

From Hemp cultivation to a wide range of products – Fibres, shivs, seeds & oil and CBD

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European Parliament

Mark Reinders, HempFlax bv
Deputy president of EIHA

Michael Carus, nova-Institut
Managing Director of EIHA



European Industrial Hemp Association

EIHA was originally founded as an association of the members of the European Hemp Industry. Regular members include primary Hemp processors in the EU. Associate members may be associations, research organisations, companies and individuals working in the area of Hemp and other natural fibres. Founded in 2005, EIHA today has 10 regular and more than 72 associate members from 25 countries. John Hobson is the President of EIHA and Michael Carus the Managing Director.

Join EIHA and support the Hemp Industry

EIHA was founded to give industry a voice at the European Commission in Brussels. It has rapidly become a respected industry association that provides effective lobbying and serves as an information bank. The annual EIHA conference (more information at www.eiha-conference.org) has become an important event in the industry and an attractive opportunity for members and visitors to meet, learn about developments and exchange views with their colleagues.

More information at www.eiha.org

Board Member (B) and Executive Office (E)



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CAVAC (FR)

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Daniel Kruse (B)
Hempro Int. (DE)

Modern Industry with high social standards. European Hemp Fibres are available now for your bio-based products!!

Many more companies are involved in the Hemp industry like non-woven, compounding and equipment businesses. Please look for a full list of EIHA-members at: www.eiha.org

Responsible for this leaflet:
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European Industrial Hemp

Pulp & Paper, Insulation, Biocomposites & Construction, Food & Feed and Pharmaceuticals

The perfect green material – good for the environment



Pictures: Hempro Int. (DE), Hemp Technology (UK) and nova (DE)

Hemp Seeds

- are a nutritional powerhouse
- excellent and unique fatty acid spectrum
- high protein quality

Hemp Fibre

- good mechanical properties
- the perfect reinforcement for your (bio-based) plastics
- good availability at low cost
- no competition with food production



Picture: Hemp Technology (UK)

Present hemp industry

Total Hemp cultivation area
in the EU more than **20.000 ha**
in **2015**.

