CBI Product Factsheet:
Minor Oilseeds in Europe¹

¹ European Union (EU) and EFTA (European Free Trade Association)
Introduction

This Product Factsheet covers a group of oilseeds (poppy seeds, mustard seeds, hemp seeds and pumpkin seeds) which are traded in low volumes, but at a high value in the European market. These oilseeds reach the European market through the same trade channels, and find very similar applications, mostly in the bakery and confectionery segment. The direct human consumption of these oilseeds is also increasing in Europe, driven by the health & wellness trend.

Product definition

Poppy seeds

The poppy seed is an oilseed obtained from the pods of the opium poppy plant (*Papaver somniferum*). The pods contain a large amount of white, grey or bluish seeds. The poppy seed has been cultivated for over 3,000 years. Poppies grow best at cool temperatures between 10 to 15 degrees C. Today, poppy seeds are produced in various countries, mostly in Central European and Asian countries.

The tiny kidney-shaped seed is often added to foods such as breads, muffins and hamburger buns as a topping, both for its flavour and crunchy texture. Next to its use as garnish and spice, poppy seeds are also added to food for their nutritious value and low allergenic risk compared to other oilseeds. Poppy seeds can also be used as the source of poppy seed oil, as feedstuff and as a medicine. As a medicine, compared to the seed pod and straw, the seeds contain very low levels of opiates. However, as described under ‘trends’, there is a risk of contamination between different plant parts, posing a food safety threat.

Mustard seeds

The mustard seed is an oilseed that exists in three different types, namely yellowish white, brown and black mustard seeds. Yellowish white mustard seeds are obtained from the white mustard plant (*Brassica hirta / Sinapis alba*) and are the mildest in flavour. They are used primarily in the condiment and food industries, suitable for applications such as dry milling for flour, wet milling for mustard pastes, and whole ground seed for spice mixes and meat processing. The oil content of yellow mustard seed is the lowest of the three types of mustard at approximately 27%.

Moreover, brown mustard seeds are obtained from the brown mustard plant (*Brassica juncea*) and black or ‘oriental’ mustard seeds are obtained from the black mustard plant (*Brassica nigra*). Brown and black mustard seeds are hot and spicy. Brown mustard seeds are commonly ground into flour which is used to produce hot mustard, used in European products. The oil content of brown mustard seed is about 36%. The black mustard seed is native to the sub-Himalayan plains of Northern India, and often used to produce spicy cooking oils. There are oriental black mustard seed varieties grown in Canada that have oil contents of up to 50%, although the average oil content is approximately 39%.

Additional to their use for flavour, mustard seeds are also known for their nutritious value, being rich in minerals, vitamins and anti-oxidants.

Mustard seeds are best cultivated under cold atmosphere and relative moist soil. Mustards are native to Anatolia. Today, however, mustard seeds are cultivated as one of the main commercial crops in Canada, India, China, and temperate climates of European region as well.

Hemp seeds

The hemp seed is an oilseed derived from the hemp cultivars of the Cannabis plant (*Cannabis sativa* L.). Hempseeds are commonly used as a condiment in its raw version, ground into a bakery or into milks or they are sprouted. Hemp seeds have been used as a source of food for thousands of years. Nevertheless, its cultivation and food use remain limited.

In recent years, hemp seeds have been recognised as functional foods (to stimulate health). The seed is known for its high levels of protein, its unique fatty acid profile and its dietary fibre, mineral and vitamin content. Nonetheless, it is still considered to be a niche product.

Pumpkin seeds

Pumpkin seeds (or ‘pepitas’) are edible kernels of the pumpkin fruit (*Cucurbita maxima*). The seeds are commonly used in foods for their sweet, creamy and nutty flavour as well as for their nutritious value. The seeds’ use in foods is primarily as
a condiment, for instance in baking and salads, and as an oil. In the latter case, oil may be produced from the naked green seed or, as a cheaper option, from the green seeds including its white shell.

Pumpkins are cultivated in different parts of the world. Today, China (specifically the Inner Mongolia province) produces more pumpkin (seeds) than any other country. It is known for its high quality and organic certified production process. India, Russia, the Ukraine, Mexico, and the U.S. are also major producers of pumpkin (seeds).

