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Fiber2fashion.com

# Processing Industrial Hemp into Textile

May Kahoush

The Swedish School of Textiles

University of Borås

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# Sustainability of hemp (vs. cotton)

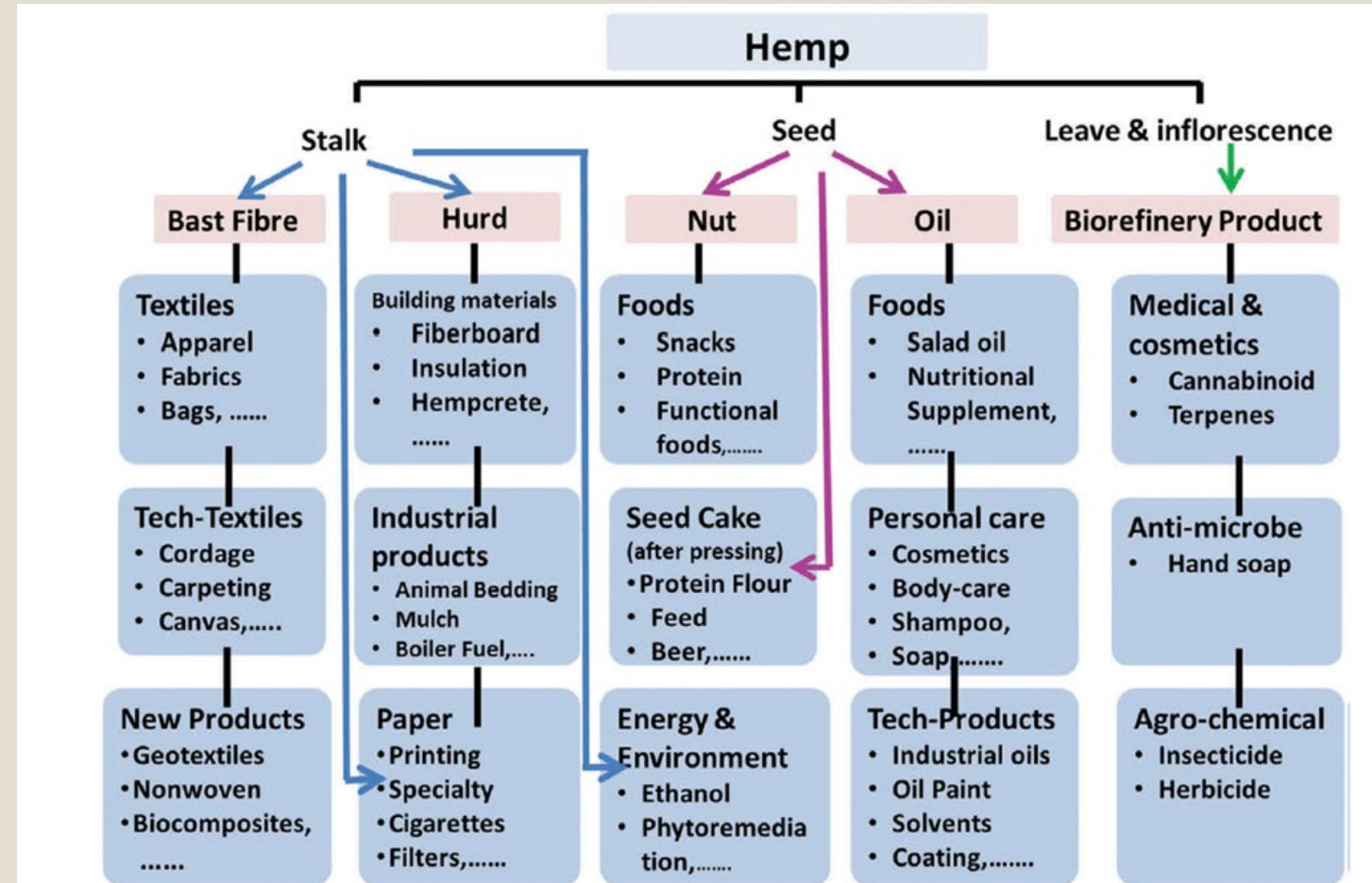
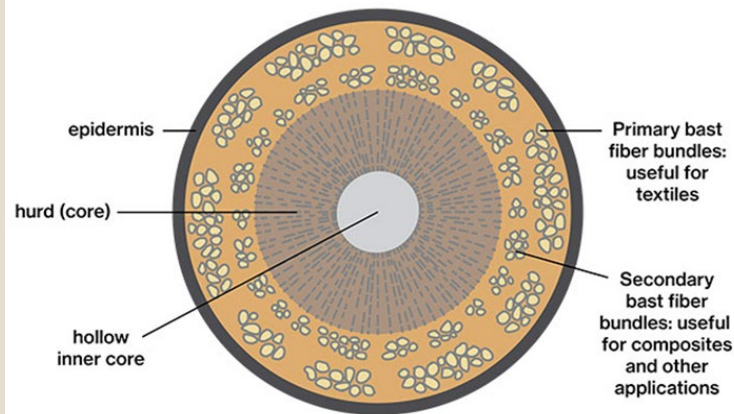
- + 77,63% reduction in cost associated with agriculture activities
- + 3 times more metric tons of fiber/ha
- + Carbon neutral
- + Needs less water

