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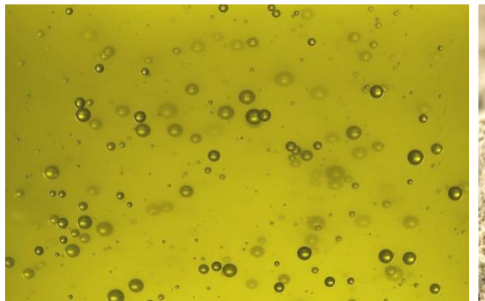
Hempro Int.

Hemp Grain & Quality

EIHA Conference, June 2018, Cologne



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Hemp Grain & Quality

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Main Statement

The quality of the hemp grain used as raw material is the basis for building up the quality of hemp food products.

Preventing all types of contamination that may occur is essential for supplying the best possible quality raw material.

Hemp Grain & Quality

Canah and Hempro Int. - over 15 years in hemp grain processing

- Methods to process: hulling / shelling, pressing, milling
- Hemp food products have to comply with regulations on Quality & Safety and with the standards set up by the clients.
- The pressure from the market and from the authorities is determining us to establish quality standards for our products and consequently for the hemp grain.

Farming and Supply Chain

Cultivation

- Variety of seeds
- Region
- Methods

Harvest

- Time
- Method used
- Variety of seeds

Key Activities for Grain Quality

Transportation

- Packaging
- Cleanliness
- Temperature changes
- Moisture

Storage

- Cleanliness
- Temperature
- Environmental moisture

Cleaning and drying

- Within 8 hours from harvest
- Drying method
- Temperature

Quality Control

Organoleptic properties

- Color
- Odor
- Taste

Impurities

- Type
- Percentage

Quick Tests

Moisture + aw-value

- Impact on molds and yeast development
- Preventing of micro growth

FFA (free fatty acids)

- Measured in pressed oil
- Depending on the freshness of seeds

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Quality Measures

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Impurities:
Some of them can be eliminated in the standard cleaning process, others not. So it is much better to prevent the contamination.

Impurities impact the final product:
- From visual point of view
- From quality point of view

An important impact on quality has the gluten from grass-related grains (wheat, rye, barley, oat)





Quality Measures

Example of impurities versus clean hemp grain:

Straw parts and dust in hemp grain

Good hemp grain

Quality Measures

Examples of impurities:

Black vegetal fragments and fungus sclerotia

Wheat grain

Quality Measures

Examples of impurities:

Removed impurities

Different impurities and green hemp grain

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Quality Control

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Microbiology

Chemical Analysis

Pesticides / PAH

Quality Control

Heavy Metal

Total THC

Mycotoxine

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Quality Control

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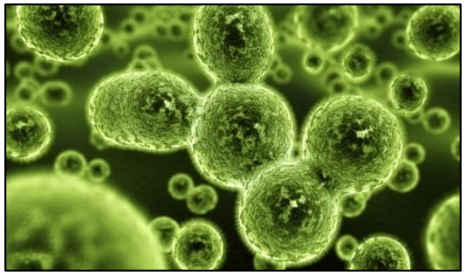
Salmonella