**Codes for minor oilseeds:**
The products covered in this Product Fact Sheet can be found in the following Harmonised System (HS) codes:

<table>
<thead>
<tr>
<th>HS code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1207 5090</td>
<td>mustard seeds (excl. for sowing)</td>
</tr>
<tr>
<td>1207 9190</td>
<td>poppy seeds (excl. for sowing)</td>
</tr>
<tr>
<td>1207 9991</td>
<td>hemp seeds (excl. for sowing)</td>
</tr>
<tr>
<td>1207 9996</td>
<td>other, incl. pumpkin seeds (excl. for sowing)</td>
</tr>
</tbody>
</table>

**Product specification**

**Quality**

**General**
The quality properties of the minor oilseeds covered in this document can be differentiated according to several parameters. Quality grade specifications often include:

- Uniformity in size, shape and colour; different varieties should not be mixed.
- Seed conditions such as hardness, moisture content, oil content (including fatty acid composition), odour, colour and flavour.
- Cleanliness and absence of moulds, weevils, obnoxious smell, insect infestation and artificial colouring matter.
- Absence of foreign matter: dust, lumps of earth, dirt, stones, straw or any other impurity and/ or any other edible/non edible seeds.

Oilseeds should be free from mycotoxins and harmful microbiological activity. Especially Aflatoxin and ochratoxin contamination are known to be a problem for many oilseed producers, and buyers closely monitor these aspects.

It is also important to prevent adulteration and contamination of seeds by foreign materials (e.g. dust) by keeping facilities and equipment clean. In addition, make sure to ensure proper storage and transportation (see ‘Packaging’).

**Organic (if relevant)**
- Comply with organic standards for the production of oilseeds. Refer to the section on ‘Niche requirements’ for further details on organic production and labelling.

**Labelling**

- Ensure traceability of individual batches.
- Use English for labelling purposes, unless your buyer has indicated otherwise.
- Labels must include the following:
  - Product name
  - Manufacturer’s lot or batch code
  - Whether or not the product is destined for use in food products
  - Name and address of exporter
  - Product’s country of origin
  - Shelf life: Best-before date / use-by date
  - Net weight / volume in metric units
  - Recommended storage conditions

**Organic (if relevant):** Name / code of the certifying body and certification number.
Packaging

The minor oilseeds covered in this document are usually transported in natural bags (e.g. jute), often with an inner lining material to avoid bleeding, or paper bags.

- Ensure preservation of quality by:
  - Thoroughly cleaning and fumigating containers before loading the seeds.
  - Protecting the cargo from moisture during loading, as to avoid mould, spoilage and self-heating.
  - Ensuring appropriate temperature, humidity/moisture and ventilation conditions during transportation.
  - Protecting the cargo from pests such as beetles, moths, etc.

Trade and Macro-economic statistics

Imports

Figure 1: Total imports of minor oilseeds to Europe, including share of developing countries (DCs), in 1,000 tonnes

Source: Eurostat, 2015

- Total European imports of poppy, hemp and mustard seeds amounted to 203,000 tonnes (€223 million) in 2014. Additionally, imports of ‘other seeds’ (incl. pumpkin seeds) amounted to 146,000 tonnes (€246 million) in 2014.
- Over the period 2010-2014, total European imports showed a positive annual growth rate for mustard seeds (+4.5%) and poppy seeds (+1.0%), while imports of hemp seed showed a slight negative decline (-0.9%). ‘Other seeds’ (incl. pumpkin seeds) have recorded a significant average annual decline of -8.6% since 2010.
- West European countries, especially the Netherlands, Germany, Belgium, and the UK, account for the largest share of total European imports for all four oilseed categories covered in this Product Factsheet.
- These countries are important trade hubs and, in some cases, oilseed processors, which makes them key distributors of seeds and their products to other European countries. For instance, as well as being the main European importer of hemp seed in 2014, the Netherlands was also the second largest (re-)exporter of hemp seeds to other European countries in the same year. In 2014, Dutch hemp seed imports reached 6,800 tonnes (€7.6 million), and its hemp seed (re-)exports reached 4,700 tonnes (€7.7 million), accounting for 33% of total European trade.

