TFZ

Technologie- und Förderzentrum
im Kompetenzzentrum
für Nachwachsende Rohstoffe

Multi-Purpose Oilseed Crops for more Food Security

Online-Presentation, 21 Nov. 2024

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www.tfz.bayern.de

Technologie- und Förderzentrum (TFZ) in the Centre of Excellence for Renewable Resources in Straubing

Institution of StMELF

Bavarian State Ministry of Food, Agriculture, Forestry and Tourism

- Support of production and utilization of biomass for energy and industry
- Applied research, demonstration & consulting
  NAWAREUM Museum for sustainability & climate protection
- About 110 staff members

Four Research Departments

- Renewable resources crops and material cycles
- Solid biofuels
- Renewable fuels and materials
- System evaluation of renewable resources

Fotos: Tobias Hase, TFZ

Department Renewable Fuels and Materials

Key activities

- Evaluation of alternative fuels for agriculture and forestry
- Quality analysis of new renewable fuels
- Operation & emission behaviour of agricultural machinery at the test stand and in the field
- Support of state owned farms during the transformation to climate friendly propulsion systems
  Bavarian climate protection law: climate neutral state administration by 2028
- Development of renewable two-component covering materials for agri-/horticultural applications
  sprayable, adhering, curing, biodegradable

Analysis of ignition behaviour

Fuels for motor tests at test bench

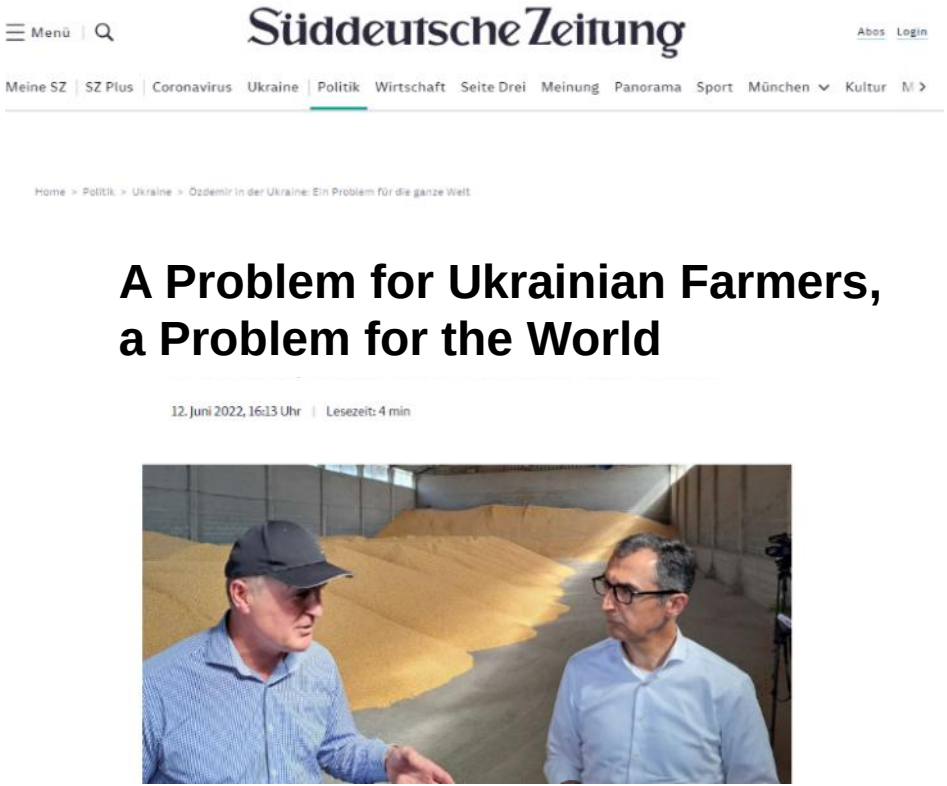
Operation and emission testing

Fotos: Tobias Hase, TFZ

Outline

1. Introduction – „No fuel - no food“
2. Multi-Purpose-Crops
3. Rapeseed Oil Production and Use
4. Benefits of Rapeseed Oil Fuel – Contribution for food security
5. Summary

No Fuel – No Food!



"… He would only need a large rapeseed press, then he could make biodiesel from it.
…
Diesel is becoming scarce in the country. And without it, no combine harvester will run."