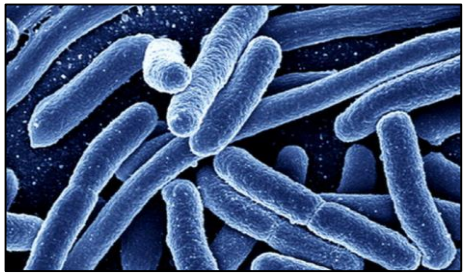
Coagulase Positiv Staphylococci



Mold

Microbiology

Bacillus Cereus



E.Coli

Anaerobic Sulphite Reducin Bakteria

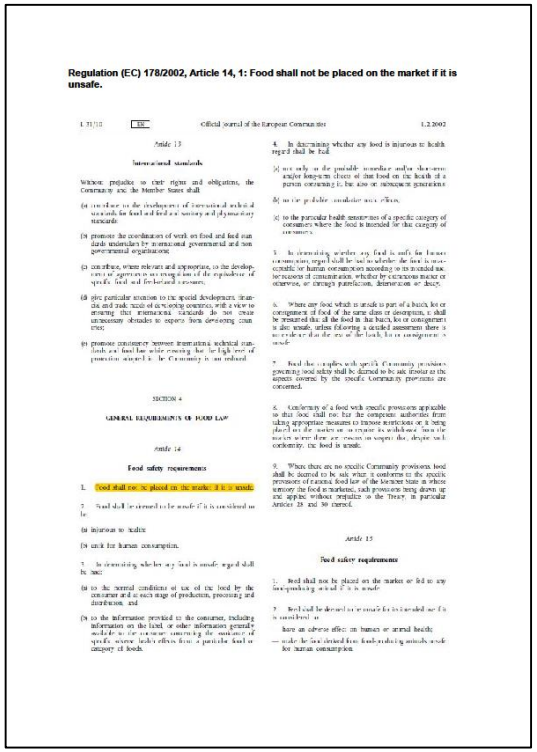
Quality Control

Microbiology [KbE/g]

	Oilseeds	
	guidance value	warning value
Microbiology [cfu/g] *		
Total Plate Count	10^6	
Enterobacteriaceae		
E.coli	10^1	10^2
Bacillus Cereus	10^2	10^3
Coagulase Positiv Staphylococci		
Yeast	10^4	
Mold	10^4	
Anaerobic Sulphite Reducing Bacteria		
Salmonella in 125g		n.d. in 125g

* according to DGHM (German Society of Hygiene and Microbiology)

Regulation (EC) 178/2002, Article 14, 1: Food shall not be placed on the market if it is unsafe.



Regulation (EC) 178/2002, Article 14, 1: Food shall not be placed on the market if it is unsafe.

EN Official Journal of the European Communities 1.2.2002

Article 13

International standards

Without prejudice to their rights and obligations, the Community and the Member States shall:

(a) contribute to the development of international technical standards for food and feed and sanitary and phytosanitary standards;

(b) promote the coordination of work on food and feed standards undertaken by international governmental and non governmental organisations;

(c) contribute, where relevant and appropriate, to the development and agreement on and recognition of the equivalence of specific food and feed-related measures;

(d) give particular attention to the special development, financial and trade needs of developing countries, with a view to ensuring that international standards do not create unnecessary obstacles to exports from developing countries;

(e) promote consistency between international technical standards and food law while ensuring that the high level of protection aimed at in the Community is not reduced.

SECTION 4

GENERAL REQUIREMENTS OF FOOD LAW

Article 14

Food safety requirements

1. Food shall not be placed on the market if it is unsafe.

2. Food shall be deemed to be unsafe if it is considered to be:

(a) injurious to health;

(b) unfit for human consumption.

3. In determining whether any food is unsafe regard shall be had:

(a) to the normal conditions of use of the food by the consumer and at each stage of production, processing and distribution, and

(b) to the information provided to the consumer, including information on the label, or other information generally available to the consumer concerning the avoidance of specific adverse health effects from a particular food or category of foods.

4. In determining whether any food is injurious to health regard shall be had:

(a) not only to the probable immediate and/or short-term and/or long-term effects of that food on the health of a person consuming it, but also on subsequent generations;

(b) to the probable cumulative toxic effects;

(c) to the particular health sensitivities of a specific category of consumers where the food is intended for that category of consumers.

5. In determining whether any food is unfit for human consumption, regard shall be had to whether the food is unacceptable for human consumption according to its intended use, for reasons of contamination, whether by extraneous matter or otherwise, or through putrefaction, deterioration or decay.

6. Where any food which is unsafe is part of a batch, lot or consignment of food of the same class or description, it shall be presumed that all the food in that batch, lot or consignment is also unsafe, unless following a detailed assessment there is no evidence that the rest of the batch, lot or consignment is unsafe.