Tip:
- Accompany developments in the European trade for oilseeds and identify developments such as the emergence of new suppliers and decline of established ones. An interesting source to get acquainted with the European market and its trade dynamics is the website of the European Commission’s Export Helpdesk. The website of FEDIOL centralises publications addressing the oilseed sector and can be relevant to the products covered in this Product Factsheet.
In 2014, the largest shares of developing country-sourced oilseeds were recorded for hemp seeds and the product group 'other oilseeds, including pumpkin seeds'. Hemp seed imports from developing countries account for approximately 46% (9,900 tonnes / €10 million) of supplies to European countries, while this was 51% for the product group 'other oilseeds, including pumpkin seeds' (75,000 tonnes / €142 million).

Hemp imports are significantly determined by Chinese supplies to Europe. In 2014, China supplied 100% of the total developing country supplies of hemp seeds to Europe. China’s supply of hemp seeds has remained stable over the last five years in terms of volume. China also supplied 57% of 'other oilseeds, including pumpkin seeds' sourced from developing countries and 36% of poppy seeds.

Mustard seed imports from developing countries account for approximately 19% (26,000 tonnes / €16 million) of supplies to European countries.

Ukraine dominates developing country supplies of mustard seeds to Europe, accounting for 84%. In the period 2010-2014, the Ukraine experienced a sharp annual average decline of mustard seed exports to Europe (-14%), but a slight annual average increase in terms of value (+1.5%).

Paprika seed imports from developing countries account for the lowest share, approximately 10% of paprika seeds being sourced from developing countries (4,400 tonnes / €10 million).

Turkey significantly determined the paprika seed supplies in 2014, accounting for 57% of paprika seed supplies to Europe. Turkey’s share of paprika seed supplies has experienced an average annual increase over the last five years (+7.5% in terms of volume and +14% in terms of value). China was also an important supplier of paprika seeds (36%), having experienced an even sharper annual average increase of +33% in terms of volume and +51% in terms of value.

**Tip:**
- Identify your potential competitors and learn from them in terms of:
  - Marketing: website, social media, trade fair participation, etc. Well-structured websites are for example: **Earthen Delight (India)**, **Dalian Spring Agricultural Products (China)**, **Umalaxmi Organics (India)**, **Etna (Turkey)**, **Bata Food (Turkey)**.
  - Product characteristics: origin, quality, oil content, etc.
  - Value addition: certifications, processing techniques.
Exports

Figure 3: Total exports of minor oilseeds from the European market, 2010-2014 in 1,000 tonnes.

- In 2014, total European exports of poppy, hemp and mustard seeds reached 109,000 tonnes (€175 million). Exports of ‘other oilseeds’ (incl. pumpkin seeds) amounted to 57,000 tonnes (€129 million).
- The largest European exporters of minor oilseeds are located in Western Europe. Most of the export destinations for these oilseeds are also located within the EU, thus reflecting the high level of intra-European trade for these products.
- Germany is the main (re-)exporter of mustard seeds, accounting for a share of 45% of the total European exports in 2014. France is the main (re-)exporter of hemp seeds (with a share of 44% of total European exports in 2014) and the Netherlands is a large exporter of all selected oilseeds (including e.g. 33% of total hemp seed exports). Whereas Germany is a large producer of mustard seeds, and France is the largest producer of hemp seeds in the EU, the Netherlands’ function is limited to being a major trade hub for oilseeds.
- An important exception is the Czech Republic, accounting for approximately a third (43%) of total European exports of poppy seeds in 2014. Czech exports amounted to 24,000 tonnes (€54 million). The Czech Republic is also the main global producer of poppy seeds, with a long tradition in poppy seed cultivation.