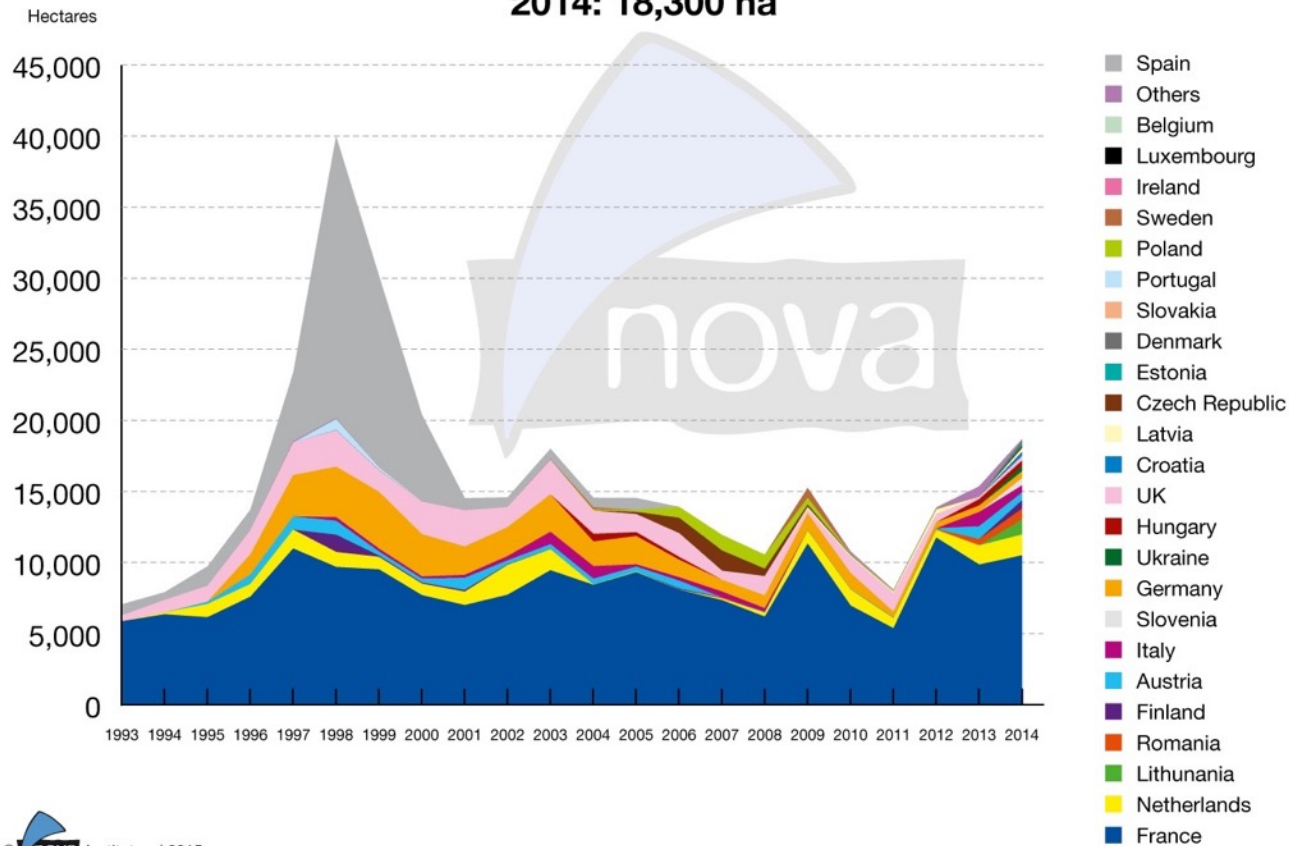
The European Industrial
Hemp Association (EIHA)
has **13 regular members**
(hemp processors) and
114 associate members
from **37 countries** (2016).

Main hemp processors 



European Hemp cultivation area is growing from
 8,000 in 2011 to 18,300 ha (2014), 20,000 ha (2015) and
 to 25,000 ha in 2015!

Hemp Cultivation Area in the EU 1993–2014
 2014: 18,300 ha





Hemp Processing HempFlax (Alba, Romania)