Source: Süddeutsche Zeitung, 12 June 2022

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No Fuel – No Food!

Diesel fuel shortage paralyzes agriculture and logistics
Argentina

"In Argentina, the increasing shortage of diesel fuel is becoming more and more of a problem for the agricultural and food industry … wheat sowing, which should be running at full speed in the country at the moment, is regionally at risk. And harvesting work, for example in the maize and sugar cane fields, has come to a standstill … The farmers' association Coninagro referred to difficulties with the supply of inputs, livestock transport and food logistics."

Source: Agra-Europe, 13 June 2022

Multi-Purpose Crops

Multi-purpose crops provide more than one significant purpose, such as:

- Food
- Animal feed
- Oil, starch, fibre,
- Medicine, cosmetics
- Detergents, chemicals
- Fuel
- Conservation, improving soil quality, shade, pest management …

Benefits:

Higher revenues, flexibility & resilience, especially when facing changing conditions (market demands, weather conditions, emergencies …)

Oil Plants – Worldwide

Rapeseed

Sunflower

Linseed

Soybean

Hemp

Abyssinian Mustard

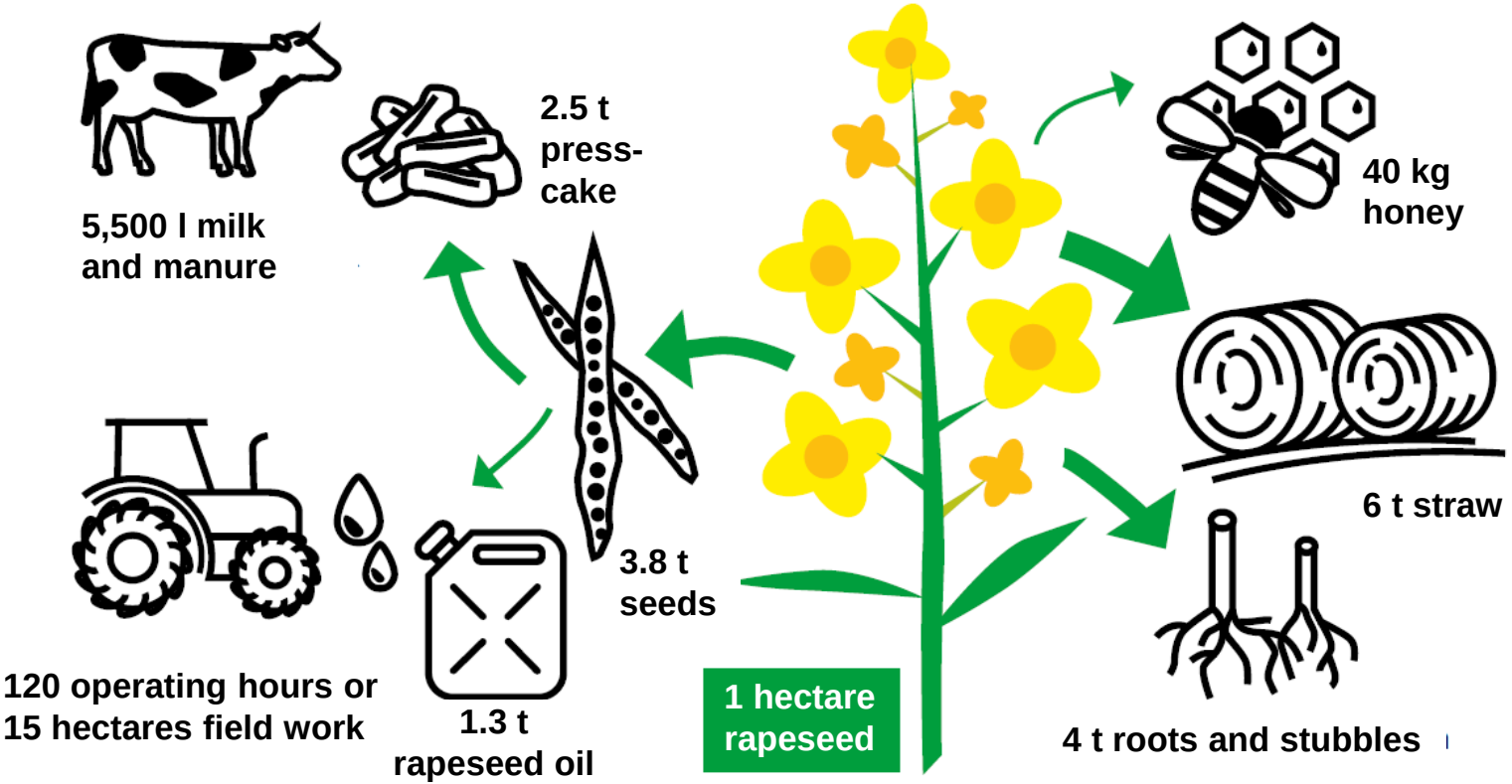
Ricinus

Cotton seed

Jatropha curcas

Moringa

Rapeseed for Food, Feed and Fuel



Source: TFZ Kompakt 8

Rapeseed Oil Processing

Growing Rapeseed

- Grown on 1 to 1.5 million hectares in Germany (6 to 9 % of agricultural land)