Tip:
- The website of FoodDrinkEurope could be an interesting source to understand consumption patterns of food products, including the use of oilseeds, across different European countries.
Consumption

Figure 4: Apparent consumption\(^2\) of minor oilseeds in the European Union, in 1,000 tonnes

- Total apparent consumption of mustard, poppy and hemp seeds in Europe amounted to 225,000 tonnes in 2014, having declined at an annual average rate of -2.0% since 2010.
- Mustard seeds are the most consumed oilseeds in the group of minor oilseeds (65% of total consumption). The consumption of mustard seed has recorded an average annual increase of +3.0% since 2010. Please note that apparent consumption also includes industrial demand, including mustard seeds which are used in the production of mustard in Europe (e.g. France, Germany, the Netherlands, Eastern Europe, etc.).
- Hemp seeds accounted for 25% of total apparent consumption in 2014, also including industrial demand stemming from the crushing industry (hemp seed oil). Hemp seed consumption increased substantially between 2010 and 2012, at an annual average rate of +26%, but declined at an annual rate of -16% between 2012 and 2014.
- Poppy seeds recorded a sharp decline in consumption, at an annual average rate of -23%. The market for poppy seeds generally declined in this period due to the risk of seed contamination from other plant parts, which has enhanced food safety concerns – following high profile reports from consumers. Poppy seeds are mostly used in bakery and confectionery in both Western and Eastern Europe.

Production

Figure 5: Production of minor oilseeds in the European Union, in 1,000 tonnes

- Source: FAOSTAT 2015, Eurostat 2015

\(^2\) Apparent consumption: defined as a calculation of (imports – exports) + production.
• Total European production of hemp, poppy and mustard seeds reached 140,000 tonnes in 2013. Given the total production volume of 219,000 tonnes in 2009, European production levels of these three seeds declined at an annual average rate of -11% over the period 2009-2013.

• Production levels of all three seeds decreased substantially in the period 2009-2013. Mustard seed production declined at an average annual rate of -12%, hemp seed production declined at an annual average rate of -10% and poppy seed production declined at an annual average rate of -9.0%.

• The main producer of poppy seeds in Europe is the Czech Republic, accounting for more than a third of total European production (14 out of 42,000 tonnes) in 2013. Nevertheless, Czech production of poppy seeds declined over the period 2009-2013, with an average change of -19% annually. This decline is linked to food safety concerns related to poppy seeds, as described in the section 'Market trends'. Nonetheless, the Czech Poppy Seed Growers Association estimates that production in 2014 exceeded 23,000 tonnes, due to higher crop yields and increased sowing areas.

• The main producer of hemp seed in 2013 was France. With a total production volume of 48,000 tonnes the country accounted for 98% of total European production volumes (total of 49,000 tonnes). However, French production also declined sharply at an average rate of -10% annually in the period 2009-2013.

• The main producers of mustard seed in Europe are France, Czech Republic and Germany. Of the total European production of 50,000 tonnes in 2013, France accounted for 28% (14,000 tonnes), the Czech Republic for 27% (13,000 tonnes) and Germany for 21% (11,000 tonnes) of the total production volumes.

Tips:
• Find out more about consumption and production of oilseeds in Europe through the statistics provided by FAOSTAT and Fediol (Federation of the European Vegetable Oil and Proteinmeal Industry).
• The websites of Baking Europe and of the European Confederation of National Bakery and Confectionery Organisations can also provide interesting information on the market for bakery and confectionery in Europe, which is the largest segment for the oilseeds covered in this Product Factsheet.

Market trends

Health and Wellness

• Increased scientific and public knowledge about the role that a healthy diet in general, and the fatty-acid content of foods in particular, can play in preventing disease and promoting general health has created new opportunities for the oilseed industry in recent years.

• Natural health products and functional/convenience foods represent one of the fastest growing markets in Western Europe. Because oilseeds form an ingredient in these products [Nuts and seeds accounted for more than 37% of global snack foods launches in 2013 (Innova Market Insights)], this has positively affected the demand for minor oilseeds.

• In addition, the rising number of Europeans adopting a vegetarian diet has spurred the request for more functional and high-value protein ingredients as an alternative to meat and fish, which increases the incorporation of oilseeds in products such as breads and snacks.

• In the bakery sector, there continues to be increased demand for greater variety of wholemeal breads with oats, bran and seeds. With a total consumption of bread, bagels, viennoiserie³ and patisserie estimated at nearly 39 million tonnes in the EU, this trend has largely affected the popularity of confectionery-grade oilseeds.