7. Food that complies with specific Community provisions governing food safety shall be deemed to be safe insofar as the aspects covered by the specific Community provisions are concerned.

8. Conformity of a food with specific provisions applicable to that food shall not bar the competent authorities from taking appropriate measures to impose restrictions on it being placed on the market or to require its withdrawal from the market where there are reasons to suspect that, despite such conformity, the food is unsafe.

9. Where there are no specific Community provisions, food shall be deemed to be safe when it conforms to the specific provisions of national food law of the Member State in whose territory the food is marketed, such provisions being drawn up and applied without prejudice to the Treaty, in particular Articles 28 and 30 thereof.

Article 15

Food safety requirements

1. Feed shall not be placed on the market or fed to any food-producing animal if it is unsafe.

2. Feed shall be deemed to be unsafe for its intended use if it is considered to

have an adverse effect on human or animal health;

— make the food derived from food-producing animals unsafe for human consumption

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Quality Control

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Microbiology [KbE/g]

	Oilseeds		Milled Cereal Products		Instant Products		comments
	guidance value	warning value	guidance value	warning value	guidance value	warning value	
Microbiology [cfu/g] *							
Total Plate Count	10^6						10 = 10^1 100 = 10^2 10.000 = 10^4 1.000.000 = 10^6
Enterobakteriaceae			10^5	10^6	10^3	10^4	
E.coli	10^1	10^2					
Bacillus Cereus	10^2	10^3	10^2	10^3	10^3	10^4	no guidance / warning value for unprocessed hemp seeds **BUT** for milled cereal and instant products → necessary to consider guidance / warning values for processed product when evaluation raw material
Coagulase Positiv Staphylococci			10^2	10^3	10^2	10^3	
Yeast	10^4		10^3				
Mold	10^4						
Anaerobic Sulphite Reducing Bacteria			10^2	10^3	10^3	10^4	
Salmonella in 125g		n/a in 125g					

* according to DGHM (German Society of Hygiene and Microbiology)

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Quality Control

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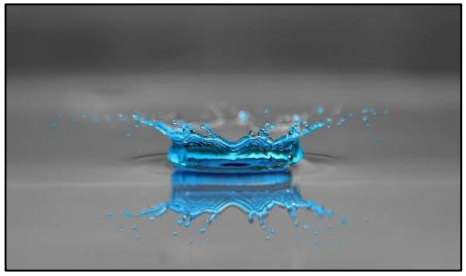
Moisture

Acid Value

Gluten

Chemical Analysis

Peroxid Value



a_w

Allergens Mustard

Chemical Analysis

Chemical Analysis		
Moisture [%] **	< 10	wheat 14% - for hemp seeds too high
Acid value [mg KOH/g fat) ***	≤ 1,5	≤ 4,0 *** - for hemp seeds too high
Peroxide value [meq act. O/kg fat] ***	≤ 2,5	≤ 10,0 *** for hemp seeds too high
Water activity (a_w)**	< 0,7	hemp (according to our experience / internal value) wheat 0,7 (official value)
Gluten [mg/kg]	n. d.	detection limit e. g. 5 mg/kg allergen labelling < 20 mg/kg => 200 µg / 100 g
Allergen: All other allergens	n. d.	

** according to MRI (Federal Research Institute of Nutrition and Food)

*** according to Deutsches Lebensmittelbuch, Leitsätze für Speisefette und Speiseöle

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Quality Control

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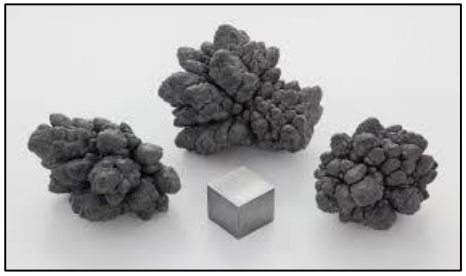
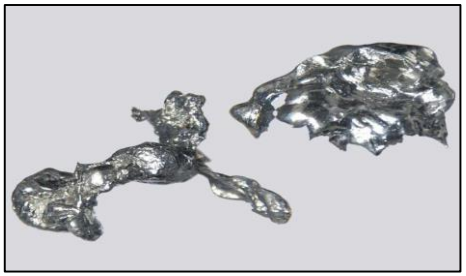


