Market data on Industrial Hemp – fibres, shivs and seeds

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Michael Carus
Managing director

European Industrial Hemp Association (EIHA)
Hemp cultivation in the World (FAO 2013)

Global harvested area for hemp fibre and hemp seed
2000 - 2011 (ha)
Hemp fibre and seed production in the World (FAO 2013)

Global production of hemp fibre and hemp seed
2000 - 2011 (t)
Present hemp industry

Total Hemp cultivation area in the EU approx. 14,000 ha in 2012.

The European Industrial Hemp Association (EIHA) has 10 regular members (hemp processors) and 72 associate members from 31 countries (2013).

Hemp processors
 EIHA members
 Non-EIHA members
EU Hemp cultivation area is growing again!

Hemp Cultivation Area in the EU (ha)
2012: 14,000 ha

- Romania
- Latvia
- Czech Republic
- Hungary
- Poland
- Sweden
- Spain
- Others
- Austria
- Italy
- Germany
- UK
- Netherlands
- France
Canada
- Installation of the first modern decortication line to produce fibres and shivs – in addition to seed production

USA
- Voters legalized recreational use of marijuana in November 2012: Washington State & Colorado
- It can be expected, that other states will follow
- As a consequence, also the cultivation of Industrial Hemp will be legalized in more and more states

China
- The company iHemp is producing the best Hemp yarn ever – enzymatic retting and steam explosion
Decortication and fibre separation:
From straw to dust, fibre and shives – a zero waste process
Hemp Processing, HempTechnology Ltd (Suffolk, UK)
Decortication and fibre separation: From straw to dust, fibre and shives – a zero waste process
Production, applications and markets for hemp fibres, shives, seeds and flowers
Overview on existing hemp applications due to EIHA survey summer 2012 (most detailed analysis ever done)
Detailed data on European Hemp 2010
EIHA survey summer 2012

- The survey covers the harvest 2010
- Hemp straw from harvest 2010: 76,095 tonnes from 10,661 ha & another ca. 5,000 tonnes from stocks
- Average straw yield: 7.2 t/ha

- Fibres: 25,589 tonnes (incl. 2 to 25% shivs, depending on the application)
- Shivs: 43,621 tonnes
  - Shivs : Fibres = 1.8 : 1
- Dust: 11,439 tonnes (20% pelletized for incineration, 80% other uses)
  - Seeds: 5,991 tonnes
  - Flowers: 7.5 tonnes (medical applications, essential oil)
EU 2010: Production of 26,000 t hemp fibres, main applications

- Automotive
- Insulation
- Pulp & Paper
- Agrotextiles
Hemp Fibre Applications, European Hemp 2010, 25,589 tonnes (EIHA 2012)
Hemp Fibre Applications, European Hemp 2010, except pulp & paper (EIHA 2012)
Price index: Hemp and flax technical short fibres

160% equals the price of technical hemp short fibres in March 2003. Basis: Supply of 100 t per year.

Sources: nova-Institute GmbH on the basis of bi-monthly price reports from: Agrifibre (UK), Badische Naturfaseraufbereitung BafA GmbH (D), Hemp Technology Ltd. (UK), HempFlax B.V. (NL), Holsten Flachs GmbH (D), Linoflax LT (Lithuania, until 2007-12), NAFED GmbH (D, until 2006), Procorlex SA Corporation (B, until 2005-10), Sachsen-Lenin GmbH (D, since 2003-10), SANECO (F, since 2008).
## Technical properties

<table>
<thead>
<tr>
<th></th>
<th>Density</th>
<th>Fineness</th>
<th>Young’s Modulus</th>
<th>Elongation at break</th>
<th>Breaking force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sisal</td>
<td>++</td>
<td>-</td>
<td>-</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Hemp</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Flax</td>
<td>+</td>
<td>+ / -</td>
<td>+</td>
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<td>+</td>
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<td>Jute</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+ / -</td>
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<tr>
<td>Ramie</td>
<td>+</td>
<td>++</td>
<td>+ +</td>
<td>+ / -</td>
<td>-</td>
</tr>
<tr>
<td>E-Glass</td>
<td>- -</td>
<td>adjustable</td>
<td>++ +</td>
<td>-</td>
<td>++</td>
</tr>
</tbody>
</table>
Eco-friendly cars need sustainable materials

Use European Hemp Fibres for biocomposites in light weight construction

European Hemp fibres for diverse bio-based products

The perfect green material
- good mechanical properties
- the perfect reinforcement for your (bio-based) plastics
- good for the environment
- good availability at a low cost
- modern industry with high social standards
- no competition with food production
- fits perfectly with your sustainable business (bio-based economy)
- reduction of CO₂ emissions

This brochure shows you many examples of hemp fibre based products, which are already introduced and established on the market, and where you can buy European Hemp Fibre.