• The increased scientific and (particularly) public knowledge on the benefits of high value oilseeds and its resulting popularity has also meant that these products are now sold in mainstream supermarkets as well, as opposed to being sold mainly in health food shops – which was the case a decade ago (Irish examiner, 2012).

³ Baked goods made from a yeast-leavened dough in a manner similar to bread, or from puff pastry, but with added ingredients giving them a richer, sweeter character, approaching that of pastry.
Make sure your product characteristics and quality match your target market and end-user in terms of:

- Taste and odour
- Purity level & uniformity

**Oilseeds and the food safety debate**

- Scientists have recently warned for potentially hazardous levels of morphine in poppy seeds used in UK bakery products. The UK Food Standards Agency (FSA) said 'morphine-like' effects were observed in some consumers after they had eaten poppy seeds ([International Business Times, 2014](#)).
- Poppy seed exporters supplying the European Union’s food market must be aware of the risk of morphine contamination during cultivation, harvesting and processing. The potential of hazardous quantities of morphine in food products containing poppy seeds, such as the recently researched for the UK’s bakery sector, can seriously jeopardise an exporter’s reputation. It should thus be considered as an essential factor in handling.
- Poppy seeds do not contain the opium alkaloids (which cause the morphine effect) but they can become contaminated with alkaloids as a result of poor harvest and post-harvest practices.

**Tip:**

- Stay informed on the news for Supplements and Nutrition trends in the European Union by visiting the [Nutraingredients website](#).

**Tip:**

- Currently, there is no European Union regulation on morphine content in poppy seeds used in food. Yet, as the discovery of morphine contamination can harm an exporter’s reputation, producers / exporters are advised to invest in improving their harvest and post-harvest handling of poppy seeds to avoid contamination. To reduce the presence of morphine in poppy seeds and increase the seed’s quality, the [Food Standards Agency (FSA)](#) has issued a set of codes regarding washing, soaking and heat treatment of the poppy seeds ([Bakery Info, 2014](#)).

- Similar to poppy seed contamination, hemp seeds may be contaminated during maturation, harvesting and processing, causing high levels of tetrahydrocannabinol (THC). This occurs when the hemp seed’s hull directly contacts the cannabinoid-containing resins in bracts.
- In the 2009, the European Union developed a regulation for hemp food, which indicates that the maximum content of THC allowed in hemp plants must be lower than 0.2%. However, the enforcement of food law is nation-specific.

**Tip:**

- Regardless of the divergence in law enforcement across the European Union, exporters are advised to invest in production and processing practices that reduce THC contamination of the hemp seed to a minimum. Exporters must consider investing in proper post-harvest practices, especially during the cleaning of the seeds, so as to guarantee that the seeds are not contaminated by other parts of the plant during handling.
What legal requirements must my product comply with?

Contaminants in food:
The European Union has laid down maximum levels of contaminants in food, including ingredients such as oilseeds.

Tip:
- Check out the maximum levels for contaminants in food set by EU legislation.

Maximum Residue Levels (MRLs) of pesticides in food:
European Union legislation has been laid down to regulate the presence of pesticide residues (MRLs) in food products.

Tip:
- Verify that residues remain within limits. For more information, consult the specific European Union legislation: Maximum Residue Levels (MRLs) of pesticides in food.

Additives, enzymes and flavourings in food:
The European Union has set a list of permitted flavourings and requirements for their use in foodstuffs intended for human consumption, which includes oilseeds. This is particularly relevant to food manufacturers. However, insight into this legislation can help you to understand their requirements.

Tip:
- Familiarize yourself with the concerns of the end-users of your products by checking European Union legislation on additives, enzymes and flavourings in food.

Hygiene of foodstuffs:
Food business operators shall put in place, implement and maintain a permanent procedure, or procedures, based on the HACCP (Hazard Analysis and Critical Control Points) principles. This also applies to the import of food to the EU and export from the EU.

Tip:
- Ensure compliance with European Union legislation on Hygiene of foodstuffs (HACCP).

What additional requirements do buyers often have?

Food safety management:
Buyers commonly require their suppliers to have a quality/food safety management system in place. These systems require companies to demonstrate their ability to control food safety hazards in order to ensure that food is safe at the time of human consumption.

