reduced environmental impact are to be encouraged where possible. It could therefore be justified to set a requirement for CO_2 emissions in bakeries with the aim of stimulating the use of renewable energy and other energy sources with low CO_2 emissions.

The opportunity to set separate CO_2 requirements for bakeries was evaluated during the development of the criteria. Because CO_2 emissions are strongly linked to energy use, businesses with high energy use often also have high CO_2 emissions.

While work is in progress it was decided that no requirements were to be set for bakeries' CO_2 emissions, apart from a points score requirement for GWP factors and refrigerants in refrigeration and freezing equipment (P9). The reason for this is that there is

[99] Enova 2011.
https://industrinettverk.enova.no/reports/BenchmarkAnalysisIndustry.aspx?Bransje=f026c62c-d66c-4b85-9c07-46064340cd50

insufficient data on the energy use of bakeries and their sources of energy to set separate CO_2 requirements in the first version of the criteria. The introduction of a separate CO_2 requirement can also lead to "doubling" the same requirement, because energy use and CO_2 emissions are closely linked. In this first version of the criteria Nordic Ecolabelling is therefore primarily focusing on requirements which reduce energy use. The requirement on refrigerants in the bakery and in transport also has an impact on the greenhouse effect.

The opportunities to set a separate requirement for CO_2 emissions will be re-evaluated in future versions of the criteria.

Water consumption

In the day-to-day work of the bakery water is mainly used in making the dough, for personal hygiene and for cleaning equipment during downtime. If the bakery washes its own plastic trays (in separate premises, separate from production) this also involves significant water consumption. Day-to-day cleaning generally uses different types of manual mops and mechanical mops. Bakeries aim to avoid using water for cleaning during production as far as possible. This is to minimise microbial growth and contamination.

Legislation which set out hygiene regulations for food production is extensive and necessitates water-based cleaning of production equipment and premises at regular intervals, often during downtime. In its criteria Nordic Ecolabelling wants to work towards optimum water consumption in general. However, reduced water consumption in bakeries might lead to reducing necessary hygiene measures or cutting production. On the basis of this, in these criteria Nordic Ecolabelling is not setting requirements for measures to reduce water consumption in bakeries.

12 New criteria

These criteria are the first Nordic Ecolabelling criteria in an whole new product area, food, and therefore need to be specially evaluated before the next version. Because we do not yet have any licensing experience in this field, it can be difficult to correctly define important evaluation points for the next revision, but it may be relevant to address the following when revising criteria:

- The level of requirements for organic produce in the bakery and in the bread.
- Traceability and growing of conventionally grown produce.
- Health aspects, such as new discoveries on the impact of fats on human health.
- Sustainability certified sugar and soya.
- Energy use. Making energy requirements more stringent, particularly considering absolute limit value, functional unit and bake-off processes.
- The environmental impact of the transport packaging (e.g. trays that are returned, corrugated cardboard boxes) including the environmental impact of washing trays.

13 References

The references used, other sources and references to people contacted are shown as footnotes on the relevant page of the document.

14 Terms and definitions

Actual energy use: Specific energy use based on purchased or measured energy in the form of electricity, district heating/district cooling and fuel (e.g. gas).

Bake-off: Bread which is not completely baked and must be baked before consumption. Bake-off bread may be a frozen or a fresh product. It is pre-baked to a varying extent and is then sometimes frozen. It is (defrosted) and baked at the bake-off site/point of sale.

Bake-off site: Defined in these criteria as a place where bake-off bread is finally baked for sale to the consumer. Examples of these are supermarket in-store bakeries that bake part-baked bread.

Bakery: "Bakery" means a place of manufacture where flour from cereals and other ingredients are used to produce bakery products such as bread and crispbreads (e.g. loaves, crispbread, rolls), sweet bread, pies, pastries, patisserie products, etc.

Bread: Bread means bread baked from cereals and other ingredients. Cereal species are wheat (including spelt, durum wheat), rye, oats, barley, rice, maize, millet, durra and other sorghum species.

Bread may be rye bread, white bread, baguettes, rolls, crispbread, etc. Other products means biscuits, sweet bread and crispbread, buns, pizza, pasties, etc.

Cereal: Cereal species are wheat (including spelt, durum wheat), rye, oats, barley, rice, maize, millet, durra and other sorghum species.

Dietary fibre: Dietary fibre: carbohydrate polymers with three or more monomeric units, which are neither digested nor absorbed in the human small intestine and belong to the following categories: 1) edible carbohydrate polymers naturally occurring in the food as consumed, 2) edible carbohydrate polymers which have been obtained from food raw material by physical, enzymatic or chemical means and which have a beneficial physiological effect demonstrated by generally accepted scientific evidence, 3) edible synthetic carbohydrate polymers which have a beneficial physiological effect demonstrated by generally accepted scientific evidence.

Dietary fibre has a energy value and the conversion factor is 2 kcal/g or 8 kJ/g.

Ecolabelled: Defined in these criteria as products/services labelled with the Nordic Ecolabel or the EU Ecolabel.

GWP: Global Warming Potential Global (GWP) is a relative measurement of the climate impact of greenhouse gases. The climate impact of gases is relative and compared with the climate impact of the equivalent amount of carbon dioxide.

Ingredients labelling:
This means that one ingredient in the list of ingredients of a food product can be organic and the remaining ingredients conventionally grown in line with Council Regulation (EC) No 834/2007. The organic ingredient may not be found together with the same ingredient in non-organic form. These ingredients must comply with the regulatory requirements under Council Regulation (EC) No 834/2007. Under these requirements a third party must check that these ingredients are organic.

The references to the organic production method may only appear in relation to the organic ingredients and the list of ingredients shall include an indication of the total percentage of organic ingredients in proportion to the total quantity of ingredients of agricultural origin. The terms and the indication of percentage referred to in the previous subparagraph shall appear in the same colour, identical size and style of lettering as the other indications in the list of ingredients. (Council Regulation (EC) No 834/2007, Article 23)

Keyhole label: Aims to guide consumers towards healthier foods.

The Keyhole label is used by agencies in Sweden, Norway and Denmark. The criteria are set jointly by the food agencies of the three countries. The criteria for being able to label food with the Keyhole label include fibre and whole grain, fat and fat quality, sugar and salt.

Mass balance: Mass balance means that when ingredients with different characteristics are mixed, the added total of all the batches taken from the mix must have the same characteristics in the same amounts as the total of all the batches that were added to the mix. It is therefore required that information about characteristics and the amounts of the batches referred to remain associated with the mix.

ODP Ozone depletion potential (ODP):
Used as a measurement of the individual refrigerant's effect on depletion of the ozone layer. The reference value for ODP is the refrigerant CFC11 which has an ODP value of 1.

Primary packaging:
The packaging closest to the actual product.