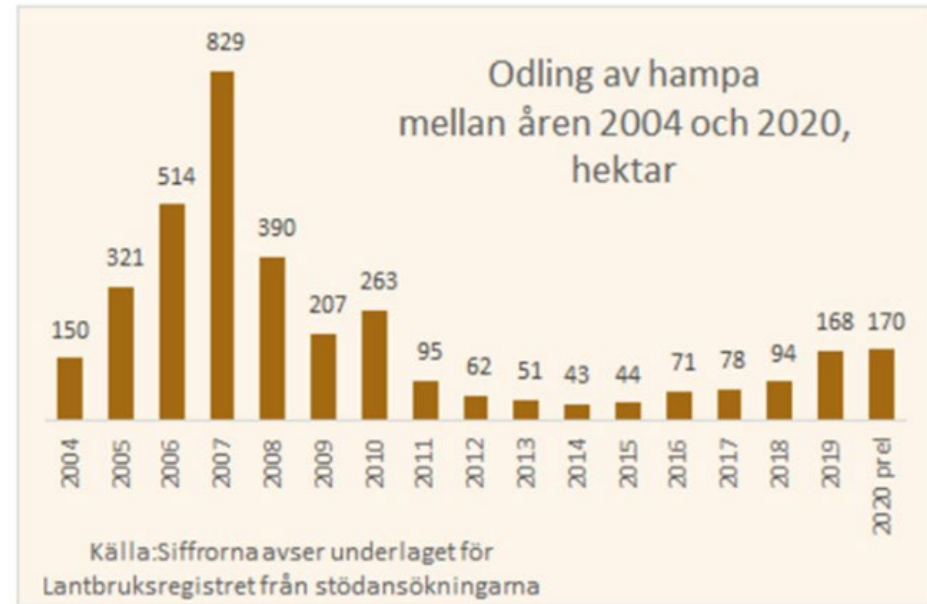


# Simply, There is no waste in hemp plant!

## Hemp Fiber

An inside look at a hemp stalk





Hemp grown in Sweden since 2004, in hectares

# Hemp in Sweden - history & status

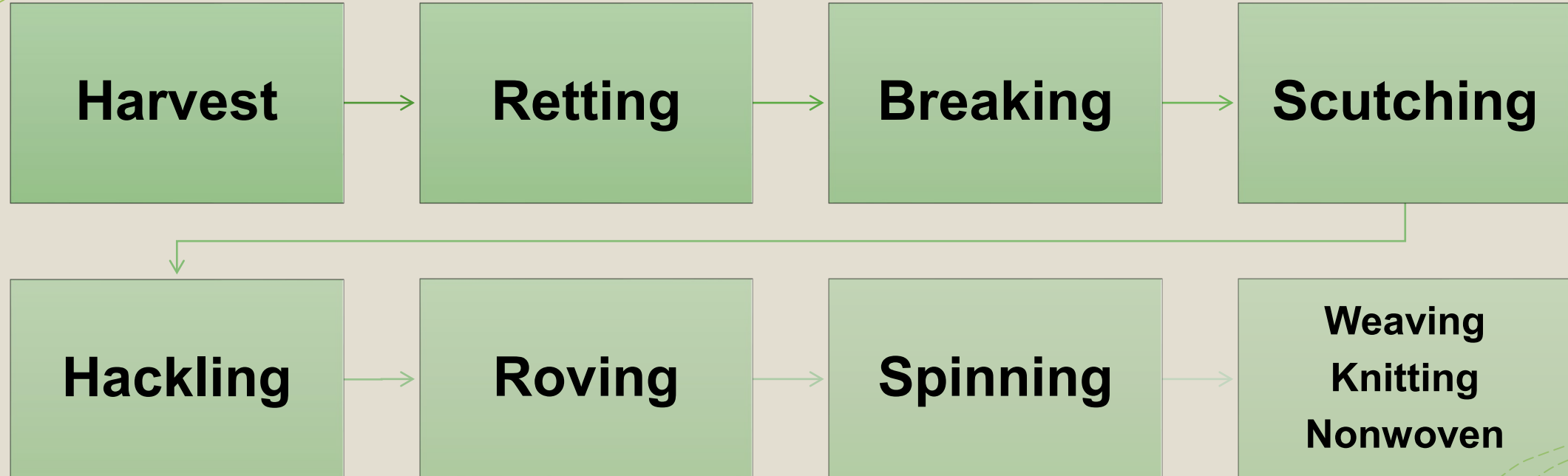
+ Subfossil remains of hemp have been found at Lindängelund, Malmö, dating back to Roman iron age around AD 1-400

+ According to government statistics:  
A total of 170 hectares were cultivated in 2020

About 150 hemp operators in Sweden

# Common fiber extraction steps

(Schumacher et al., 2020)



# Retting and degumming

- + Breaks down the layer that bind the fiber together
- + Degrading mainly pectins, hemicellulose and lignin to release fiber bundles and facilitate fiber extraction