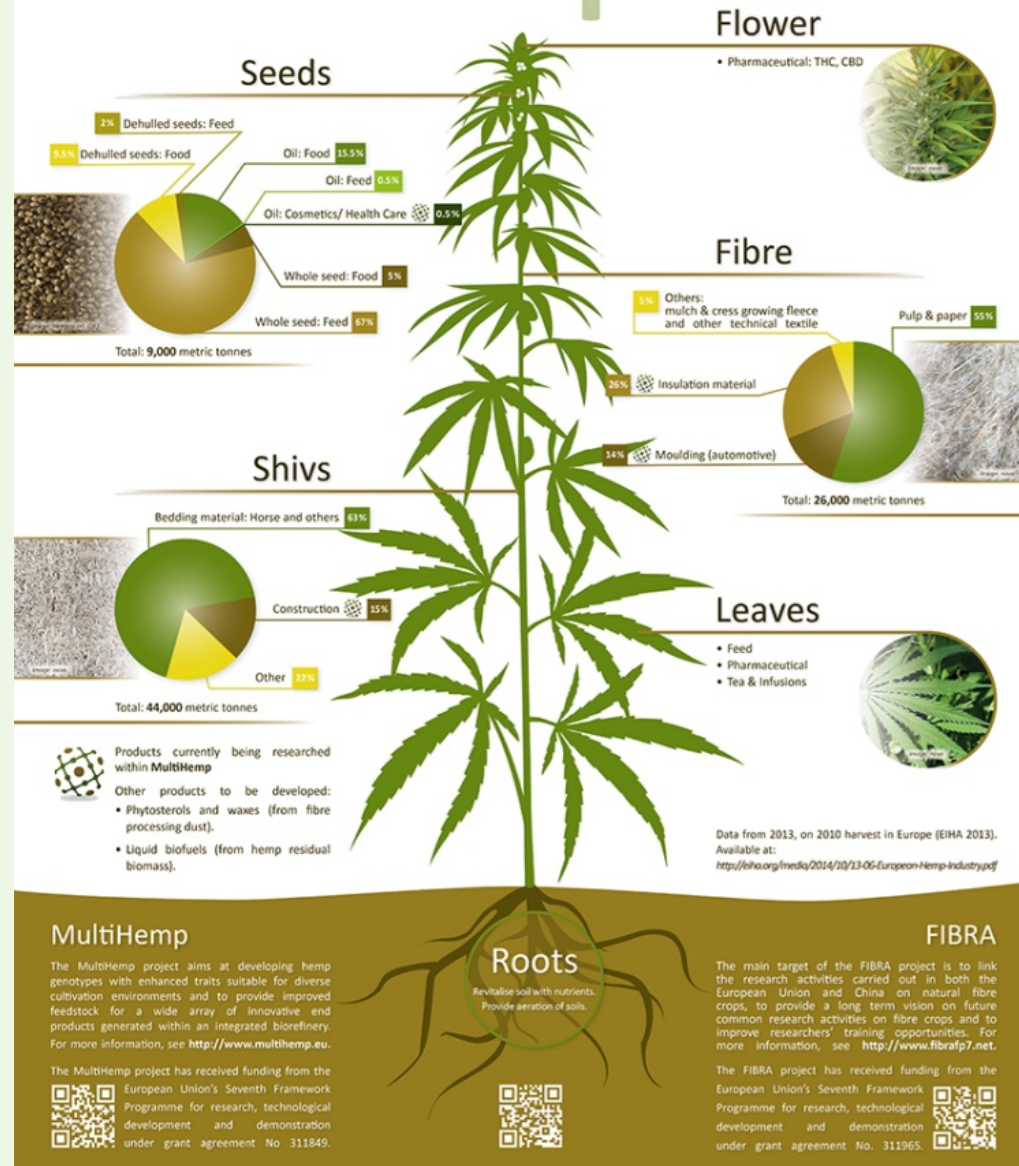


Hemp processing plant, HempFlax 2016

Decortication and fibre separation: From straw to dust, fibre and shives – a zero waste process



A natural biorefinery Hemp



Production, applications and markets for hemp fibres, shives, seeds and flowers



EU 2016: Production of 30,000 t hemp fibres, main applications



Non-automotive



Insulation

Automotive



Pulp & Paper

Agrotextiles

Fibres

Picture: NPSP (NL)



High carbon capture by Hemp fibre insulation fleeces. Picture: Hock (DE)



Applications for Hemp Fibres

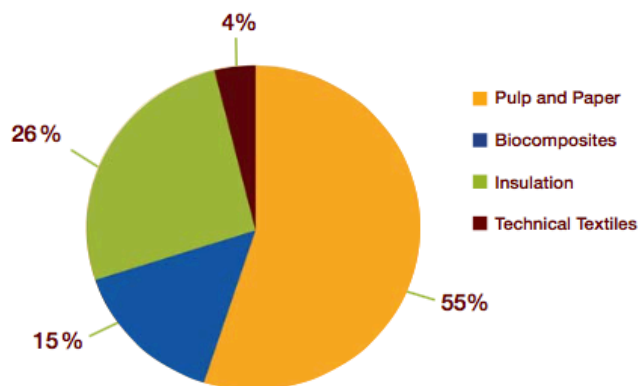
Hemp fibres have some of the best mechanical properties of all natural fibres. They are mainly used for speciality pulp & paper, insulation material and for bio-composites in automotive applications.

Before the rediscovery of industrial Hemp in Europe in the 1990s, Hemp fibres were mainly (> 95%) used for speciality pulp & paper. Nevertheless in 2014, Hemp pulp & paper with a share of 55% is still the most important market for European Hemp Fibres, supplied mainly by French producers.