Tip:
- Suppliers can apply a basic HACCP system. However, if they aim to supply food manufacturers more directly, it is necessary to have a certified food safety management system recognised by the Global Food Safety Initiative, such as ISO 22000, British Retail Consortium (BRC) or International Featured Standards (IFS) Food. Visit the website of the Global Food Safety Initiative for more information.
What are the requirements for niche markets?

Regulation (EC) 834/2007 on organic agriculture:

The European Union has established requirements on the production and labelling requirements with which an organic product of agricultural origin must comply in order to be marketed in the EU as “organic”.

Tips:
- In general, the market for organic oilseeds is still a niche segment. If you do choose to obtain a certificate for organic production, find out more about Organic production and labelling.
- Make sure that your organic certification is harmonised with the European legislation.

Fair Trade:

Fairtrade Labelling Organisations International (FLO) is the leading standard-setting and certification organisation for Fairtrade. Products which carry the Fairtrade label indicate that producers are paid a Fairtrade Minimum Price. FLO has a minimum price for oilseeds. Other fair trade standards available in the European market are Fair Trade Ecocert and the Institute for Marketecology’s Fair for Life.

Tips:
- Before engaging in a Fairtrade certification programme, make sure to check (in consultation with your potential buyer) that this label has sufficient demand in your target market and whether it will be cost beneficial for your product.
- Although FLO certification is the leading fair trade certification scheme in Europe, you can also check out other schemes such as IMO’s ‘Fair for Life’ and Ecocert Fair Trade.

Market channels and segments

Figure 6: Trade channels for minor oilseeds in Europe

The European market for minor oilseeds can be segmented based on their end-use within the food sector.
- The edible seed industry can be divided into having two different segments:
  1) food processing: The bakery and confectionery industry, as highlighted under ‘Trends’, is by far the largest market segment for the oilseeds covered in this Product Factsheet. A very small share of minor oilseeds is used in other processed food products, with the exception of mustard seeds (i.e. in mustard manufacturing).
- **2) consumer market (packaging):** it is direct consumption of oilseeds, mainly for health purposes. Oilseeds are sold whole or broken / ground to consumers, to be sprinkled over foods such as yoghurts, oatmeal and salads. This segment is growing in importance, as the availability of minor oilseeds at supermarkets is increasing.

- **The crushing industry** relates to the production of vegetable oil (and oilseed cake as a by-product). For minor oilseeds, this segment is not significant. The crushing industry requires volumes and (low) prices which are beyond the scale of these products. An exception is hemp seeds: around 15% of the hemp seed production is crushed into oil – which is still a small share when compared to the 80-95% of sunflower seeds crushed into oil.

The minor oilseeds covered in this Product Factsheet are essentially speciality products, commanding a market which requires high quality. Within the bakery and confectionery segment (as well as for direct consumption), the physical characteristics of the high value oilseed, such as uniformity in colour, shape (whole seeds) and a very high purity level, are the most important requirements.

The oilseeds can be further segmented into: non-certified high quality seeds and certified high quality seeds.

**Figure 7: Food industry: segmentation of minor oilseeds**

![Food market segmentation diagram]

**Tips:**
- Importers are the most suitable entry point for minor oilseeds into the European market, since the exported volumes are generally small and are directed to a specific (niche) market. Traders provide their customers with a mix of products and are able to create scale by sourcing from different origins.
- When approaching a trader, make sure to provide them with the appropriate product documentation (composition and properties, as described under CFA in Market Trends: Health & Wellness) and be realistic about the volumes you can deliver.

**Interesting Sources**
- The EU Vegetable Oil and Protein meal Industry - [www.fediol.eu](http://www.fediol.eu)
- The European Industrial Hemp Association - [http://eiha.org](http://eiha.org)
- The Food and Agriculture Organisation of the United Nations has a variety of agricultural databases - [faostat3.fao.org](http://faostat3.fao.org)
- For information on the latest market developments in the Oils and seeds sector, visit The Public Ledger - [publicledger.agra-net.com/oils](http://publicledger.agra-net.com/oils)
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November 2015