Dew

Water

Microwave

Bag

Seawater

Chemical

Biological

Steam explosion

Electrolytic





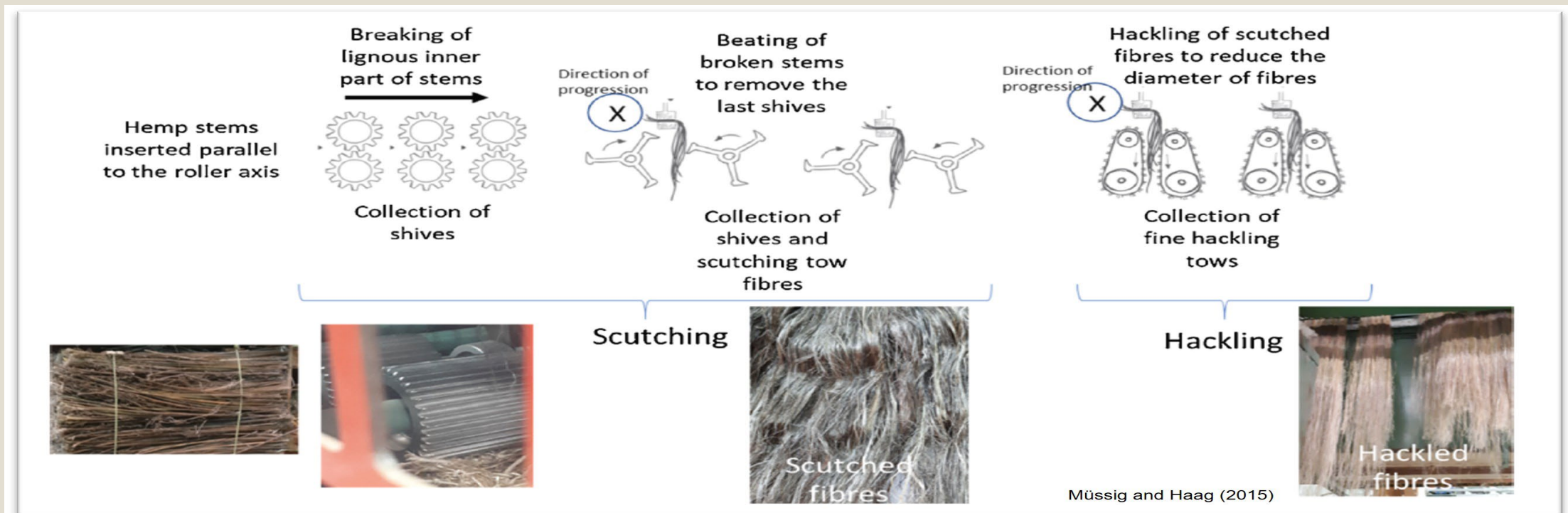


# Breaking Decortication

Stems are broken down using a breaker or  
flute rolls

# Scutching - Hackling

- + Beating the stems to separate fibers from the core
- + Passing them through rotary blades
- + Fibers are combed to remove any unwanted particles







# Cottonization

- + The process of shortening hemp fibers and making them finer
- + To get similar features as cotton



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# Carding

+ To further comb the fibers and form a web



# Roving

The sliver is twisted and drawn out further to improve strength, then wound on spinning bobbins



# Spinning

Generally, to produce a better, finer yarn, the fibers are then thoroughly wetted in a small trough of water as part of the spinning process, known as wet spinning. Fibers can also be dry spun, which often results in a coarser yarn.

**Easier said than done!**



POLY.se



# Novel hemp-based cellulose fibers





# Textile production via weaving, knitting and nonwoven







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ustainablejungle.com

# Applications

Moonclothdesign.com

Molo hemp.com

Shooos.de



# Technical Applications

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Thermal insulation