Insulation material is the second most important application for Hemp fibres today. Insulation material accounts for 26% of the applications or if you take out pulp & paper nearly 60%. Together with other non-woven applications like mulch fleeces which are used in gardens and agriculture. Cress growing fleeces in some European countries are the dominant medium used for cress cultivation. And other non-wovens such as mats for farrowing pigs, the share of this applications group is 30%.

Biocomposites account for 15% of the applications, without pulp & paper 33%. The only really established biocomposite market is press (or compression) moulding in automotive interior applications with a share of 96% of all biocomposites. This corresponds to more than 3,700 tonnes of Hemp fibre or about 7,500 tonnes of biocomposites (natural fibre content varies between 30 and 70%). Automotive biocomposites for interior applications are still a growing market and are used for door panels/inserts, trunkliners, spare wheel covers, parcel trays, headliners, A-B-C columns and much more.

Applications for European Hemp Fibre from harvest 2010, in total 26,000 metric tonnes (EIHA 2012)



Cases, natural fibre and polypropylene, compress moulding (Germany).



Urn, Hemp fibre and bioplastics, compress moulding or injection moulding (Germany).



Hemp is good for agriculture, the environment and enhances regional development

Environment

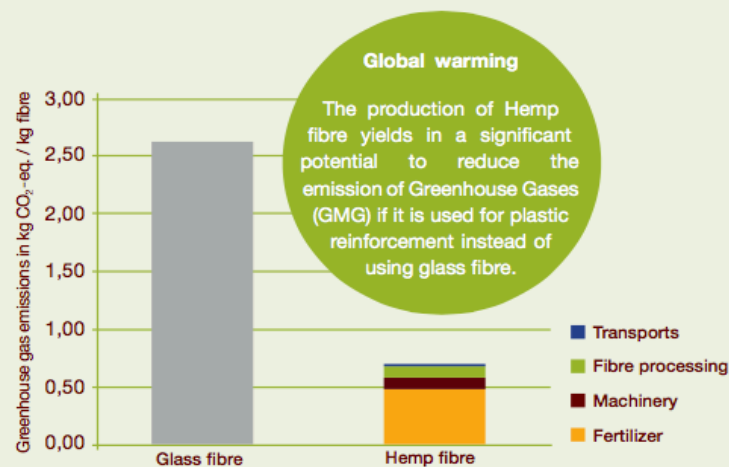
Hemp fibre



The environmental friendly cultivation of the Hemp crop (*Cannabis sativa L.*) is a key driver for economic success and the future expansion of sustainable Hemp products:

- Due to its vigorous growth and disease resistance, Hemp can be grown without the use of any agrochemicals, this is rare in agriculture today.
- In times of increasing monocultures, Hemp is an enrichment for agro-biodiversity, a true rotational crop.

The processing of Hemp into its main products and by-products such as fibres and shivs requires no chemical additives and no water. Where Hemp is used in applications it has brought considerable ecological benefits.



Natural fibre composites – innovative technology for the automobile industry



BMW 5 Series



Fibre



Non-woven Fleece



Naked Door



Finished Door

Natural fibre composites – wide range of application possibilities



Cases

natural fibre and polypropylen, compress
 moulding (Hempro International, Winter &
 Linotech)



Urn

hemp fibre and bioplastics, compress
 moulding or injection moulding

Insulation – CO₂ emission and cost reducing application for construction



Application



Agrotextiles: Organic growth medium

Cress – an environment friendly, annual renewable base layer for the plant industry replacing peat



Cress production

Shivs

Picture: Hemp Technology (UK)