Production:	In these criteria the bakery's production means the bakery's entire prime production of fresh bread, semi-finished products, frozen bread and other products such as sweet bread and other bakery products (fresh, semi-finished products and frozen). Prime production means the production that meets the quality requirements the bakery has in place for its products for sale. This production concept does not thus include the bakery products that go to waste, such as spoiled bread and seconds.
Trans fats:	Industrially manufactured trans fats can be formed when vegetable oil is converted into partially hydrogenated fat. The food industry uses hydrogenation to make the fat more solid so that the products achieve the desired crispness, solidity and melting point. Hydrogenation also increases shelf-life. Trans fats also occur naturally in small amounts in milk fat.
Waste:	In these criteria waste is defined as organic waste arising in the bakeries in the form of flour, dough, bread and bread products. Any bread returned from stores and other points of sale is not included in the concept of waste in these criteria.
Whole grain:	The whole grain (cereal germ, endosperm and bran); the grain may be milled, crushed or similar but the component parts must be included in their original proportions for the cereal concerned.

Appendix 1

Description of bread manufacture

As a rule the small bakeries add their ingredients manually from sacks but have automated the dough making process because this is a labour-intensive part of the operation. Shaping, rising, baking and packaging is often done manually.

Medium-sized bakeries may have automated lines for their big sellers but generally the baking process is carried out in the same way as it is in small bakeries. Automated packaging solutions are common because manual packaging lines demand a large number of staff.

Industrial bread manufacture in large, modern bakeries uses automated processes controlled by computers and control systems. The ingredients reach the bakery by rail/road either in large sacks (big bag) or in bulk (= not packaged but in large containers). The delivery choices made depend on the size of the bakery. The large manufacturers aim to obtain as many of the ingredients as possible in bulk form which can then be pumped into different sized silos or containers at the plant.

Conveyor belts, often long ones, run between the different steps of the process, moving the bread on to the next station. The job of the staff is to supervise the systems, adjust them where necessary and check the resulting product. As a result, the skills set that bakers require today has changed a great deal. They need to be familiar with computerised process technology while also retaining the old craftsmanship in order to be able to assess the quality of the dough and the finished bread.

The ingredients are pumped up from silos and containers by computer-controlled weighing systems/flowmeters to large dough mixers. Here the dough is kneaded and risen for different periods of time/at different temperatures depending on the recipe. Then the dough is transported on a conveyor/by lift to dough hoppers which further knead the dough and portion it out on the dough conveyor/into tins. The dough/loaf is then left to rise in a rising cabinet. If rolls are required, these are cut after rising. Then the dough is baked in the oven.

Ovens come in many different types and lengths. The ovens can be run on electricity/oil/gas. Baking trays can be placed in the oven on shelves or large bakeries often use tunnel ovens. Here the bread is transported at different speeds through different temperature/humidity and air circulation zones.

The heat can vary a great deal depending on the product. In pure radiation ovens the heat is either spread from above/from below or from both directions at the same time. In hot air ovens, the heat/steam circulates in different ways which can be pre-programmed.

After baking, the bread is cooled, often on large cooling spirals and are then frozen in some processes.

There are many different kinds of packaging lines for bread from fully or semi-automated with different conveyors and sometimes robot stations to packing by hand. Different types of metal detection/x-ray equipment is used in the packaging lines to prevent any foreign objects being packed in with the bread. The bread is wrapped in plastic bags and

then stacked in cardboard boxes/plastic trays loaded onto wooden/plastic EU pallets at different heights.

Appendix 2 Availability and use of organic ingredients in the Nordic countries

Finland

In Finland there is no officially set organic farming target. Eight percent of the total amount of agricultural land of 2.3 million hectares is cultivated organically[100]. In 2011 the harvest for organic wheat and rye was 21,000 tonnes. This constituted just over 2% of the total yield for these cereals in Finland. The organic rye harvest was 6,600 tonnes and the organic wheat harvest 14,700 tonnes. This corresponds to 14% of the total rye harvest and 3.6% of the wheat harvest in Finland[101]. Approximately 50% of the organic harvest of wheat and rye was sold to merchants as organic cereals[102]. The remainder was used in agriculture or sold as conventionally grown cereals. It is not certain how high a proportion of the organic harvest was used for bread.

Norway

The Norwegian government has set a target that 15% of food production and food consumption must be organic by 2020[103]. Organic land accounted for 4.7% of total agricultural land in 2010 (5.7% of land under conversion was included). The proportion of organic land has increased steadily since 2000 but the increase in recent years is as much a consequence of a reduction in the amount of farmed arable land in Norway, as a net increase in the amount of land farmed organically[104].

The Norwegian Agricultural Authority (SLF) issues statistics on the production and sale of organic agricultural products. These statistics include amounts of domestically produced and imported cereals and amounts of flour and grain sold. Norwegian production of organic cereals is in fact greater than the figures reported in statistics because these only include cereals weighed in at cereal centres. A large proportion of the organic brain is never weighed in at cereal centres because it is used as animal feed on the farm. This is done to fulfil they aims of organic animal husbandry which states that each farm must be self-sufficient in feed to a certain degree. Of the cereals weighed in at cereal

---

[100] Koikkalainen et al 2011. Luomu 50 – mitä tarkoittaisi, jos 50% Suomen viljelyalasta siirtyisi luomuun (Organic 50 – what would it mean if 50% of Finnish arable land was switched to organic) (http://www.mtt.fi/mttraportti/pdf/mttraportti36.pdf)

[101] Information Centre of the Ministry of Agriculture and Forestry, Tike, Matilda Agricultural Statistics. 2012. http://www.maataloustilastot.fi/sv/statistik-over-den-ekologiska-skorden (2012-03-13)

[102] Use of the organic harvest is a calculation based on sample surveys and calculations. Information Centre of the Ministry of Agriculture and Forestry, Tike, Matilda Agricultural Statistics: Användningen av ekoskörd på gårdarna (Use of organic harvest on farms) Http://www.maataloustilastot.fi/sv/statistik-over-den-ekologiska-skorden (15.12.2011)

[103] Norwegian Agricultural Authority (2011). Produksjon og omsetning av økologiske landbruksvarer (Production and sale of organic agricultural products). 2010 report.

