MiscanValue - Creating value chains for utilization of miscanthus fibres from sustainably managed marginal and post-mining areas

Processing of Miscanthus biomass into pulp, fiber and insulation materials

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Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

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Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

Use of renewable raw materials for products - wood

- Wood
- Wooden products
- Plywood
- Strandboard
- Chipboard
- Fiberboard
- Insulation board

Combination with annual plants possible

- Straw,
- Miscanthus, reed
- Hemp, flax

→ **MiscanValue**

Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

Production of Miscanthus fiber and pulp

- Processing of raw material into pulp and fibers for insulating materials or paper and packaging
- Different raw material (location, harvest time)

Miscanthus in wintertime

Laboratory TMP device

Different fibers, pulp

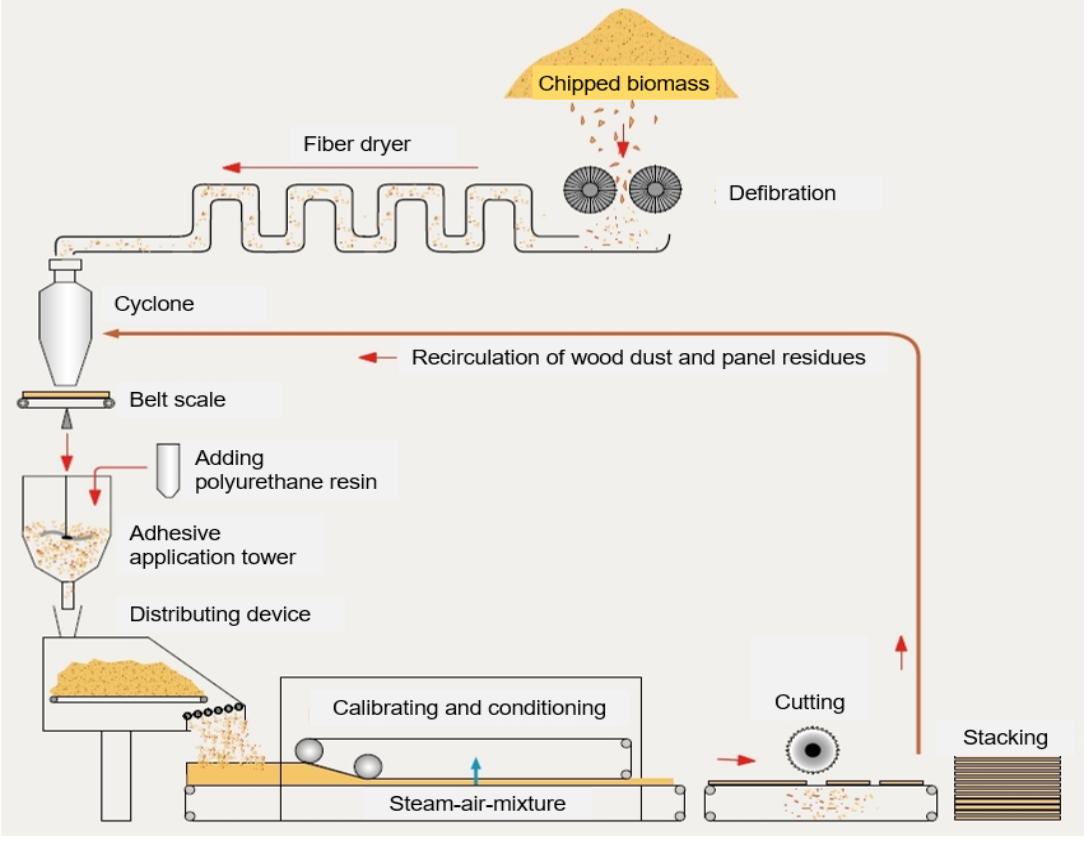
for insulating materials

for paper and packaging

Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

Production of Insulation Material in general

- Chipped biomass
- Defibration, Refinering
- Fiber dryer
- Adding Resin and Additives
- Preforming
- Hot Press, Conditioning
- Cutting, Storage, Transport



Manufacturing process for insulation material (Adapted from: Dederich, L., Wiegand, T., 2007)

Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

Production of Insulation Material
Laboratory scale

- Processing of raw material, TMP (stems and leaves)
- Mixing with spruce/pine wood (100, 70, 30, 0 %)
- Different target densities (110 kg/m³ and 240 kg/m³)
- Different TMP machine gap (0.5 mm and 0.14 mm)
- Varying time, temperature, pressure
- Resin; PMDI (polymeric methylene diphenyl diisocyanate), 5 %
- Testing material properties (thermal insulation, mechanical strength)




Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

Production of Insulation Material
Laboratory scale

- Mixture with wood fibers (0, 30, 70, 100 %)
- Mixture with Miscanthus chips (70, 30 %)
- Varying additives (hydrophobing/binding agent, PMDI, formaldehyde resin)


Insulation boards, different mixtures

Production of insulation board

Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

Applications, insulation materials (for construction)

- Blow-in insulation
- Flexible insulation
- Insulation boards
- Insulation composite systems





pictures: Gutex, Steico, Best Wood

Production of Miscanthus chips and chipboard
Laboratory scale

- Shredding of Miscanthus (2 – 23 mm length)
- Processing of raw material with knife ring chipper
- Production of 3 layer chipboard

Miscanthus, Chips and fibers

Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

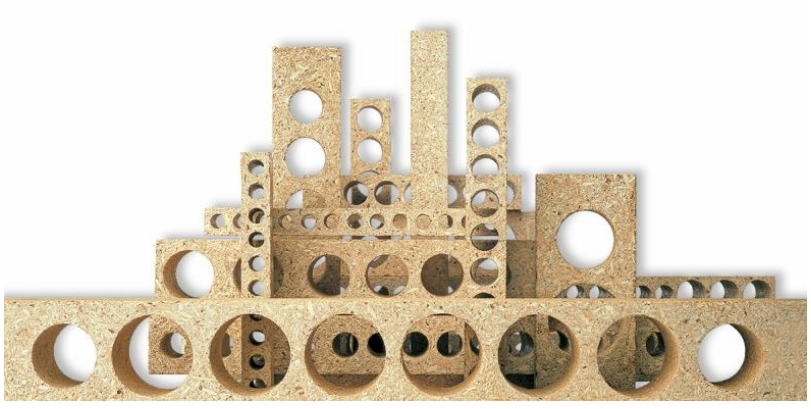
Production of chipboard
Laboratory scale

- Mixing with spruce/pine wood (top layer)
- Resin; UF (urea-formaldehyde), 12 %
- Testing material properties (mech. strength, water uptake test, ash Content)

Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

Applications, chipboard

- Building boards
- Kitchen worktops
- Cement bonded panels
- Doors

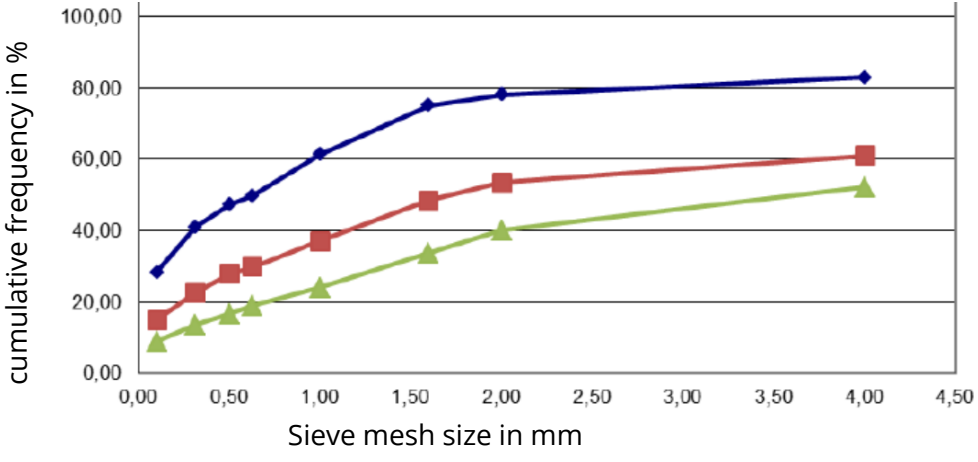


pictures: https://expresszuschnitt.de/, https://otto.de https://toom.de, https://bausal.de