Lead



Cadmium

Heavy Metals

Mercury

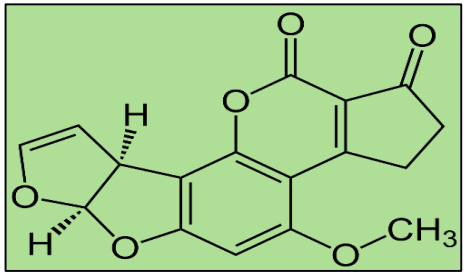
Arsenic

Heavy Metals

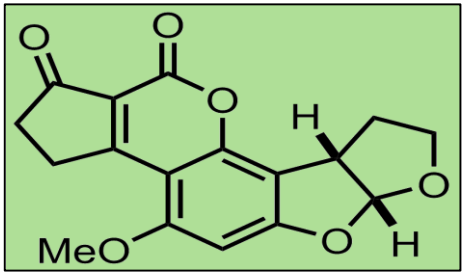
	Oilseeds	comments
	content$_{max.}$	
Heavy Metals ** [mg/kg]**		
Lead	< 0,2	grain
Cadmium	< 0,1	grain except wheat
Mercury	-	(dietary supllements < 0,1)
Arsenic	-	(milled rice < 0,2)

**** Council regulation (EC) 1181/2006

Quality Control



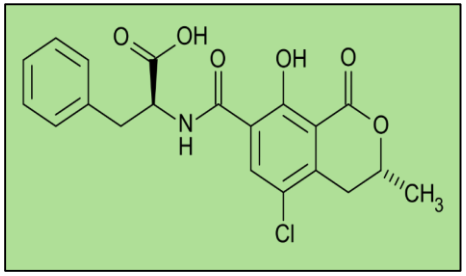
Aflatox B1



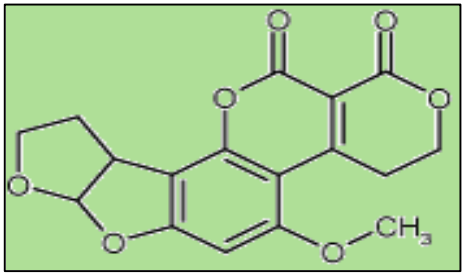
Aflatox B2

Mycotoxines

Aflatox G1



Ochratox. A



Aflatox G2

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Quality control

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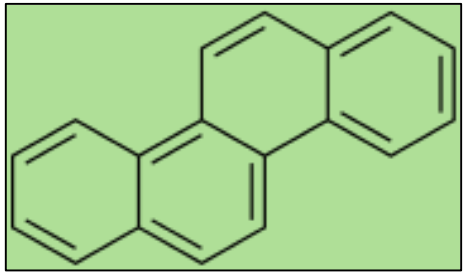
Mycotoxine [µg/kg]

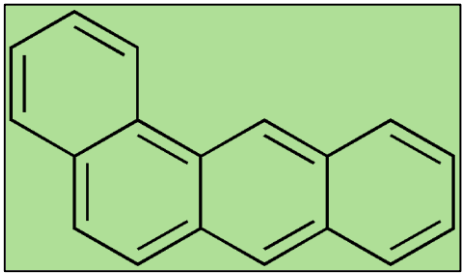
	Oilseeds $content_{max.}$	comments
Mycotoxines *****		
Aflatox B1	< 2,0	direct human consumption or food ingridient except usage as refined vegetable oil
	< 8,0	oilseeds that are sorted or treated with other physical methods
Aflatox B2	-	
Aflatox G1	-	
Aflatox G2	-	
Σ B1+B2+G1+G2	< 4,0	direct human consumption or food ingridient except usage as refined vegetable oil
	< 15,0	oilseeds that are sorted or treated with other physical methods
Ochratox. A	< 5,0	unprocessed grain
	< 3,0	product made out of unprocessed grain an grain for direct human consumption