[104] Ibid.

centres in 2008 to 2010, 90-95% was used for feed. The proportion of wheat used in food in the period 2009-2010 was 41%.[105]

Norway is dependent on imports of organic cereals to meet consumer needs. According to SLF a total of approximately 14,000 tonnes of organic cereals were imported in 2009-2010 and approximately 25,000 tonnes were imported in 2010-2011. Between 20-30% of the imported cereals were used in food. Food wheat dominated imports in 2009-2010, approximately 3,800 tonnes were imported while in 2010-2011 equal amounts of spelt and food wheat were imported at approximately 2,500 tonnes each. If it is roughly estimated that the extraction rate[106] is 75% this means that between 3,200 and 4,100 tonnes of the imported organic cereals was used in food. 2,000 tonnes of flour was also imported to Norway but it is not possible to determine how much of this was organic.[107]

The main reasons for cereals being imported is that growing conditions in Norway are limited, but also that there is very little production of cereals for bread in Norway and what there is is geographically widespread. This means expensive logistics and sales, which in turn mean higher ingredients costs for organic flour. Because a limited amount of organic bread wheat is produced in Norway, sourcing sufficient organic cereals in different quality classes for optimum and stable flour composition over time is challenging. Different grades are often mixed together due to logistical considerations rather than being sorted by quality grade. The move towards increasingly automated baking processes also demands even flour quality. Furthermore, the extraction rate for organic cereals is often lower than for conventionally grown cereals.[108]

In 2010 a total of 2,035 tonnes of organic flour and grain was sold in Norway, which was 24% less than in 2009 when the figure was 2,665 tonnes. The cause of the drop was a large player in the retail sector (the Ultra chain) cutting the amount of fresh organic bread from its own bakeries due to reduced sales. Total sales of flour and grain in Norway amounted to 279,000 tonnes in 2010. This means that the proportion of organic flour and grain sold in Norway is approximately 0.7% of the total proportion of flour and grain [109]. The proportion which is imported cannot be assessed but it is quite large. SLF's import data shows larger amounts than the amount of organic flour and grain sold in Norway. However, the import data is uncertain because it is estimated by SLF assessing each imported batch by price and quantity.

According to SLF sales of organic cereal products and bakery products in Norway increased up to 2008 inclusive. A large proportion of this increase was due to the Ultra chain's focus on organic bread. Sales fell in 2009 and the Ultra chain cut back on their

---

[105] Norwegian Agricultural Authority (2011). 2010 report. Produksjon og omsetning av økologiske landbruksvarer (Production and sale of organic agricultural products). Report, 1:2011 21.03.2011.

[106] The extraction rate states how high a proportion of the entire grain counted from the centre is included in the flour. A whole grain flour has an extraction rate of 100% while a lighter fine white flour (kärnvetemjöl) has approximately 72%.

[107] Tysdal, K. 2012. Norwegian Agricultural Authority Personal communication (22 February 2012)

[108] Norwegian Agricultural Authority (2011). Report for the first quarter of 2011. Produksjon og omsetning av økologiske landbruksvarer (Production and sale of organic agricultural products). Report, 17:2011 15.09.2011.

[109] Ibid.

organic bread initiative in 2010. This resulted in an almost 50% drop in sales of organic bread in 2010 (NOK 55 million) in Norway compared with 2009 (NOK 90 million).[110]

Sweden

The Swedish government had the target of certified organic farming covering 20% of agricultural land by the end of 2010. To increase demand the Riksdag has laid down that 25% of public sector food consumption should be organic by 2013.[111]. The target for organic production was not met as the proportion of certified organic farming in 2010 was just under 11% of total agricultural land. If land under conversion to organic production is included, this promotion amounts to 14% of total agricultural land[112]. 4.5% of Sweden's total production of cereals was organically grown, but only 3.2% was approved for sale under an ecolabel. The organic harvest for the cereals used in bread (wheat and rye) was approximately 72,000 tonnes, amounting to 2.8% of the total harvest (2.5 million tonnes) of these cereal types. It is uncertain how large a proportion was used as bread grain and it has not been possible to obtain information on total flour production in Sweden. According to KRAV approximately 20% of all organic cereal produced and imported is used for food, the remainder is used for animal feed[113]. Lantmännen states that a third of all organic cereals are used for food. If it is assumed that KRAV's and Lantmännen's proportion for food concerns the cereals rice, wheat and oats, the proportion of organic flour and grain in Sweden amounts to approximately 0.7-1.2% of the total proportion of flour and grain. This estimate does not include imports. This is a slight underestimate because Lantmännen's and KRAV's data includes mixed cereals and barley. Because the denominator in the equation (i.e. conventionally harvested plus organically harvested cereals) is so very much larger than the numerator (organic cereals) the proportion which is organic would not be affected if these figures were included. Lantmännen states that of their sales of organic cereals for food, half was oats and half was milled cereals[114].

In 2011 there was a lack of organic cereals in Sweden[115,116]. Sweden went from being an exporter of organic cereals to any importer during the period 2005-2009. There are two main reasons for this trend 1) the price of conventionally grown cereals has been high for

---

[110] Ibid.

[111] Swedish Board of Agriculture. 2011. http://www.jordbruksverket.se/amnesomraden/odling/ekologiskodling/vadarekologiskproduktion.106.510b667f12d3729f91d80008069.html (04.05.2012)

[112] Swedish Board of Agriculture (2011). Skörd för ekologisk och konventionell odling 2010. (Harvests in organic and conventional farming 2010) Official Statistics of Sweden, SJV JO 16 SM 1102.

[113]KRAV 2012. Marknadsrapport 2012. http://www.krav.se/Documents/Marknadsrapporter/marknadsrapport2012/Marknadsrapport_2012.pdf (2012-03-13)

[114] Anneke Svantesson and Ulrika Palm Lantmännen Cerealia (personal message 30.01.2012 and 14.03.2012 respectively).

[115]. Ryegård & Ryegård. 2012. Ekologisk livsmedelsmarknad (The organic food market). Ekoweb & LRF. (http://www.lrf.se/PageFiles/64119/Marknadsrapport_eko_20120126.pdf (downloaded 28.02.2012)

[116] KRAV 2012. Market report 2012. http://www.krav.se/Documents/Marknadsrapporter/marknadsrapport2012/Marknadsrapport_2012.pdf (13.03.2012)

a period, providing an incentive for cereal growers to convert, 2) organic livestock farming (particularly dairy production but also egg production) has increased in Sweden in recent years, leading to higher demand for organic feed. Today organic dairy products represent a third of sales and organic eggs 10% of total egg sales in Sweden[117]. This can be simply demonstrated by the fact that the number of organic dairy cows has almost doubled and the number of poultry has more than doubled in Sweden between 2005 and 2010.[118]

The increase that has been seen in organic arable farming is primarily payment-driven and not consumption driven according to an analysis by the Swedish Board of Agriculture[119]. Payment-driven means that it is the green premium to organic farmers that drives development not consumer demand.

Denmark

The Danish government has ambitious targets for developing organic farming in Denmark. These are supported through a number of initiatives in the "Organic Action Plan 2020" (Ministry of Food, Agriculture and Fisheries of Denmark). One target is to double the area farmed organically and for 60% of the food produced in public sector catering to be organic. Organic production is also an important area for Danish exports of agricultural products.

