

A to Z of *Jatropha curcas* L.

5. Processing

Ir. R. (Remco) Hamoen

Ir. T. (Tim) Voordouw

Ir. J. (Jeroen) Willemsen

Dr R.E.E. (Raymond) Jongschaap

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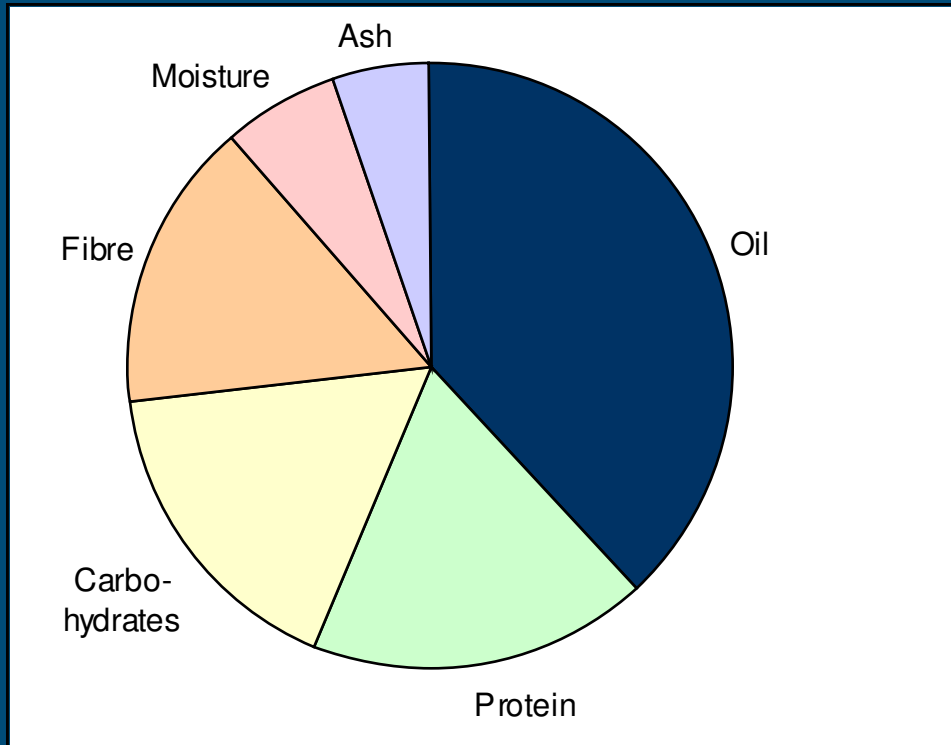
Introduction

- Oil fraction and characteristics
- Press technology
- Oil yield and quality
- By-products and their use / value

Discussion with audience



Oil fraction and characteristics



- High oil content
- Grows on poor land
- Toxic
- Pest resistant

Its toxicity makes Jatropha a sustainable oil seed



Jatropha versus diesel oil

Specification	Jatropha Oil	Diesel Oil
Specific gravity (gr mL ⁻¹)	0.9180	0.8410
Sulphur (ppm)	0.13	1.2
Calorific value (kcal kg ⁻¹)	9470	10170
Flash point (°C)	240	50
Cetane value	51	50