***** Council regulation (EC) 1181/2006 and (EU) 165/2010

Quality Control



Chrysen

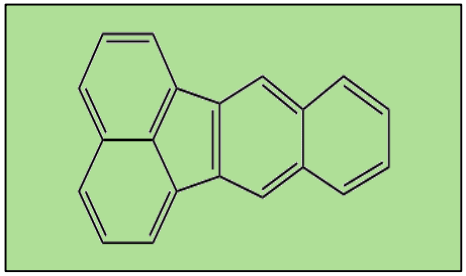


Benzoapyren

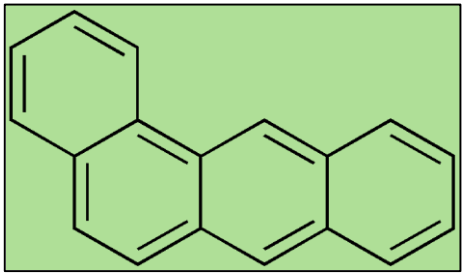
Pesticides

Pesticides / PAH

Pesticides



Benzoflourathen



Benzanthracen

Pesticides / PAH

	Oilseeds content$_{max.}$	comments
Pesticides (standard range)		
organic	≤ 0,01	Council Regulations (EC) 834/2007 and (EC) 889/2008 BNN guidelines
conventional		Council Regulations (EC) 396/2005 and EC 889/2008
PAH ****(µg/kg]**		
Benzo(a)pyren	< 0,5	2,0 µg/kg in oil
1,2-Benzanthracen	-	
Benzo(b)flouranthen	-	
Chrysen		
Σ 4 PAH	< 2,5	10 µg/kg in oil

****** Council regulation (EC) 1181/2006 and (EC) 835/2011

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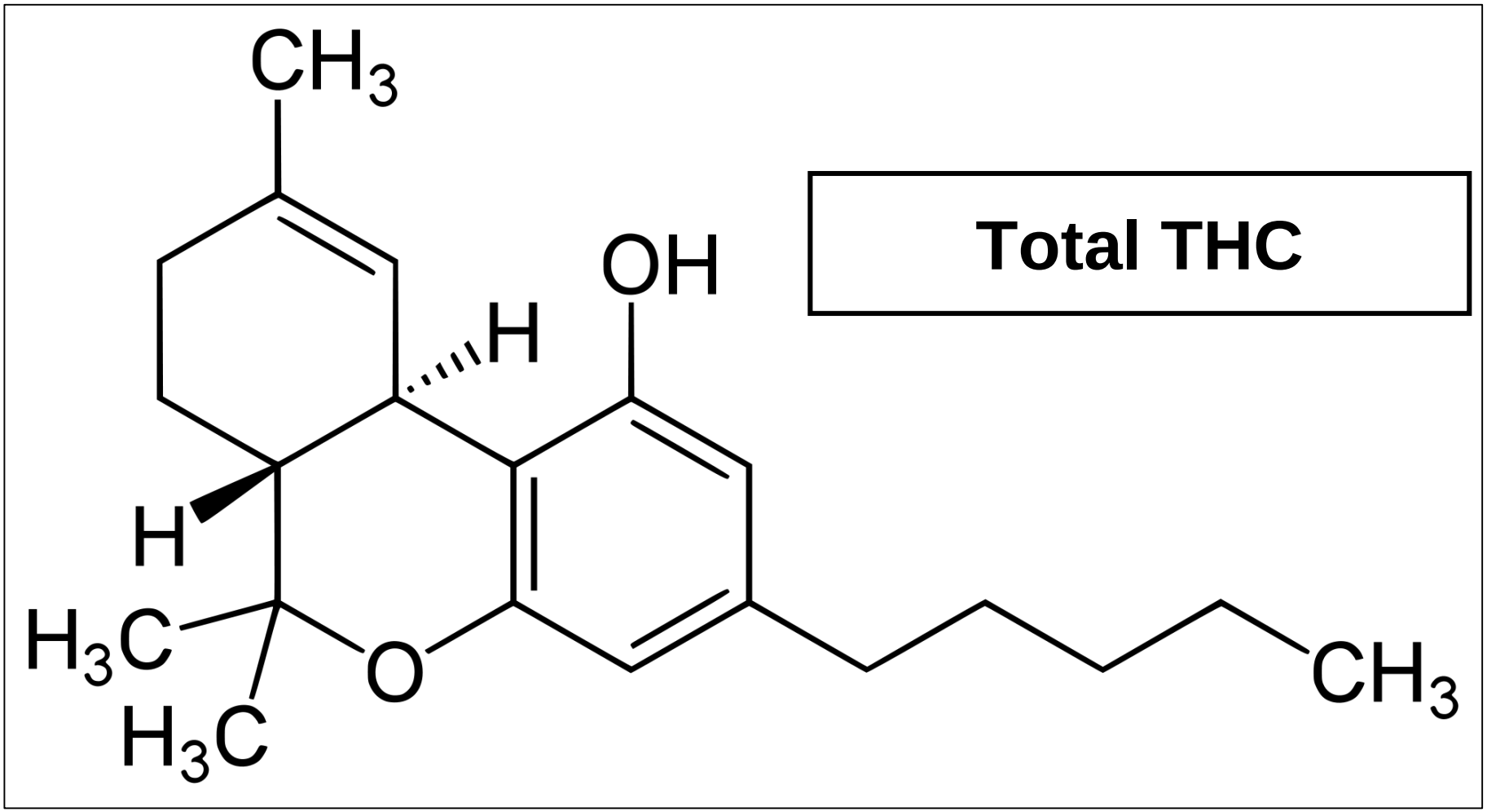