The Danish Plant Directorate publishes figures on organic agricultural production every year. In 2010 there were 2,602 organic agricultural companies in Denmark, covering a total area of 173,513 ha (ecoweb.dk:). The Danish Society for Nature Conservation would like all agricultural land in Denmark to be converted to organic but currently organic farming covers only 7% of the total agricultural area. (dn.dk)

According to GfK ConsumerScan 2011 the market share (value) of organic bread in Denmark was as follows:

- Organic rye bread: 3.2%
- Organic wheat bread 2.0%

Conversion to organic production

The theoretical conversion period for conventionally farmed land to certified organic farming is two years. This means that the harvest can be sold as organic in the third year after applying to convert to organic. Feed crops may be used for EU Organic and

[117] KRAV market report 2011.
(www.krav.se/Documents/Marknadsrapport2011/KRAV_Marknadsrapport_web.pdf) (2012-01-19)

[118] Swedish Board of Agriculture. Yearbook of Agricultural Statistics 2011 (www.jordbruksverket.se)

[119] Swedish Board of Agriculture. 2010. Hur styr miljöersättningen för ekologisk produktion? – effekter på marknad och miljö. (Impact of green premiums on organic production – effects on the market and the environment). Report, 2010:1.

KRAV-certified animals if the feed is harvested no earlier than 12 months after the start of the conversion period.[120]

[120] KRAV http://www.krav.se/KravsRegler/2012/4/ (1).

Appendix 3 Sustainability certification and traceability of ingredients

Sustainability certification seeks to set out rules for how ingredients are to be grown in order to meet social, economic, organic and cultural needs. What today's certification systems have in common is that they cover steering-related aspects as well as environmental and social requirements. The major certification bodies have developed provisions, policies and standards which define various specific requirements more clearly.

Types of certification

a) Sustainability certification of ingredients
Sustainability certification is a certification system for forest/agriculture managers or owners who want to show that their forestry/agriculture has favourable social effects and that it is carried out in an environmentally sustainable and economically profitable manner. The process follows agreed principles and criteria issued by a recognised, independent organisation. Traceability certification is a business-to-business certification.

b) Traceability certification Chain of Custody (CoC)
Chain of Custody certification means that a certified material can be traced throughout its production chain. The system is intended for companies that manufacture or trade in the raw material/product. The purpose is to show customers that the company uses responsibly produced raw materials. The Chain of Custody certificate helps companies to tighten their raw materials purchasing policies and to comply with public or private purchasing provisions. Most sustainability certification system also have a specific traceability standard.

Relevant sustainability certification systems for food products

Organic farming production can be in line with EU Organic, KRAV, Statskontrolleret, Debio and Luomu. The purpose of organic farming is agriculture adapted to nature without synthetically manufactured mineral fertiliser or chemical plant protection products. The objective of organic farming is an ecocycle-based approach and striving for a rural landscape with a large number of species and biodiversity. Another aim is to produce agricultural products of good quality using sustainable production methods.

Roundtable on Sustainable Palm Oil (RSPO) is a global standard for sustainable production of palm oil. RSPO was founded in 2004 by stakeholders throughout the production chain from oil palm producers, purchasers, consumers and dealers to NGOs including environmental organisations. The different stakeholders are reflected in RSPO's management structure by gathering together working parties in "roundtable" discussions in which each stakeholder group has equal rights. The aim is for different stakeholders and competing companies to work together towards a common goal and make decisions through consensus. According to WWF 10% of palm oil used globally is certified but only half of that is purchased (WWF, 2011)[121].

[121] WWF. 2011. Palm Oil Buyers' Scorecard 2011. Measuring the Progress of Palm Oil Buyers.

GreenPalm has been approved by RSPO as an official broker for trade in sustainably certified palm oil.

Roundtable on Responsible Soy Association (RTRS)[122] is an initiative from stakeholders throughout the soya production and distribution chain. It is also supported by environmental organisations, such as WWF. The first RTRS standard was adopted in 2010 and the first RTRS soya was produced in 2011. There has been little interest in purchasing certified Soya and not even half of the 210,000 tonnes of certified soya produced by the Brazilian producer Amaggi was sold in 2011[123]. The RTRS standard contains, for example, requirements on improved production methods in agriculture, working conditions, reduced use of plant protection products, respect for local societies and protection of areas with high biodiversity. RTRS has been criticised because it is technology neutral, i.e. it allows both GMO and GMO-free soya and it does not ban dangerous plant protection products. Under RTRS it is not permitted to certify land which changed land use after May 2009.

ProTerra[124] is an initiative from the Swiss part of Coop and WWF. The certification can be used for several agricultural products but here is relevant for soya. In 2011 3.5 million tonnes of ProTerra certified soya was produced in Brazil. Pro Terra's requirements for soya production cover farming methods, use of chemicals, energy use, staff working conditions and respect for the rights of local populations and indigenous peoples. It also includes mechanisms for dealing with complaints and measures to preserve biodiversity and requirements not to accept soya from natural forests and other sensitive natural areas. ProTerra does not accept soya from land deforested after 2004 and for land deforested between 1994 and 2004 there is a requirement that a certain amount is replanted. Genetically modified soya cannot be certified under ProTerra.[125] ProTerra does not prohibit use of harmful plant protection products in cultivation. ProTerra has been criticised for not inviting different stakeholders into the criteria process and for not having checks carried out by an independent party, as the certification company CertID and ProTerra were owned by the same company[126]. In 2012 the companies were split and work is underway to ensure that more certification companies could be used. Today ProTerra certification is owned by the ProTerra Foundation and more stakeholders have been invited in to revise the criteria[127].

---

[122] www.responsiblesoy.org (21.02.2012)

[123] SwedWatch. 2012. Mera soja mindre mångfald – En granskning av sojaimporten från Brasilien. (More soya less diversity – an examination of soya imports from Brazil). Swedwatch follow-up report #48. Latin America groups.

[124] http://www.proterrafoundation.com/

[125] http://proterrafoundation.org/index.php/proterra-certified/2-the-proterra-institute/85-strong-non-gmo-requirements (27.06.2012)

[126] SwedWatch. 2012. Mera soja mindre mångfald – En granskning av sojaimporten från Brasilien. (More soya less diversity – an examination of soya imports from Brazil). Swedwatch follow-up report #48. Latin America groups.

[127] http://www.proterrafoundation.org/index.php/certification/managing-proterra-certification/standards-maintenance-and-development (27.06.2012)

Bonsucro (previous Better Sugar Initiative)[128] is a cooperation between a number of players, including producers of sugar cane, investors, dealers and non-governmental organisations. It is also supported by environmental organisations, such as WWF. The first standard was adopted in 2010. The production standard contains rules on the environment, social development and economical and good business practice.

Traceability of raw materials

Traceability states where the raw materials come from. In principle there are three different methods of documenting traceability 1) physical separation at every stage ("Track and trace") 2) mass balance and 3) certificate trading (Book and claim). In most traceability certification systems it is possible to use physical separation and mass balance. Certificate trading is not permitted in all systems but is permitted, for example in RSPO via an international system called GreenPalm.

