# Phytomass waste management

Josef Maroušek

# Characteristics

1. feedstock
2. technology
3. process parameters
4. finalization

# Utilization

5. interactions with topsoil
6. economy

# Conclusions

# Discussion


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# 1. Feedstock

- cellulose of colagen casings
- composted biowaste
- kaustrifikační kaly
- separated slurry
- sewage sludge
- oilcakes
- fermentation residues



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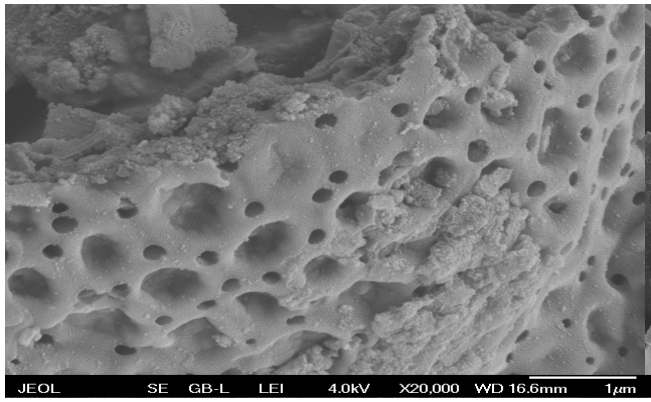
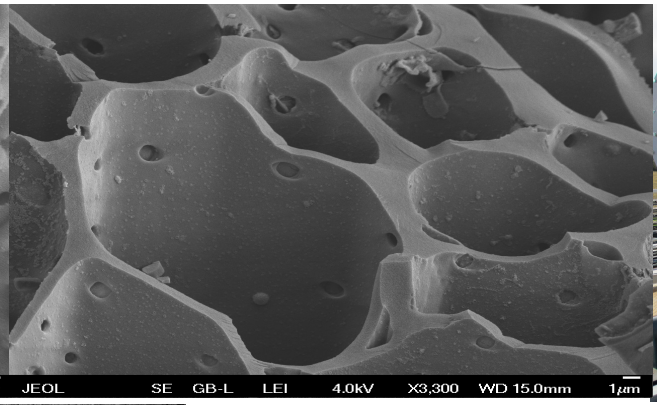
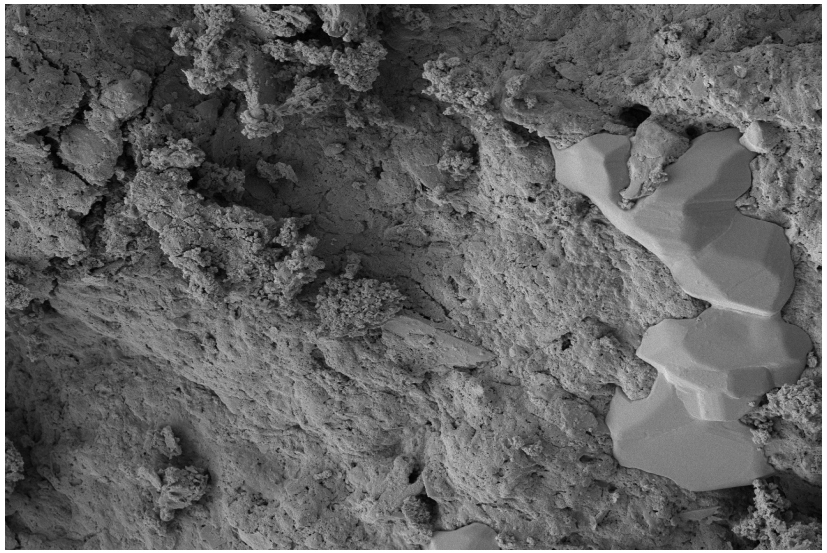
# 1. Feedstock

- organic matter with high concentration of C
- Removal of easily biodegradable C via steam – explosion or hydrolysis
- Thermal breakdown of some pollutants (C biofilter capture)
- imobilization of some heavy metals