Press technology

■ Press types



Hand press

- Up to 7 kg/hr
- Low investment cost
- Low capacity
- Labor intensive



Strainer press

- Up to 1000 kg/hr
- High investment cost
- High capacity



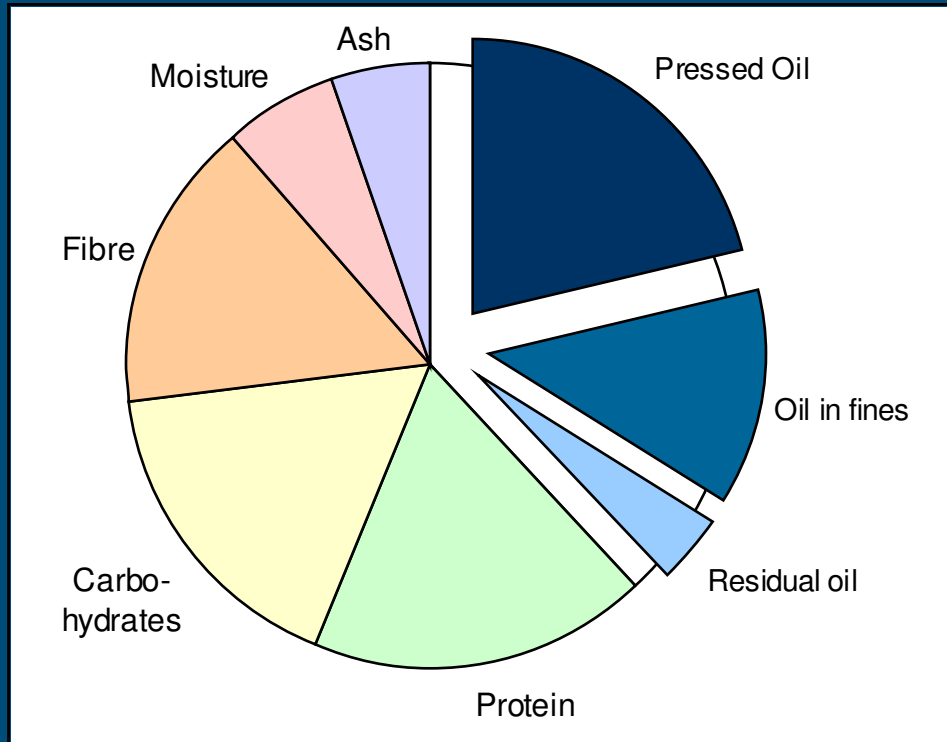
Cylinder hole press

- Up to 25 kg/hr
- High investment cost
- Medium capacity

Local medium or central high capacity?



Oil yield and quality

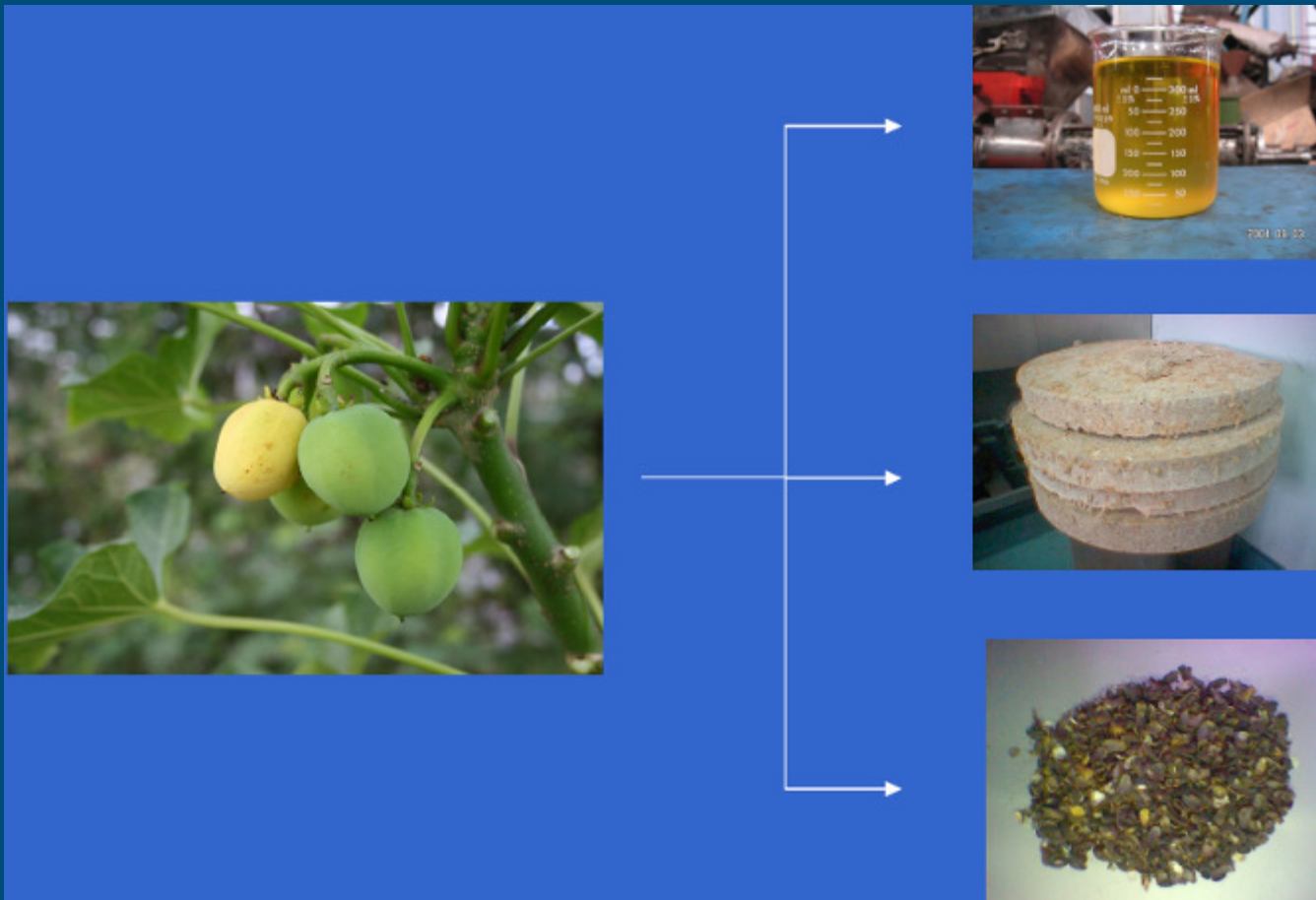


- Yields up to 95% possible
- Pure oil is of high quality
- High amount of fines that must be removed