Below is a more detailed description of the three traceability systems for raw materials:

1a) Traceability via physical separation at all facilities ("Track and trace") with what is known as Hard IP or Identity Preserved (IP) means that raw materials are kept separate throughout their life cycle (Figure 1). This means that it is possible to definitively state the precise origin of the raw materials of a product. The method is often used in the food industry, where, for example organic labelling requirements traceability at this level.

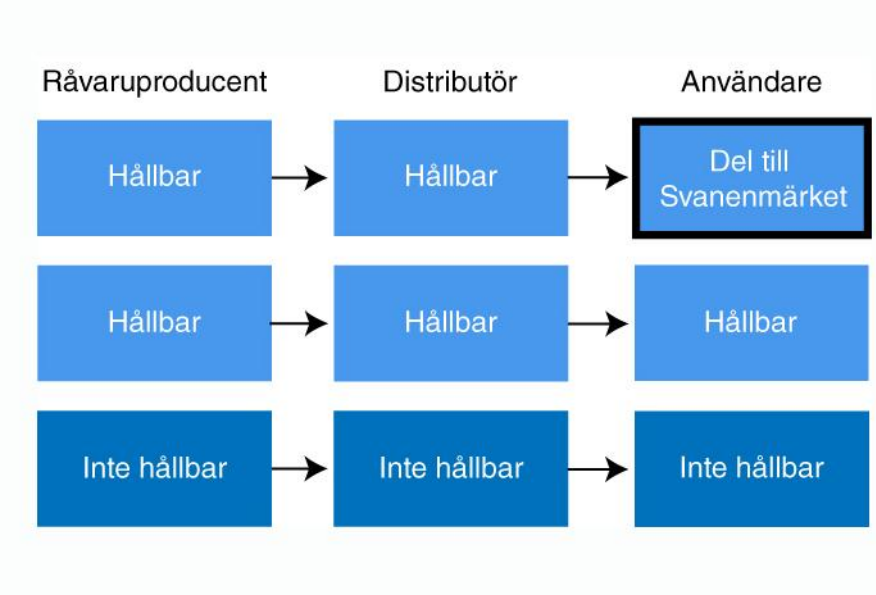


Figure 1. Traceability via physical separation at all facilities.

[key]

Raw materials producer	Distributor	User

[128] www.bonsucro.com (21.02.2012)

Sustainable	Sustainable	Part to Nordic Ecolabel
Sustainable	Sustainable	Sustainable
Not sustainable	Not sustainable	Not sustainable

1b) Traceability via physical separation of sustainable and non-sustainable raw materials. ("Track and trace" with what is known as Soft IP) means that stock of raw materials is kept separate but mixing of different sustainable mixes is allowed (Figure 2).

The advantage of physical separation is that it is possible to follow the raw material all the way to the end customer. The system involves less administration but can be expensive and complicated for smaller flows.

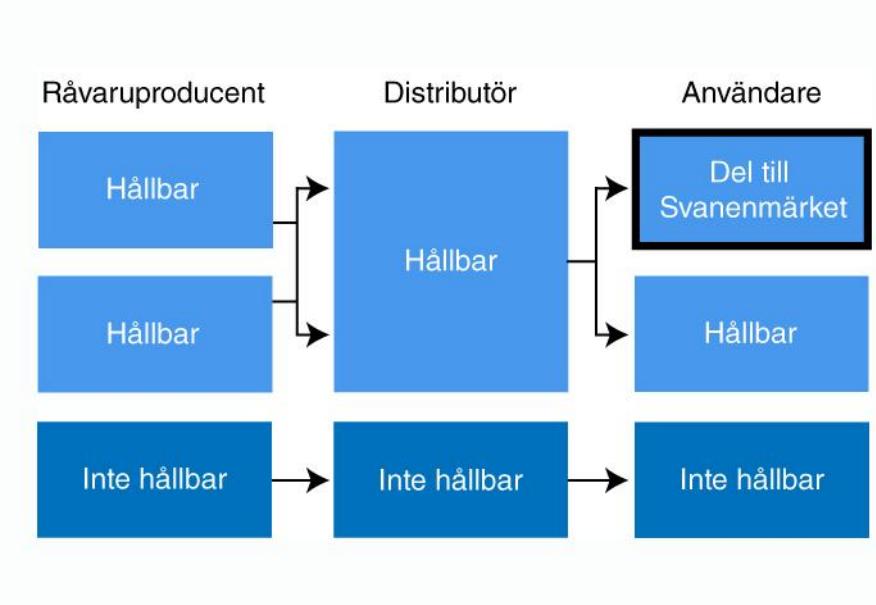


Figure 2. Traceability via physical separation of sustainable and non-sustainable raw materials.

[key]

Raw materials producer	Distributor	User
Sustainable	Sustainable	Part to Nordic Ecolabel
Sustainable		Sustainable
Not sustainable	Not sustainable	Not sustainable

2. Traceability via mass balance allows mixing of sustainable and non-sustainable raw materials (Figure 3). The requirement is that X% of sustainable raw materials into the mix is equal to X% of sustainable raw materials out of the mix. It is possible to use this method in traceability certification for food and in traceability certification for forest products (e.g. Forest Stewardship Council, FSC).

The advantage of mass balance is simplicity because no physical separation is necessary, making it easier and cheaper, particularly for trade with smaller flows. It requires a system for reporting mass balance.

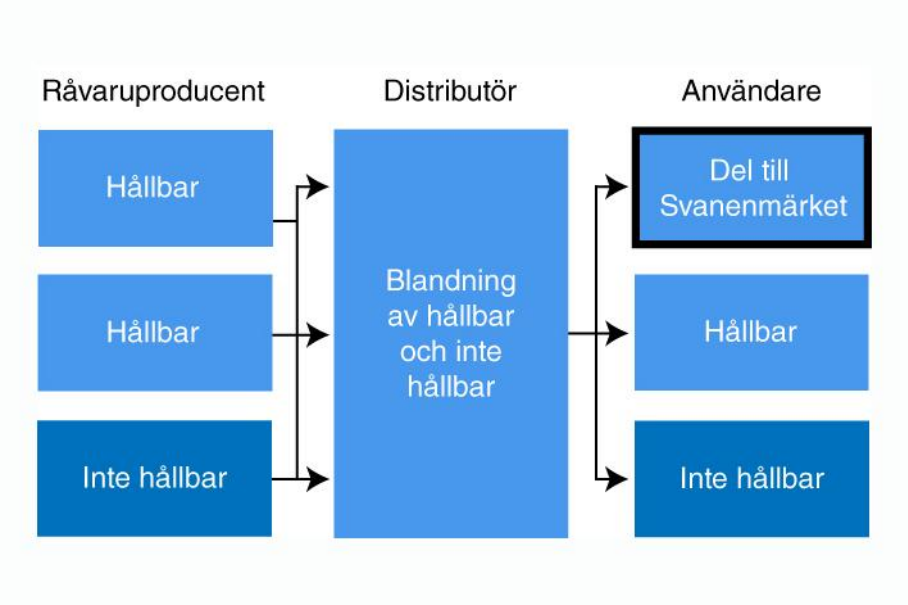


Figure 3. Traceability of mass balance of sustainable and non-sustainable elements.