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# 2. Technology

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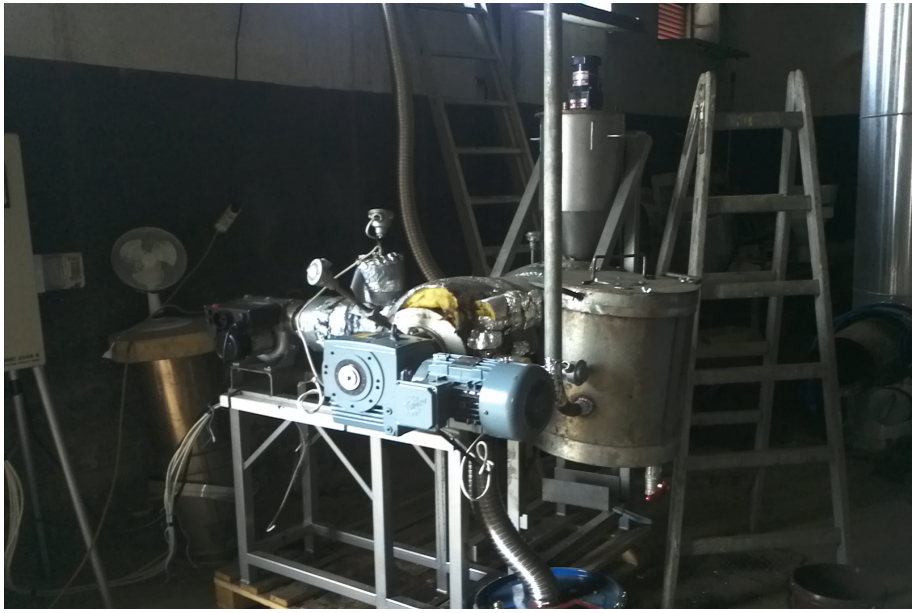


# 3. Process parameters

- drying
- maximum temperature, temprature dynamics
- hydraulic retention time
- bas environment
- pressure (removal of volatiles)

Meta- analysis:

C (17 – 91%)

N (2 – 75%)

P (0,5 – 70%)

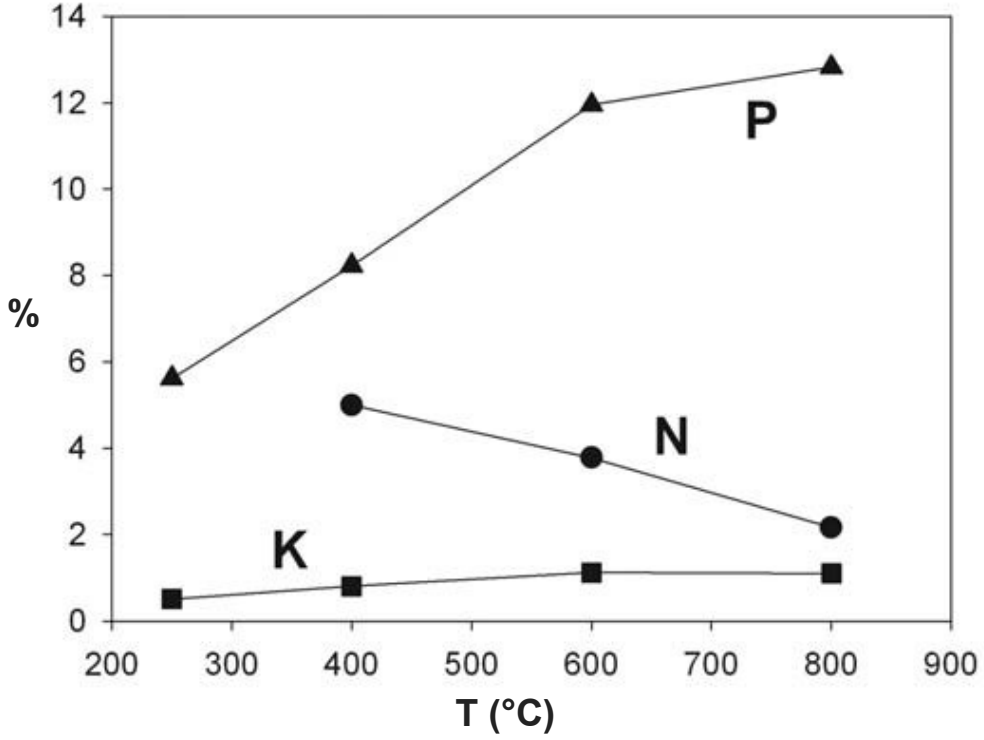
K (1 – 60%)