Applications for Hemp Shivs

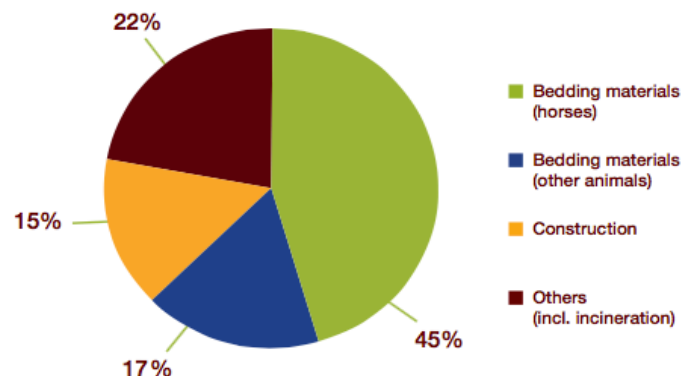
High performance bedding material for horses and other animals like chickens is today the most important market for Hemp shivs. Hemp shivs can absorb moisture up to 4 times their dry weight. They are effective for much longer in the stable or poultry house compared to other materials thus saving working time. After use Hemp bedding rots down quickly into an excellent compost.

Of the total Hemp shiv applications equine bedding has a market share of 45% and other bedding 17%.

An interesting new and increasing market is using Hemp shivs in combination with lime for construction. Here the market share for shivs is currently 15%. Over the last few years hundreds of private houses have been built in France, the UK and Ireland with this new material, which can be sprayed into a timber frame construction. The material is easy to handle, price competitive, shows good insulation properties for a construction material and it appears to be crack proof, a good attribute for earthquake risk areas. Eco-construction experts especially are seeing great potential in Hemp-Lime-Construction.

Small amounts also go to the particle board industry. Hemp shivs can be used to produce light weight particle boards (half the density).

Applications for European Hemp shivs from harvest 2010, in total 44,000 metric tonnes (EIHA 2012) in total 26,000 metric tonnes (EIHA 2012)

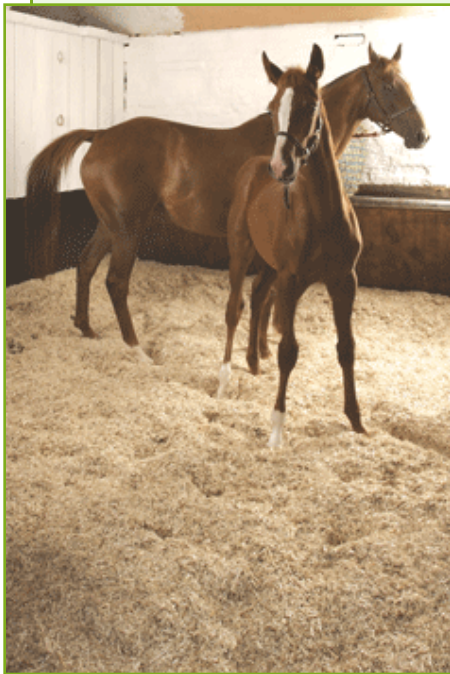


Pharmaceutical applications

THC, the well known cannabinoid responsible for the psychotropic as well as several pharmaceutical effects, exists only in very low concentrations in industrial Hemp (< 0.2%). In recent years, interest has been increasing in the therapeutic potential of another cannabinoids, which do not have any psychoactive effects. Even high doses do not cause any relevant side-effects. Cannabidiol (CBD) is the primary cannabinoid of industrial Hemp, present in concentrations in the range of 0.5 to 2% in the upper third of

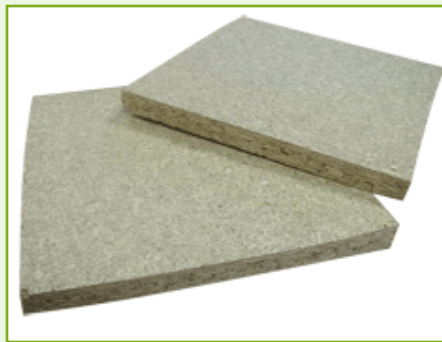
the plant. There is potential for therapeutic use in a large number of diseases and symptoms. These include anxiety disorders such as post-traumatic stress disorder, psychosis, epilepsy, dystonia, diabetes, cancer, inflammatory diseases and Alzheimer's. In addition it may have an effect on skin diseases, hepatitis, obesity as well as ADHD (attention deficit/hyperactivity disorder). CBD can be utilized parallel to Hemp fibres and shivs, giving an extra income.