[key]

Raw materials producer	Distributor	User
Sustainable	Mixture of sustainable and not sustainable	Part to Nordic Ecolabel
Sustainable		Sustainable
Not sustainable		Not sustainable

3. Systems only based on certificate trading, known as "Book and claim" (Figure 4). There is no physical connection between the product and the certificate. This is the method used by GreenPalm to buy RSPO certificates. The system must guarantee that the certified raw material/product is not sold more than once. The advantage of the system is simplicity because no physical separation is necessary, making it easier and cheaper, particularly for trade with smaller flows. The disadvantage is that it accepts trade in all sorts of palm oil, in other words it does not combat trade in non-certified palm oil.

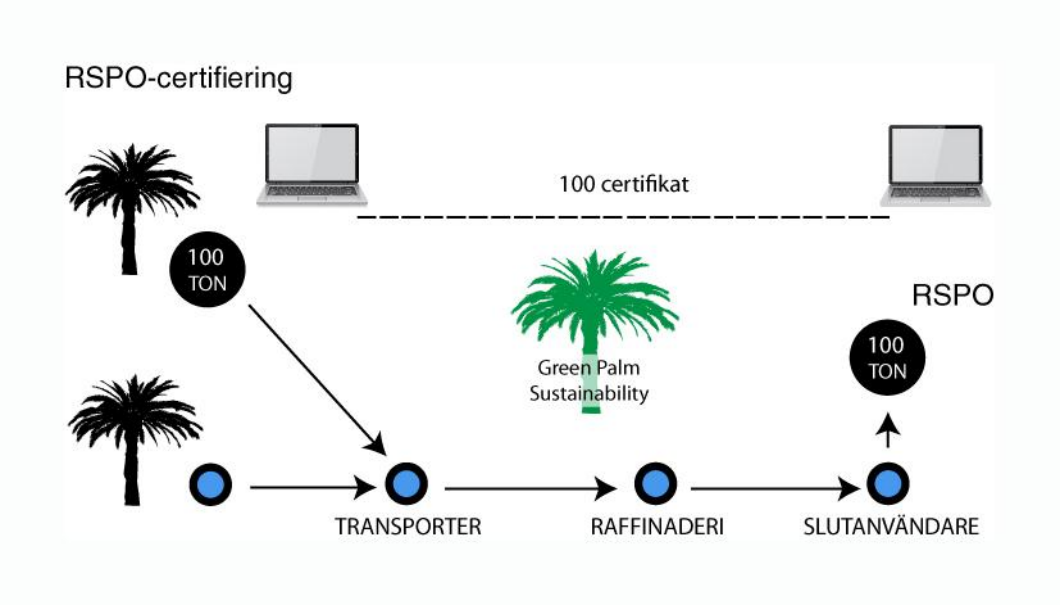


Figure 4. Traceability via certificate trading.

Appendix 4 Description of ingredients for fats, oils and sugar

Palm oil

Palm oil is an extremely versatile ingredient, traditionally used as a food and as a raw material in non-food products, such as cosmetics, soap, shampoo and detergent. Only recently, with rising prices for petroleum products and the challenge of climate change, have we seen a focus on palm oil as a renewable energy source.

Palm oil is a relatively new product in the food industry which has replaced other fats following the discovery of the negative consequences of trans fats. Palm oil is used in cooking in much of the world. Because it is a cheap edible fat and advantageous in terms of food technology it is one of the main ingredients in margarine internationally and is also common in the food industry. A study of industrial margarines and domestic margarines in Sweden shows that trans fats have mainly been replaced by palm oil[129]. In Norway there is a demand for palm oil-free alternatives to margarine. Palm oil is squeezed from the flesh of the palm fruit, and palm kernel oil comes from the kernel of the fruit.

FAO calculates that palm oil production will double from 25.6 million tonnes (equivalent to 1999/2001) to 54.2 million tonnes by 2030 (Reinhardt et al, 2007). Approximately 90% of all the palm oil produced and traded worldwide comes from Malaysia and Indonesia[130 131]. The rest is mainly used in Nigeria, Thailand and Colombia. Oil palms only grow in the tropics in a band along the equator (between latitude 10° S and 10° N), and up to a height of 500 metres above sea level.

In December 2011 new legislation was introduced by the EU on the provision of food information to consumers (Regulation 1169/2011 of the European Parliament and the Council). Under the Regulation after 2014 the origin of "vegetable oil or fat", such as "palm oil", must be stated on food products[132].

To produce palm oil more sustainably, Roundtable on Sustainable Palm Oil (RSPO) (described above in Appendix 3, Sustainability certification of ingredients) has developed sustainability certification for palm oil production. According to WWF 10% of palm oil used globally is certified by RSPO but only half of that was purchased during 2011[133].

The information received by Nordic Ecolabelling from bakeries indicates that it is very common for palm oil to be used in bakeries in products with a high fat content. Major players in the bakery industry buy certificates from GreenPalm to certify that the palm oil they use is produced sustainably under Roundtable on Sustainable Oil Palm (RSPO).

---

[129] Åsgård & Wretling. 2011. Margariner och matfettsblandningar - analys av fettsyror. (Margarines and edible fat blends – analysis of fatty acids). Report 2011:15 The National Food Administration, Sweden.

[130] WWF. 2011. Palm Oil Buyers' Scorecard 2011 – Measuring the Progress of Palm Oil Buyers.

[131] Thoenes 2006. Biofuels and Commodity Markets – Palm Oil Focus. FAO, Commodities and Trade Division.

[132] http://mattilsynet.no/mat/merking/nye_krav_om_bedre_merking_av_mat_97301 (accessed 28.02.2012)

[133] WWF. 2011. Palm Oil Buyers' Scorecard 2011 – Measuring the Progress of Palm Oil Buyers.

One says that they have set up a target for all palm oil to be RSPO-certified in 2012. The smaller bakeries either do not use fat blends that contain palm oil or they use a fat blend but do not know whether it contains palm oil . The small bakeries state that they also use butter and margarine.

Sales include everything from palm oil-free products to 5-100% palm oil. These solid fats are roughly twice as expensive as products which use palm oil, but then they also tend to be non-hydrogenated and free of trans fats. Organic palm oil is also available on the market.