K, Cl

Ca, Si

Mg, P, S

Fe, Mn

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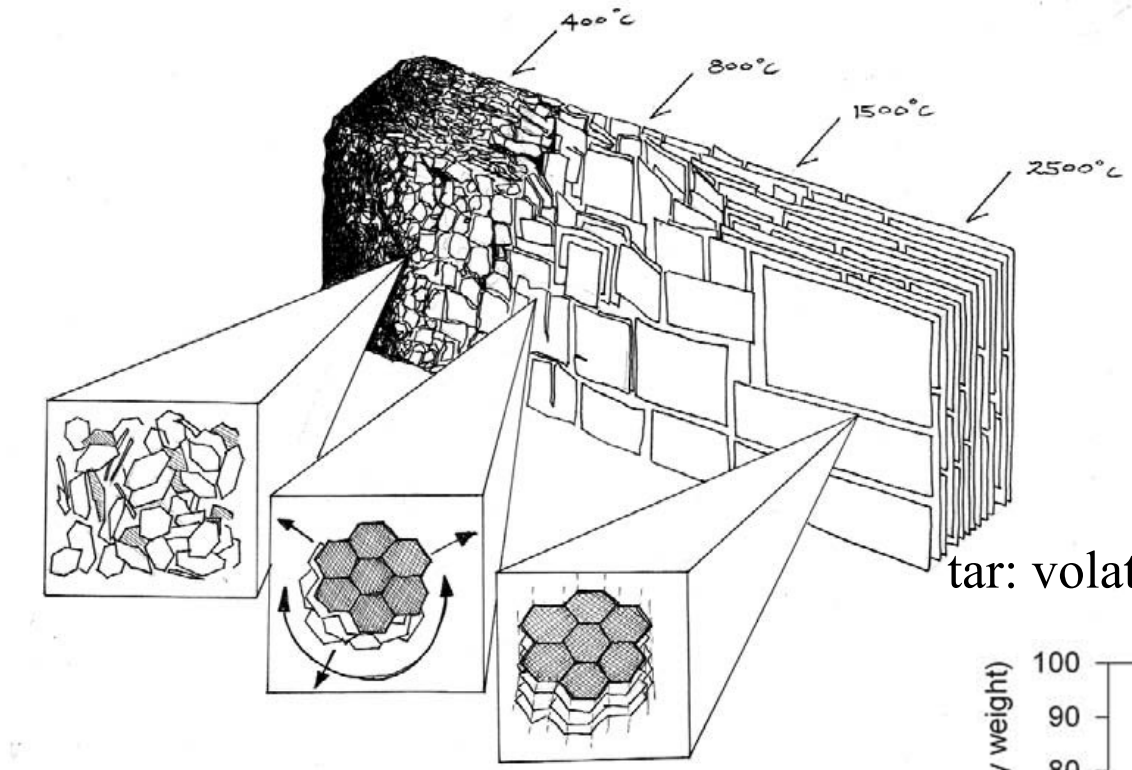


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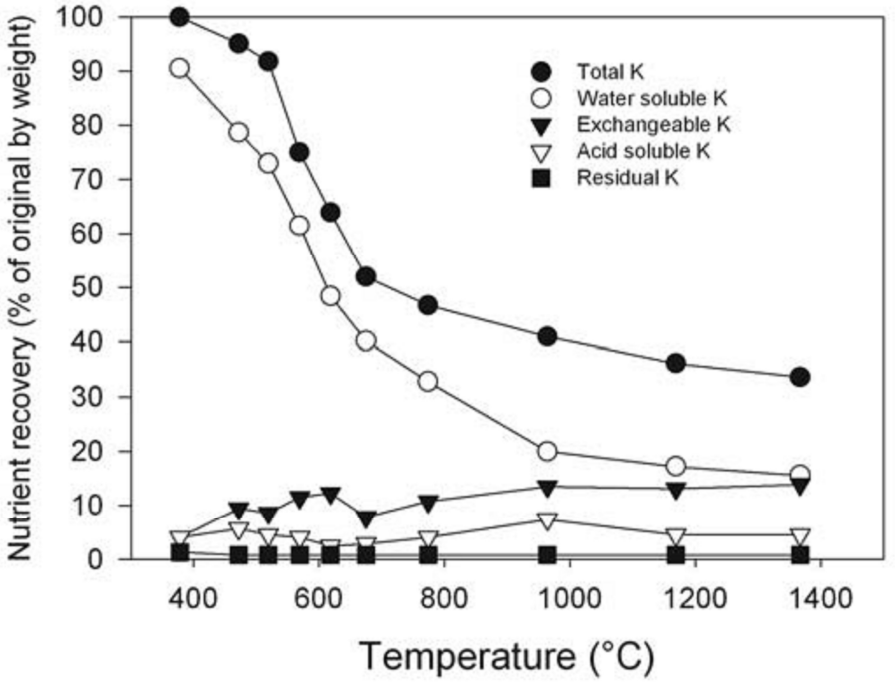
- 120°C chem. binded $H_2O$
- 200 – 260°C degr. HMC
- 240 – 350°C depol. CELL
- 280 – 500°C degr. LIGN
- 2000 – 3500°C grafit