EU 2016: 50,000 t production of Hemp Shivs, main applications



Animal Bedding

Particle Boards



Construction



Garden

Animal bedding – implementation for the comfort of your animal



Horse stable ground



Chicken farming

Garden – decorative alternative to barkmulch

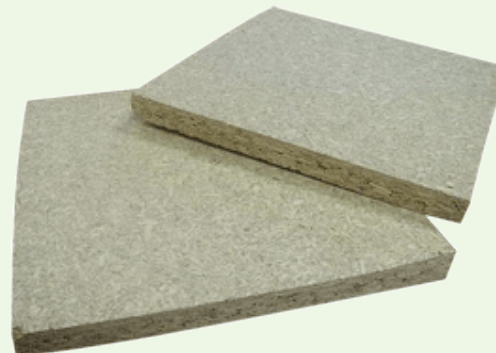


Particle boards – alternative to wood-based particle boards with half the weight



KOSCHE (Germany)
stopped (all particle board)
production in 2009;

AGROSYS (Germany) is
still producing and also
Chinese Hemp particle
boards are available.



Construction – easy to handle construction material with great qualities



Spraying



Finished Wall

Construction – easy to handle construction material with great qualities



Examples show offices and private houses in UK – many hundreds of houses are built in UK and France in recent years.



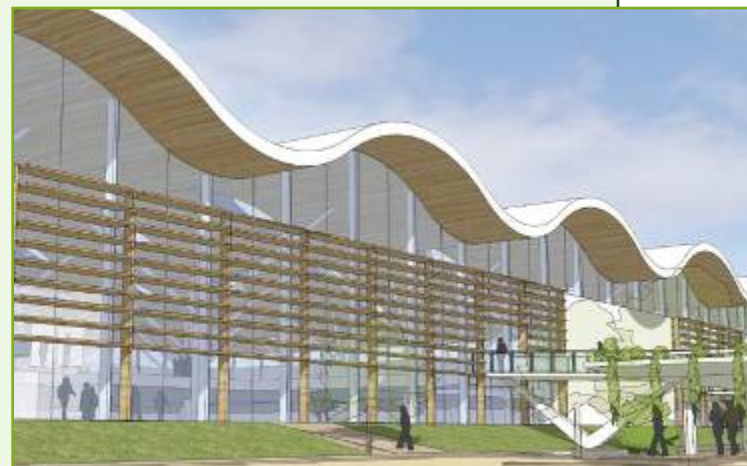
Construction – applicable for large constructions as well



Beer Distribution Centre



Hemclad® – Mark & Spencers Cheshire



Hemclad® – Mark & Spencers Cheshire (2012)



EU 2013: Production of 11,500 t, consumption of 21,300 t hemp seeds – main applications



Seeds & Oil



Hemp seeds

Hemp Seed is a nutritional powerhouse

"Hemp seed is a nutritional powerhouse," says German-American scientist Dr. Gero Leson.

"It is an excellent source of several critical mineral nutrients and vitamins. Its oil has an outstanding fatty acid spectrum; its protein is balanced and easily digested. Moreover well prepared Hemp foods are very appetising. I am convinced that Hemp seeds have a great food potential. Their nutritional composition and culinary versatility are very much in line with several major trends in the science and marketing of food".

In his comprehensive 1993 book on fat nutrition "Fats that heal, fats that kill", Dr. Udo Erasmus concluded "the best-balanced source of essential fatty acids is Hemp seed oil".