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Acoustic insulation

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Building cement and composites

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Insecticides

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Adsorbents from waste hemp and other components

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Loose fill-in insulation for buildings

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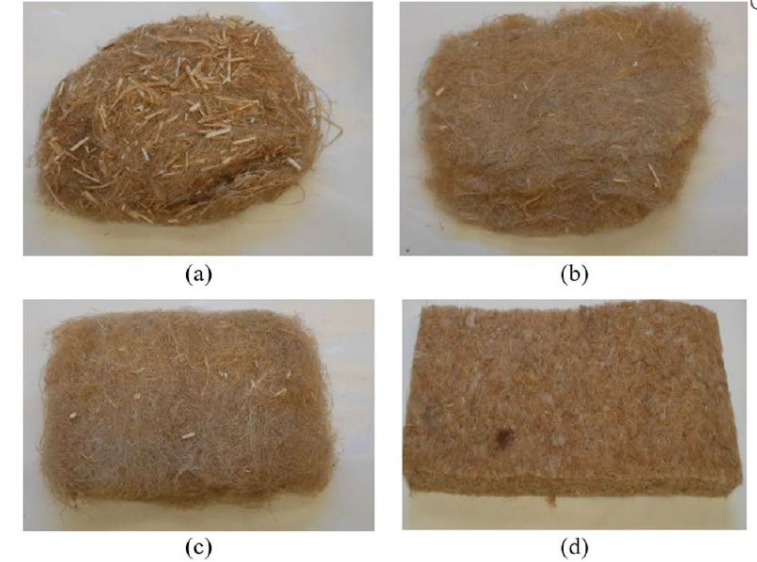
Anti-oxidants and anti-bacterial applications

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Functional fibers (after chemical treatments and modification)

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Many more .... Not mentioning the CBD related applications yet!



# Challenges

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High cost

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Machinery

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Retting and Spinning

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Sustainability in the process

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Legislations

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**Thank you!**

**[may.kahoush@hb.se](mailto:may.kahoush@hb.se)**