Rape and sunflower oil

Rape (Brassica napus) and turnip rape (Brassica rapa) are the most common oilseed plants in the Nordic countries. Because oilseed plants are a good rotation crop in cereal-dominated crop rotation, they can generally reduce the need for plant protection products in the cultivation system. Oilseed plants are, however, sensitive to disease and pests. The are also poor in competing with weeds. This is one reason why oilseed crops are only grown to a limited extent (Fogelfors, 2001). Rape is one of the four most grown GM (genetically modified) crops but there are no genetically modified sunflower varieties.

Fat from soya

In bakeries soya oil is mainly used in chocolate but also in margarine and fat blends for bakeries. Oil from soya accounts for 28% of the world's consumption of vegetable oil. The USA, Brazil and Argentina produce 80% of the world's soya. Of the soya grown in these countries, the GMO proportion was 100% in Argentina, 93% in the USA and 75% in Brazil in 2010.[134] The use of GM soya has led to the development of herbicide-resistant weeds. There has been an increase in total use of plant protection products since GMO was introduced in Brazil, but it is not possible to distinguish increased use of plant protection products in the cultivation of GM soya compared with conventionally grown soya[135]. In Brazil use of herbicides in soya cultivation increased by 50% per hectare and use of fungicide increased by 70% between 2003 and 2008[136].

In addition to the ever increasing use of plant protection products, ever increasing land use is also a challenge. In Brazil the most economically successful crops soya and sugar cane, together with cattle farming, are judged to account for 80% of the use of agricultural land. An increased demand for these leads to increased demand for land, which in the long run can lead to deforestation. Growing sugar cane and soya and cattle

---

[134] Soy Stats. 2012. Soy Stats 2011. www.soystats.com. (10.05.2012)

[135] SwedWatch. 2012. Mera soja mindre mångfald – En granskning av sojaimporten från Brasilien. (More soya less diversity – an examination of soya imports from Brazil). Swedwatch follow-up report #48. Latin America groups.

[136] Meyer & Cederberg. 2010. Pesticide use and glyphosate resistant weeds – a case study of Brazilian soybean production. SIK report No 809. SIK. Gothenburg.

farming also pushes out less financially rewarding props from the best land to the periphery, i.e. to the forest[137].

The total area used for soya beans in Brazil was approximately 24 million hectares in 2010/2011[138] but is expected to increase to approximately 27 million hectares by 2019[139]. Developments in Brazil are not driven by the production of soya for use as a vegetable oil. A large proportion is used for domestic biodiesel production, but export of soya for feed to Europe is also considerable.

In total 70 million tonnes of soya was produced in Brazil in 2010 and in 2011 300,000 tonnes of RTRS soya and 3.5 million tonnes of ProTerra soya were certified. This means that access to certified soya from Brazil is limited but not all RTRS soya was sold in 2011. Major importers of soya to the Nordic countries are Lantmännen, Denofa and Svenska Foder and a large proportion goes for feed[140]. All the soya that Denofa and Svenska Foder import from Brazil is ProTerra certified. 35% of Lantmännen's soya from Brazil is ProTerra certified (some of which is purchased from Denofa). In 2011 Lantmännen also bought RTRS certified soya, which amounted to 22% of volumes.[141] Lantmännen has decided that in 2013 50% of its soya purchasing must be RTRS-certified[142]. To guarantee that soya does not come from GM crops, full traceability (physical separation) is required via Identity Preserved (IP). According to one major player in the industry, only a very limited amount of fat from soya is sold to bakeries in the Nordic countries.

Sugar

In the Nordic countries the market leader is the company Nordic Sugar AB (part of the Nordzucker Group). Nordic Sugar has sugar factories in Denmark, Sweden, Finland and Lithuania and two sugar refineries, one in Finland and one in Sweden. According to Swedish statistics Sweden is 96.4% self-sufficient in sugar. It has not proved possible to find corresponding statistics for Finland and Norway. According to the statistics, a considerable amount of sugar is imported to Finland.[143]

---

[137] FOE Friends of the Earth. 2010. From forest to fork – The UK's contribution to deforestation in Brasil. Report.

[138] SwedWatch. 2012. Mera soja mindre mångfald – En granskning av sojaimporten från Brasilien. (More soya less diversity – an examination of soya imports from Brazil). Swedwatch follow-up report #48. Latin America groups.

[139] FOE Friends of the Earth. 2010. From forest to fork – The UK's contribution to deforestation in Brasil. Report.

[140] Lantmännen is owned by 35,000 Swedish farmers and is one of the largest groups in the Nordic countries in food, machinery, energy and agriculture. Denofa is based in Norway and is 51% owned by the Brazilian soya producer Amaggi with the remainder owned by Norgrain. Svenska Foder is owned by Danska Landbrugs Grovvarelsekab (DLG).

[141] SwedWatch. 2012. Mera soja mindre mångfald – En granskning av sojaimporten från Brasilien. (More soya less diversity – an examination of soya imports from Brazil). Swedwatch follow-up report #48. Latin America groups.

[142] Lantmännen. 2012. http://lantmannen.com/sv/press--media/Nyheter-och-pressmeddelanden/Lantmannen-paskyndar-utveckling-av-certifierad-soja/ (08.06.2012)

[143] Swedish Board of Agriculture, 2010. Market overview – vegetables. Report, 2010:04.

Organic sugar is not grown on a large scale in Finland, Norway or Sweden[144] [145]. In Sweden organic cultivation of sugar beet ceased in 2006 due to low profitability[146]. It is possible to buy organic sugar from Nordic Sugar AB which buys organic raw sugar on the global market from countries including Brazil, i.e. it comes from sugar cane[147]. Nordic Sugar does not sell sustainability certified sugar according to Bonsucro[148]. Nordic Sugar cannot offer full traceability via its factories because it only has two silos for sugar and one for molasses at each factory. Full traceability would require a larger number of smaller silos.