Hemp flour and hulled seeds & Hemp protein powder



Hemp bars



Hemp oil



Hulled seeds, protein, muesli, flour, whole seeds



Hemp muesli

Hemp bar

Hemp oil

Pictures: Hempro Int. (DE), HEMP SEED OIL EUROPE (UK)

Hemp Seeds and Hemp Oil as Food

Hemp Oil – excellent and unique fatty acid spectrum

Today's Hemp oil is typically a cold-pressed gourmet oil from mature well-dried seeds. Its most unique nutritional feature is the "almost perfect" balance of the omega-3 and -6 essential fatty acids plus the presence of two "higher" omega-3 and -6 fatty acids, stearidonic acid (SDA) and gamma linoleic acid (GLA). These offer known health benefits and are found in only a few other vegetable oils – yet nowhere as balanced and tasty as in Hemp oil.

A gross imbalance in the omega-3/6 ratio in the Western diet is now considered an important contributor to the high occurrence of inflammatory, cardiovascular, skin and even mental disorders. As a balanced source of these fatty acids, Hemp oil and seeds can help reduce their occurrence, in good taste.

Hemp Protein – high quality

Hemp seeds and seed cake flour contain a high quality protein. It is easily digestible, and contains all essential amino acids in a balanced ratio that satisfies the protein needs of adults. Commercially available protein flour and powders are high in protein and dietary fibre. They are used in shakes and smoothies, as well as for baking.

Minerals, Vitamins and other Micronutrients

Hemp seeds, nuts and flour also offer a bonanza of micronutrients that are often lacking in our diet. These Hemp seed materials are good or even excellent sources of magnesium, manganese, iron, zinc and potassium – and of several B1, B3 and B5 vitamins. Hemp seeds also contain significant amounts of phytosterols and of tocopherols, i.e. members of the Vitamin E complex. Overall, the nutritional richness and culinary versatility of Hemp seeds and their products make them an excellent basis for a healthy diet and a range of food products.

Typical Nutritional Composition of Shelled Hemp Seeds (per 100 gram)

Energy content:	580 kcal (2,430 kJ)
Fat:	45 g
Protein:	35 g
Total Carbohydrate:	8 g (Fibre: 6 g)
Ash:	6 g

Selected Minerals and Vitamins (in percent of daily value, DV):

Phosphorus:	130 %
Magnesium:	150 %
Manganese:	450 %
Iron:	90 %
Zinc:	60 %
Vit B1 (thiamine):	90 %
Vit B3 (niacine):	30 %
Vit B5 (panthotenic acid):	90 %
Vit E (tocopherol):	20 %

Fatty acid composition of Hemp Oil (Varies with hemp variety)








Unsaturated fatty acids:	~ 90 %
Oleic acid (18:1 omega-9):	10 – 15 %
Linoleic acid (18:2 omega-6, essential):	55 – 60 %
Alpha-linolenic acid (18:3 omega-3, essential):	17 – 20 %
Gamma-linolenic acid (18:3 omega-6):	2 – 4 %
Stearidonic acid (18:4 omega-3):	0.5 – 2 %
Saturated fatty acids	~ 10 %

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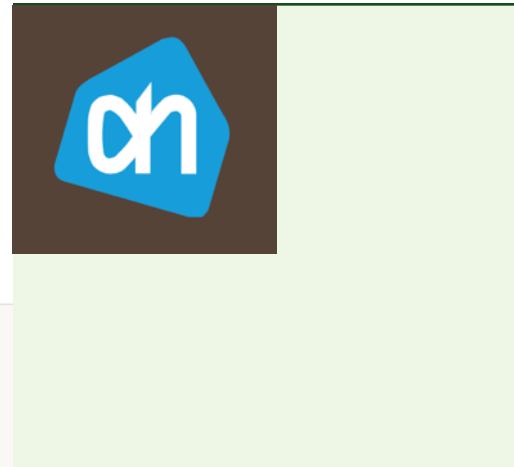
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 <p>BIO</p> <p>Raw Super Food Hen-nep olie 250 ml</p> <p>4.79</p> <p>+</p>	 <p>BIO</p> <p>Raw Super Food Hen-nep proteïne 100 g</p> <p>5.49</p> <p>+</p>	 <p>BIO</p> <p>Raw superfood Mini snacker hennep 100 g</p> <p>3.69</p> <p>+</p>	 <p>BIO</p> <p>Raw Super Food Muesli hennep 750 g</p> <p>4.99</p> <p>+</p>
 <p>BIO</p> <p>Zonnatura Granenreep gerst hennep 3-pack 3 stuks</p> <p>2.99</p>	 <p>BIO</p> <p>AH Hennepzaad 150 g</p> <p>2.69</p>	 <p>BIO</p> <p>Raw Super Food Hennepzaad raw biologisch 250 g</p> <p>4.92</p>	