Total THC

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Total THC

	Oilseeds	comments
	content$_{max.}$	
THC_{total} [mg/kg]		
Oil pressing	< 2,5	5.000 µg/kg according to BfR (former BGVV) EIHA recommandation: 10.000 µg/kg
Hulling	< 8	hulled hemp seeds (contaminated shell is removed during hulling)

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	Oilseeds			Milled Cereal Products		Instant Products		comments
	guidance value	warning value	content$_{max.}$	guidance value	warning value	guidance value	warning value	
Microbiology [cfu/g] *								
Total Plate Count	10^6							10 = 10^1 100 = 10^2 10.000 = 10^4 1.000.000 = 10^6
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Bacillus Cereus	10^2	10^3		10^2	10^3	10^3	10^4	no guidance / warning value for unprocessed hemp seeds
Coagulase Positiv Staphylococci				10^2	10^3	10^2	10^3	
Yeast	10^4			10^3				**BUT** for milled cereal and instant products
Mold	10^4							
Anaerobic Sulphite Reducing Bacteria				10^2	10^3	10^3	10^4	→ necessary to consider guidance / warning values for processed product when evaluation raw material
Salmonella in 125g		n/a in 125g						
Chemical Analysis								
moisture [%] **			< 10					wheat 14% - for hemp seeds to high
acid value [mg KOH/g fat] ***			≤ 1,5					≤ 4,0 *** - for hemp seeds too high
peroxid value [meq act. O/kg fat] ***			≤ 2,5					≤ 10,0 *** for hemp seeds too high
a_w **			0,7					wheat
Gluten [mg/kg]			< 5,0					detection limit allergen labelling > 20mg/kg
Allergene: Senf			n/a					
Heavy Metals ** [mg/kg]**								
lead			< 0,2					grain
cadmium			< 0,01					grain except wheat
mercury			-					(dietary supllements < 0,1)
arsenic			-					(milled rice < 0,2)
Mycotoxines ***								
Aflatox B1			< 2,0					direct human consumption or food ingridient except usage as refined vegetable oil
			< 8,0					oilseeds that are sorted or treated with other physical methods
Aflatox B2			-					
Aflatox G1			-					
Aflatox G2			-					
Σ B1+B2+G1+G2			< 4,0					direct human consumption or food ingridient except usage as refined vegetable oil
			< 15,0					oilseeds that are sorted or treated with other physical methods
Ochratox. A			< 5,0					unprocessed grain
			< 3,0					product made out of unprocessed grain an grain for direct human consumption
Pesticides (standard range)								
organic								Council Regulations (EC) 834/2007 and (EC) 889/2008 BNN guidelines
conventional								Council Regulations (EC) 396/2005 and EC 889/2008
PAH ****(µg/kg)**								
Benzo(a)pyren			< 0,5					2,0 µg/kg in oil
1,2-Benzanthracen			-					
Benzo(b)flouranthen			-					
Chrysen								
Σ 4 PAH			< 2,5					10 µg/kg in oil
THC$_{total}$ [mg/kg]								
oil pressing			< 2,5					5.000µg/kg according to BfR (former BGVV) EIHA recommandation: 10.000µg/kg
hulling			< 8					hulled hemp seeds (contaminated shell is removed during hulling)