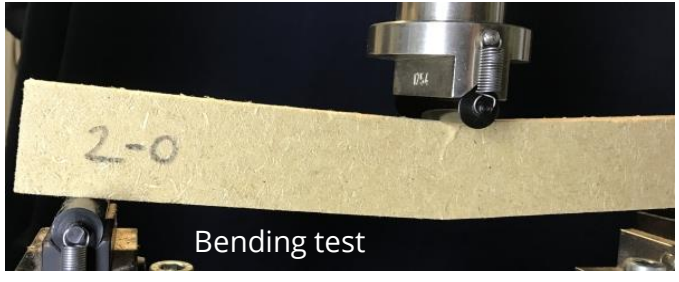
Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

Analysis of Miscanthus material and products

- Sieving curve (DIN 66165, WIHS-74)
- Thermal conductivity (DIN 4108)
- Material Testing (DIN EN 13986)




Thermal conductivity testing

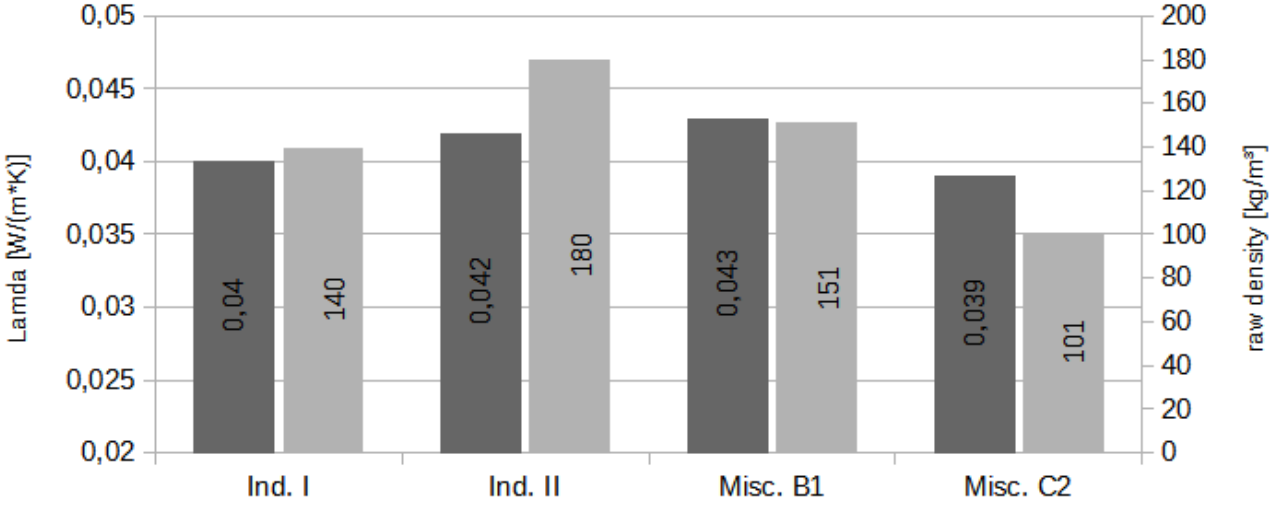


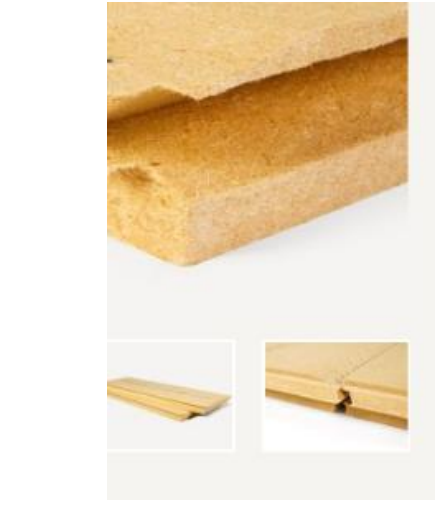
Bending test

Daniela Einer, daniela.einer@tu-dresden.de; Sören Tech, soeren.tech@tu-dresden.de

Analysis of Miscanthus Insulation Material, compared to industry material

- Thermal conductivity (DIN 4108)





pictures: Gutex

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Thank you for your attention!

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