 European Industrial Hemp Association



Big supermarkets and
 discounter selling
 hemp food products
 (2015):
 Albert Heijn (The
 Netherlands), on top
 and ALDI (Germany),
 right.



In Europe the demand for Hemp seed has been increasing over the years and is currently at about 18,000 metric tons in 2013. Estimates for 2015 see the market reach 21,000 metric tons (EIHA 2015). This is covered ca. 50% by domestic production and ca. 50% by imports from China. From all seed used for food production ca. 50% are organic certified and sold in the "bio-food" market (EIHA 2015).

mt hemp seeds p.a.	2008	2009	2010	2011	2012	2013	2014	est. 2015
EU production	6.000	7.000	6.000	5.500	7.000	9.000	9.000	11.500
- France	n/a	6.500	4.500	4.000	5.000	7.000	6.000	7.000
- others	n/a	500	1.500	1.500	2.000	2.000	3.000	4.500
EU imports*	10.000	9.700	10.800	11.500	10.000	9.000	9.500	10.000
EU exports**	500	900	800	500	300	100	100	200
EU consumption	15.500	15.800	16.000	16.500	16.700	17.900	18.400	21.300
- Food	600	700	1.800	2.500	2.700	3.200	6.400	8.300
- Feed	14.900	15.100	14.200	14.000	14.000	14.700	12.000	13.000

Development of European Hemp Seed Market 2008 – 2015

* Mainly from China, ** Exports of processed hemp seeds to North America

Sources: nova-Institut (2015) EIHA (2015), Eurostat (2015), Hempro Int. (2015)

Cannabidiol (CBD)

In recent years, interest has been increasing in a cannabinoid, which does **not have any psychoactive effects. Even high doses do not cause any relevant side-effects.**

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There is potential for **therapeutic use** in a large number of diseases and symptoms. These include **anxiety disorders such as post-traumatic stress disorder, psychosis, epilepsy, dystonia, diabetes, cancer, inflammatory diseases and Alzheimer's.**

In addition it may have an effect on **skin diseases, hepatitis, obesity as well as ADHD** (attention deficit/hyperactivity disorder).

CBD can be utilized parallel to Hemp fibres and shivs, giving the farmers an extra income.

- Currently, the CBD market is a **market niche ruled by SME**.
- 90% of the producers identify the **potential to growth** as CBD's biggest strength in Europe and NA.
- Increased public and governmental awareness is crucial to expand market and frame **proper legislation**.
Pharmaceutical? Food supplement (such as valerian?)? Will the extract be novel food?
- The way CBD is legally framed may affect its market size.



CBD rich hemp oil, HempFlax 2016

- According to estimates, CBD has the **upper market potential** in Europe of **€ 2 billion** if used as medicine for chronic diseases.
- CBD has a **minimum market penetration** potential of **€ 24 million**, if sales mimic those of over-the-counter medicine, such as valerian.
- This disparity can be reduced with more consumer information and **investment on research to support initial medical claims**, as seems to be the current trend.



**Please join the biggest conference on
Industrial Hemp**

fibres, shivs, seeds & oil and pharmaceuticals:



**13th International Conference of the
European Industrial Hemp Association (EIHA)**

June 1st – 2nd 2016, Rheinforum Wesseling (near Cologne, Germany)



More information:

www.eiha-conference.org