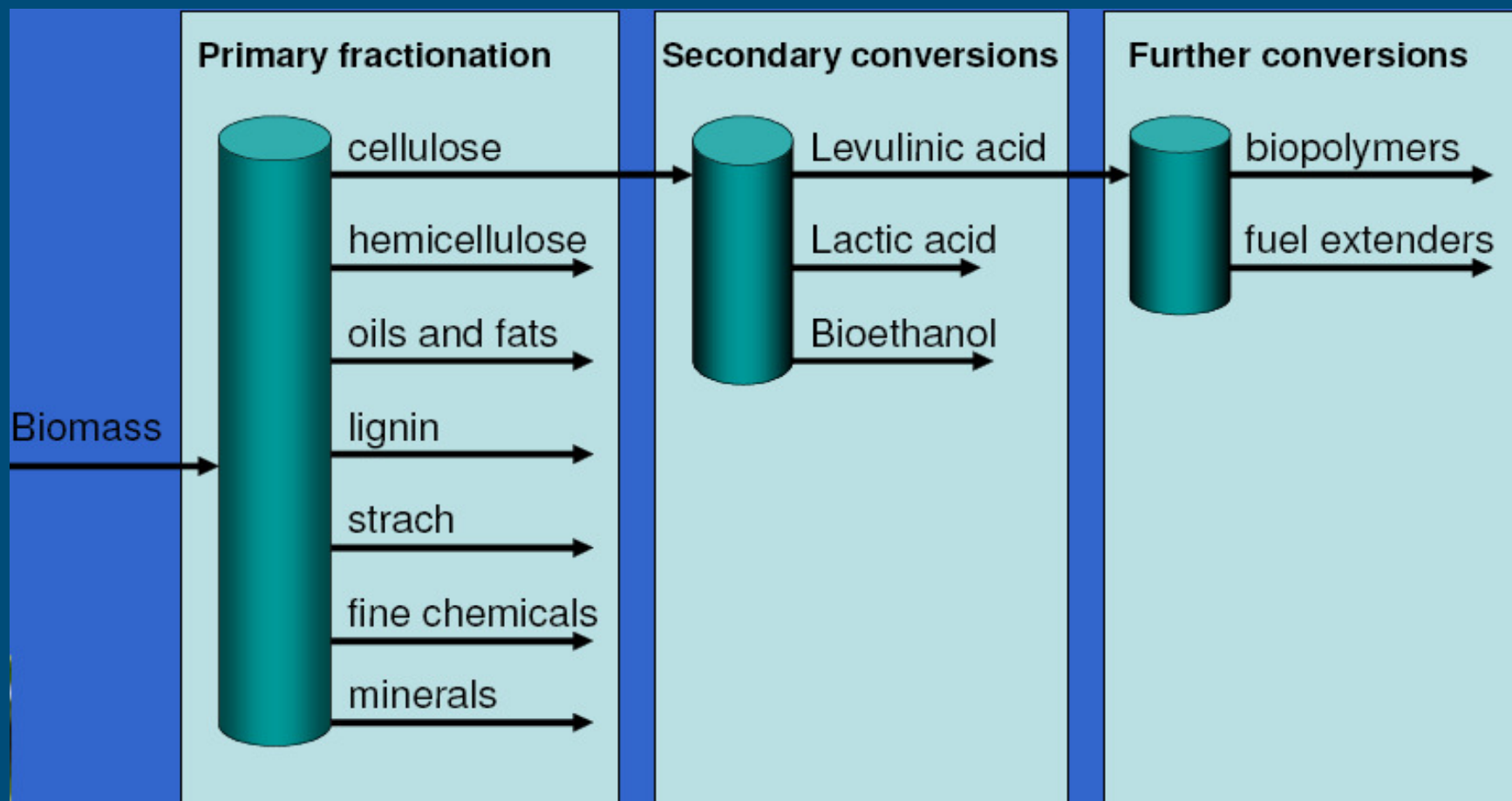
Minimal residual oil or minimal fines production?