- High oil yields: 1.3 to 1.5 t/ha

Processing

- Mechanical & solvent extraction in industrial oil mills with filtration and refining steps
- Solely mechanical extraction in decentral oil mills with adsorptive treatment and filtration

Rapeseed Oil Usage

- Nutrition
- Feeding
- Lubrication, Coatings
- Chemical industry
- Fuel use …

Source: TFZ, Fuchs

Requirements of Rapeseed Oil Fuel - DIN 51605

Density (15°C):	910-925 kg/m³
Flashpoint (P.-M.):	min 101 °C
Kin. Viscosity (40 °C):	max. 36.0 mm²/s
Heating Value:	min. 36.0 MJ/kg
Ignitability:	min. 40 (DCN)
Iodine Number:	max. 125 g Iod./100 g
Sulphur Content:	max. 10 mg/kg
Contamination:	max. 24 mg/kg
Acid Value:	max. 2.0 mg KOH/g
Oxidation Stability:	min. 6.0 h
P Content:	max. 3 mg/kg
Mg Content:	max. 1 mg/kg
Ca Content	max. 1 mg/kg
Water Content:	max. 750 mg/kg

DEUTSCHE NORM Januar 2016

DIN 51605

DIN

ICS 75.160.20

Ersatz für
DIN 51605:2010-09

**Kraftstoffe für pflanzenöltaugliche Motoren –
Rapsölkraftstoff –
Anforderungen und Prüfverfahren**

Fuels for vegetable oil compatible combustion engines –
Fuel from rapeseed oil –
Requirements and test methods

Combustibles pour moteurs adaptés aux huiles végétales –
Combustible à base d'huile de col
Exigences et méthodes d'essai

DEUTSCHE NORM Dezember 2015

DIN 51623

DIN

ICS 75.160.20

Ersatz für
DIN SPEC 51623:2012-06

**Kraftstoffe für pflanzenöltaugliche Motoren –
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Source: www.beuth.de or www.din.de