EIHA poster, June 2009

Update of the EIHA Fibre leaflet, May 2010

www.eiha.org
Natural fibre composites (1) – innovative technology for the automobile industry

BMW 5 Series

Fibre

Non-woven Fleece

Naked Door

Finished Door
European Automotive Industry 2012: 30,000 t Natural Fibres in 60,000 t Biocomposites

From 2005 (Germany) to 2012 (Europe) the winners were: Kenaf & Hemp!
Natural fibre composites (2) – wide range of application possibilities

Urn from Hemp Fibre and PLA

Scale

Toy Cars made by Injection Moulding
Natural fibre composites (3) – wide range of application possibilities

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

Urn
hemp fibre and bioplastics, compress moulding or injection moulding
Natural fibre composites (4) – Ironing board (Domena, France)

BioCharger
(GreenGran, NL & China)
JuteFibre Injection Moulding

Ironing board
(Domena, France)
Hemp Fibre Injection Moulding
Problem: Feeding natural fibres

In a project with BaFa, nova and others “soft pellets” were developed - easy to feed in compounder and now commercially available (www.bafa-gmbh.de)!
Insulation – CO₂ emission and cost reducing application for construction
Pulp and paper – special utilization of hemp
Agrotextiles: weed suppression easy to handle base for garden and agricultural use

Tree planting
Agrotextiles: Organic growth medium

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

Cress production
EU 2010: 44,000 t production of Hemp Shivs, main applications

Animal Bedding

Particle Boards

Construction

Garden
Hemp Shives Applications, European Hemp 2010, 43,621 tonnes (EIHA 2012)
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;

**AGROSY S** (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

www.eiha.org
Hemclad® –
Mark & Spencers Cheshire (2012)
EU 2011: Production of 6,000 t, consumption of 12,000 t hemp seeds – main applications

- **Feed**
  for birds and fish
  (95% of all hemp seeds)

- **Food**

- **Cosmetics**
  body care
detergent
Hemp Seed Applications, European Hemp 2010, 5,991 tonnes (EIHA 2012)
Hemp seeds – food applications

Hemp oil

Snacks

Hemp nuts
## Hemp seeds – markets

<table>
<thead>
<tr>
<th>t hemp seeds p.a.</th>
<th>2007 (EIHA)</th>
<th>2009 (est.)</th>
<th>2010 (est.)</th>
<th>2011 (est.)</th>
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<tbody>
<tr>
<td>EU production</td>
<td>6,000</td>
<td>ca. 7,000</td>
<td>ca. 5,000</td>
<td>n/a</td>
</tr>
<tr>
<td>- France</td>
<td>n/a</td>
<td>ca. 6,500</td>
<td>4,500</td>
<td>n/a</td>
</tr>
<tr>
<td>- Ukraine</td>
<td>n/a</td>
<td>500</td>
<td>500</td>
<td>n/a</td>
</tr>
<tr>
<td>EU imports</td>
<td>5,000-6,000*</td>
<td>5,000-6,000*</td>
<td>5,000-6,000*</td>
<td>n/a</td>
</tr>
<tr>
<td>EU exports</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>400**</td>
</tr>
<tr>
<td>EU consumption</td>
<td>12,000</td>
<td>ca. 13,000</td>
<td>9,000</td>
<td>9,500</td>
</tr>
<tr>
<td>- Food</td>
<td>ca. 600</td>
<td>ca. 650</td>
<td>500</td>
<td>1,000</td>
</tr>
<tr>
<td>- Feed</td>
<td>ca. 11,400</td>
<td>ca. 12,350</td>
<td>8,500</td>
<td>8,500</td>
</tr>
</tbody>
</table>

*: Mainly from China