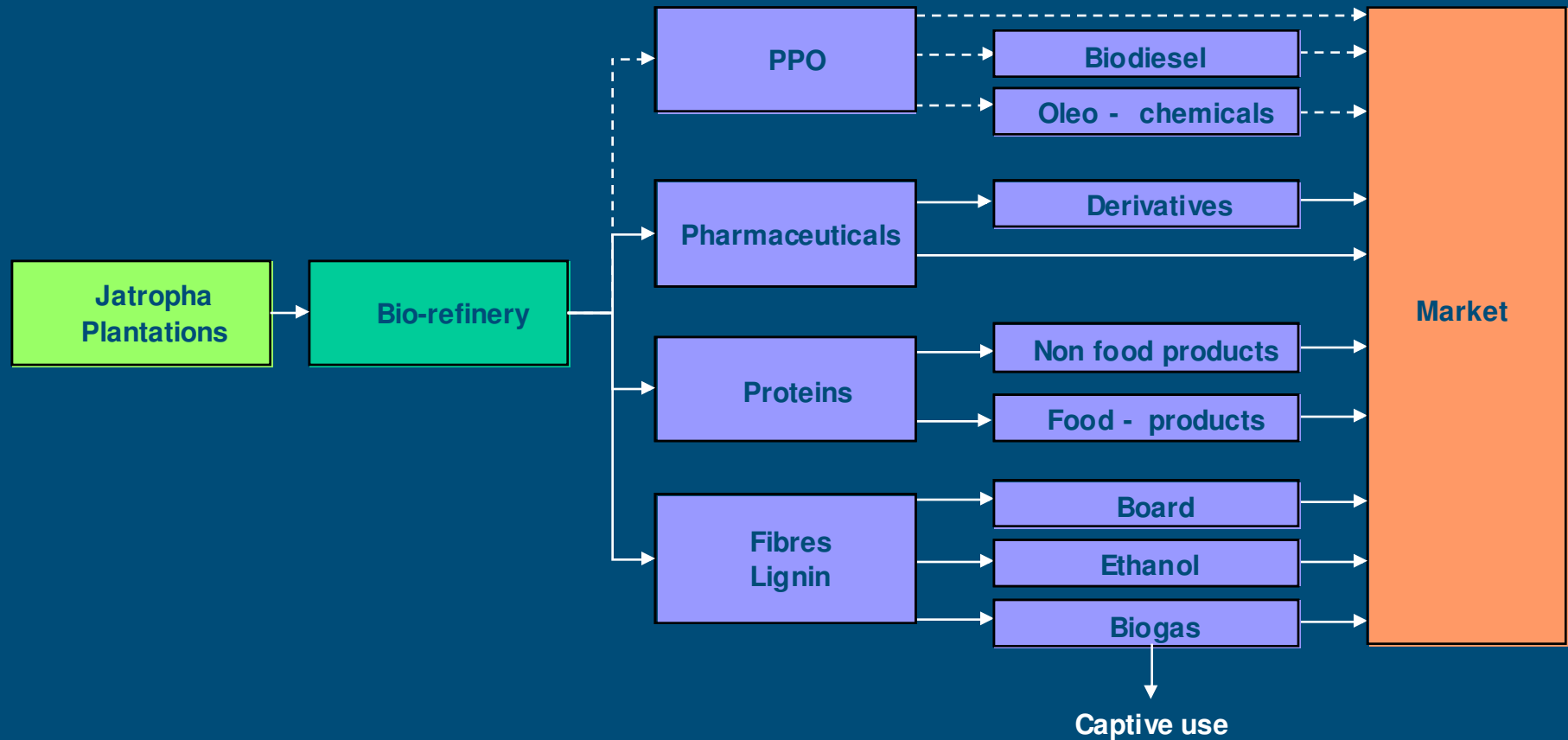
Value adding: bio-refinery



Fractionation and conversion of biomass



Jatropha curcas by-products and their use



All by-product together are more valuable than the oil



Components of *J. curcas* seeds

Components	Seed (%)
Crude Protein	15
Lignin	20
Fiber	15
Carbohydrate	10
Oil	35
Ash	5



Value of press cake (Europe)

Components	Seed (%)	€ / kg	€ / kg seed
Crude Protein	15	1.00	0.15
Lignin	20	0.15	0.03
Fiber	15	0.15	0.02
Carbohydrate	10	0.25	0.03
Total fractionated press cake			0.23
Un-fractionated press cake	60	0.035	0.02
Oil	35	0.6	0.21



Discussion / Proposition

Bio-refinery of *Jatropha curcas* leads to unsustainable use of natural resources



References

Jongschaap, R.E.E., W.J. Corré, P.S. Bindraban & W.A. Brandenburg, 2007. Claims and Facts on *Jatropha curcas* L. Global *Jatropha curcas* evaluation, breeding and propagation programme. Plant Research International B.V., Wageningen, the Netherlands, Report 158, 42 pp + annexes.
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End module 5

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