Slightly more than half of the world's sugar production comes from sugar cane and the remainder from sugar beet. The ten largest producers of sugar in the world are Brazil, India, the EU, China, Thailand, USA, Mexico, Australia, Pakistan and Russia. The largest exporters in the world are Brazil, the EU, Thailand, Australia and Guatemala. The global market price of sugar rose strongly in 2005 and 2006 partly due to increased oil prices. High oil prices bring a greater demand for ethanol as fuel for various purposes and this in turn means less production of sugar as more sugar cane is used to produce ethanol. It is primarily Brazil that affects the global market prices with its relatively large production of both sugar and ethanol.[149] Brazil is responsible for about 42% of the global trade in sugar, followed by the EU (18%) and Australia (9%).[150]

The WWF considers that sugar cane production may have caused the obliteration of some of the most unique areas for biodiversity on earth. For almost 500 years tropical forests, completely natural habits of thousands of islands, and millions of hectares of sensitive coastal wetlands around the world have been destroyed or otherwise transformed for planting sugar cane. A dozen countries around the world dedicate 25% or more of all their agricultural land for the production of sugar cane[151]. In the large export country of sugar and ethanol, Brazil, the economically best crops, soya and sugar cane together with cattle farming are estimated to account for 80% of agricultural land use. An increased demand for these leads to increased demand for land, which in the

---

[144] Tysdal, K. 2012. Norwegian Agricultural Authority Personal communication (22 February 2012)

[145] Matilda Agricultural Statistics. 2012. Organic crop in 2011. http://www.maataloustilastot.fi/sv/statistik-over-den-ekologiska-skorden (09.05.2012)

[146] Swedish Board of Agriculture, 2010. Market overview – vegetables. Report, 2010:04. http://www2.jordbruksverket.se/webdav/files/SJV/trycksaker/Pdf_rapporter/ra10_4.pdf

[147] Hansen, J. Nordic Sugar, oral communication (28.02.2012)

[148] Kopelhous, C. Nordic Sugar, oral communication (28.02.2012)

[149] Swedish Board of Agriculture, 2010. Market overview – vegetables. Report, 2010:04. http://www2.jordbruksverket.se/webdav/files/SJV/trycksaker/Pdf_rapporter/ra10_4.pdf

[150] FOE Friends of the Earth. 2010. From forest to fork The UK's contribution to deforestation in Brazil. Report October 2010.

[151] WWF http://wwf.panda.org/what_we_do/footprint/agriculture/sugarcane/environmental_impacts/habitat_loss/ (2012-02-21)

long run can lead to deforestation. However, it is not the use of sugar in the Nordic countries that is driving this development bur primarily demand for biofuels and feed.

Appendix 5: MECO analysis (Materials, Energy, Chemicals and Other)

	Production of ingredients	**Production**	**Transport**	**Shop/storage**	**Waste/Recycling/Wastage**
Materials	Artificial fertiliser NPK (conventionally grown only) Energy raw materials Land use: higher in organic cultivation as harvests are 50-70% that of conventional cultivation[152].	Non renewable: Fossil energy, Packaging oil for plastics Renewable: ingredients and cardboard for cardboard packaging	Non renewable: Fossil energy		Packaging (oil and raw materials for cardboard where used)
Energy MJ/kg bread[153] **Climate:** Greenhouse gas emissions kg CO_2-equiv./kg bread[154]	Use of energy for cultivation ≈ 2-4 MJ/kg bread Energy use organic farming 35-50% lower than conventional farming[155]. **Climate** Conventional ≈ 0.3-0.5 Organic cereals generally lower greenhouse gas emissions than conventional cereals.[156]	Industrial bakery ≈ 2 Local bakery ≈ 2 Bake-off (bakery) ≈ 2 **Climate** Mill ≈ 0.04 Industrial and local bakery ≈ 0.2-0.3 (0.05-0.1)	Distribution Industrial bakery ≈ 0.5 Local bakery ≈ 0.2 Bake-off ≈ 1.5 **Climate** Industrial bakery ≈ 0.05 Local bakery ≈ 0.01 Bake-off ≈ 0.2	Industrial bread ≈ 0.5 Local bakery ≈ 0.2 Bake-off ≈ 7 **Climate** Industrial bakery ≈ 0.01 Local bakery ≈ 0.01 Bake-off ≈ 0.1	Waste Industrial bread ≈ 0.5-1 Local bakery ≈ 0 Bake-off ≈ 1.8 **Climate** Industrial bakery ≈ 0.01 Local bakery ≈ 0.01 Bake-off ≈ 0.05
Chemicals/additives	Pesticides Straw shortening Cadmium in fertiliser and sludge, where applicable	Cleaning chemicals			

[152] Cederberg et al. 2011. Climate footprint of organic agricultural products. SIK report No. 830.

[153] Values from Saarinen et al. (2010). These do not include mills. All the values are associated with a high degree of uncertainty and the data is based on a study. The values should only be used to analyse which elements can be significant during the bread's life cycle.

[154] Values from Saarinen et al. (2010). All the values are associated with a high degree of uncertainty and the data is based on a study. The values should only be used to analyse which elements can be significant during the bread's life cycle.

[155] Lagerberg Fogelberg, C. 2008. På väg mot miljöanpassade kostråd - vetenskapligt underlag inför miljökonsekvensanalysen av Livsmedelsverkets kostråd (Towards eco-friendly dietary advice - scientific data for the environmental impact analysis of the Swedish Food Administration's dietary advice). The Swedish National Food Administration, Report 9:2008.

[156] Cederberg et al. 2010. Climate footprint of organic agricultural products. SIK report No. 830.

Other	Working conditions. Ingredients may come from land that was formerly rainforest.	Enzymes (amylase) may cause allergies in bakery workers.			

Appendix 6: Current bread labels in the Nordic countries

Name	The EU's organic farming logo	Statskontrollerat ekologiskt	KRAV	Ø label	Luomu	Fairtrade	Brødskalaen	Keyhole
Profile	Guarantees compliance with the EU's organic regulation.	Organically produced	Organically produced - requirements exceed the EU's regulations on organic production.	Organically produced	Organically produced	Guarantees good working conditions and works towards fairer trade.	Information on the content of whole grain, whole grain flour and bran.	Guarantees low in salt, sugar and fat and high in fibre.
What can be labelled?	Food	Food	Food, restaurants and shops	Food	Food and restaurants	Food, flowers and footballs	Bread and flour	Food
Extent	Compulsory on all pre-packed organic food in the EU	Danish organic label	Swedish organic label	Norwegian organic label	Finnish organic label	International	Norwegian health label	Swedish, Danish and Norwegian health labels
Market share	New label	6.8% of all food	5% of all food (2010)[157]	1.1% of all food (2010)[158]	?			4.7% (Norway, 2010)[159]
Consumer recognition	New label	98%	97%	85% (2010)[160]	?	25%		98% (Sweden) 96% (Norway, 2011)[161]

[157] KRAV's market report 2010: http://www.krav.se/Documents/Marknadsrapporter/Marknadsrapport2010.pdf

[158] Statens landbruksforskning: Produksjon og omsetning av økologiske landbruksvarer (Production and sale of organic agricultural products). 2010 report, 23.03.2011

[159] Nøkkelhullet's website: http://www.nokkelhullsmerket.no/nokkelhull/Nyheter/article868.ece?service=print, 21.02.2012

[160] Debio's website: http://www.debio.no/text.cfm?path=1,54&id=837, 21.02.2012

[161]The Norwegian Directorate of Health's website: http://www.helsedirektoratet.no/Om/nyheter/Sider/god-kjennskap-til-nokkelhullet.aspx, 21.02.2012

Nordic Ecolabelling
Nordic Ecolabelled Bakeries and Bread - Background to ecolabelling
2 January 2013