* according to DGHM (German Society of Hygiene and Microbiology)
** according to MRI (Federal Research Institute of Nutrition and Food)
*** according to Deutsches Lebensmittelbuch, Leitsätze für Speisefette und Speiseöle

**** Council regulation (EC) 1181/2006
***** Council regulation (EC) 1181/2006 and (EU) 165/2010
****** Council regulation (EC) 1181/2006 and (EC) 835/2011

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Quality Measures

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Cultivation / Harvest

- Soil evaluation
- Winddrift
- Maintainance of harvester (e.g. oil leakage)
- Use of trailers for transport of harvested crop only
- Avoiding Contaminations and impurities
- Cleaning / desinfection schedule
- Etc.

Quality Measures

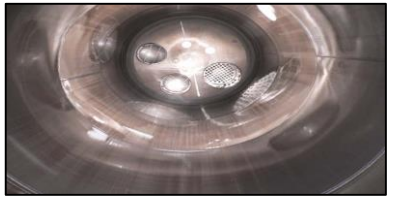
Production

- Product flow from „field to processor“
- Hygienic design of buildings, facilities, storage, equipment, e.g.
  - suitability of material (easy to clean)
  - product flow from unclean area to clean area
  - water supply and sanitation
  - wash basins, toilets for employees
- Cleaning / desinfection schedule
- Maintainance / regular exchange of cleaning devices
- Pest control, e.g.
  - pest control plan
  - waste management
  - hygienic design of manufacturing buildings
  - maintainance of buildings / production side
- Flushing batches
- Employees
  - Hygiene training for employees / hygiene awareness

Quality Measures

Packaging

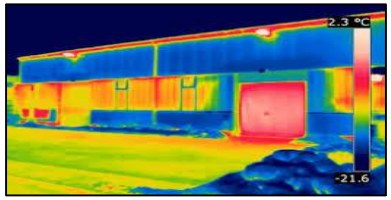
- Food defence
- Cleaning / desinfection of containers etc.
- Use of transport equipment for food grade only (bulk)
- Prevention of migration and immigration
- Protection against pests
- Use of new Big Bags
- Etc.

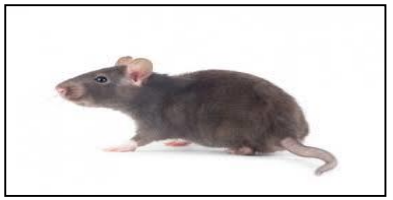


Quality Measures

Storage / Transportation

- Prevention of condensation
- Air circulation
- No standing water
- Prevention of thermal bridges
- Temperature / environmental conditions (humidity)
- Moisture of hemp seeds
- Pest control
- Etc.





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Focus on quality hemp grain

The partnership between the suppliers of hemp grain (farmers, associations and traders) and processors, focusing on quality hemp grains, as raw materials, will contribute to the development of the hemp food market.

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Thank You for Your Attention!

EIHA Conference, June 2018, Cologne