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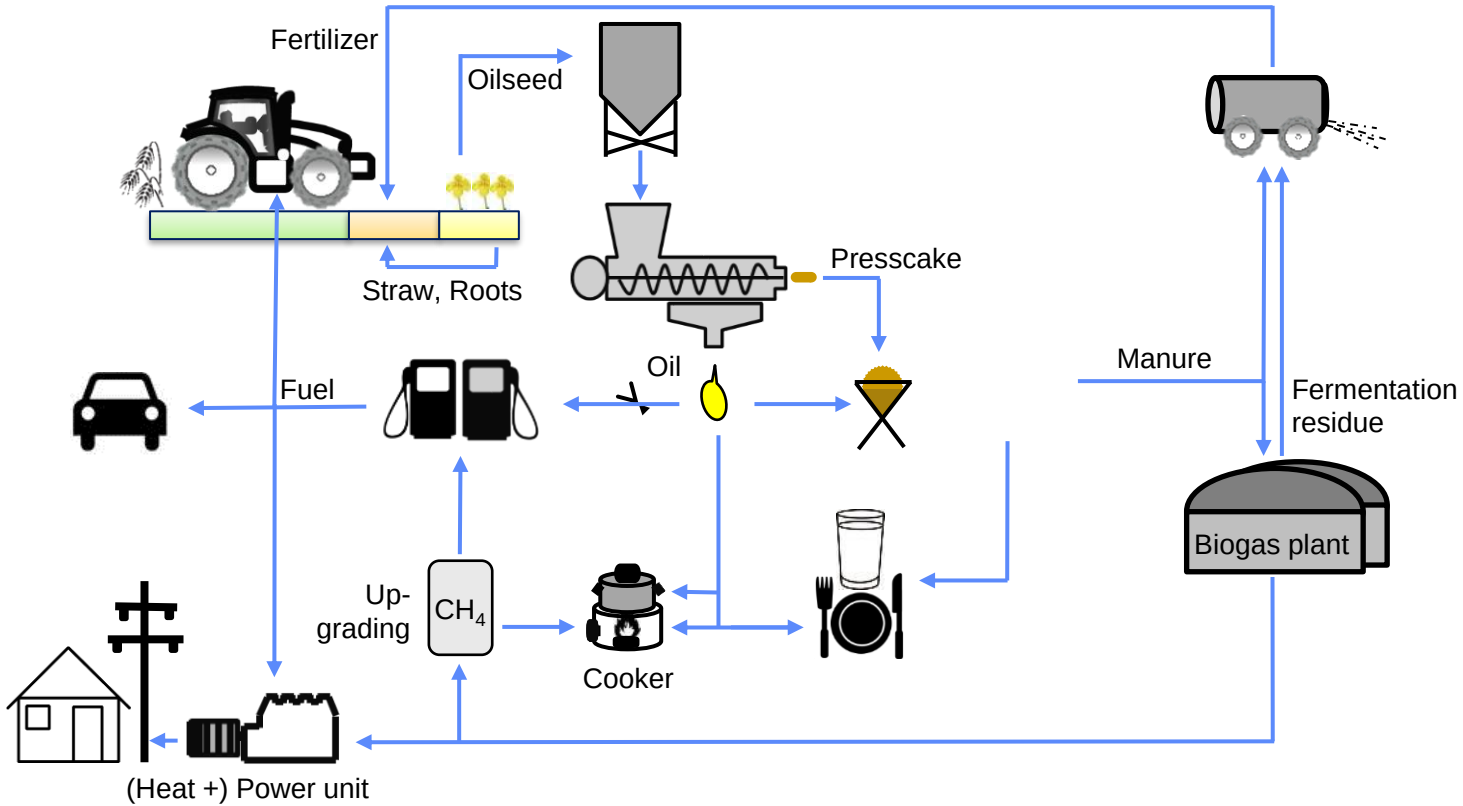
Rapeseed Oil Fuelled Tractors

- Actual no series production of vegetable oil compatible tractors
- Tractors from John Deere in field test
- Adaptation by retrofitting workshops possible (dual-fuel system)
- Not available at public filling stations
- On-farm storage and refuelling is cheap and easy

Source: TFZ

Closed Circle Economy – Decentral Plant Oil Mills



Source: TFZ

Benefits of Rapeseed Oil Fuel

- Production in both, industrial and decentral oil mills, is state of the art
- Valuable co-products (protein feed)
- Multiple usages of rapeseed oil
- Regional added value
- Less capital outflow for fossil fuel
- Climate protection
- Harmless to soil and water
- Food security

Food or Fuel?

Consumption of rapeseed for biofuels is regulated by the market

- If rapeseed becomes scarce (due to political crisis, low yields …), prices rise
- When rapeseed prices are high, rapeseed is primarily used for food production
- This is because of the high value creation potential on food markets

  ➔ Use as food increases and use as biofuel decreases

Biofuel production from rapeseed …

- 'buffers' the availability of rapeseed for food and animal feed purposes and thus,
- contributes to security of food supply (food reserve in cases of emergency)
- provides fuel for agricultural machinery, ensuring (food) production

Source: UFOP: BERICHT ZUR GLOBALEN MARKTVERSORGUNG 2020/2021

Summary

- No fuel – No food
- Oil crops such as rapeseed deliver, amongst others, food, feed and fuel
- Rapeseed oil fuel has many benefits
  - Climate protection
  - Regional development
  - Food Security (buffer and domestic fuel supply)
- Plant oil fuels need to get more political attention

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Thank you for your attention!

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