tar: volatile solids, fatty acids and fenols

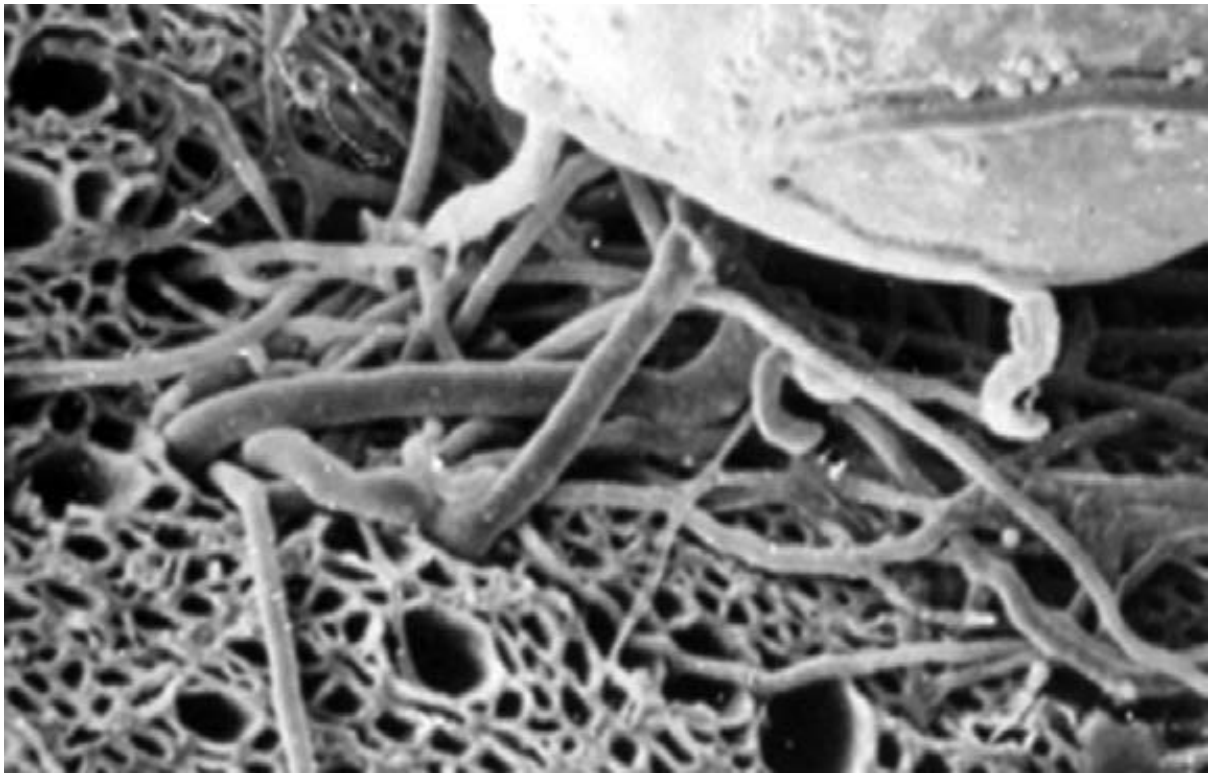


# 4. Finalization

- $H_2O$ and additives for lowering the cost
- pH
- grinding
- Physical activation
- chem. activation (reactants capable of disociation)
- nutrients

# 5. Interactions with the topsoil

- phys. – mech. (water and ait management, heat)
- pH
- nutrients
- Substrate for soil biota
- CEC
- sorbtion



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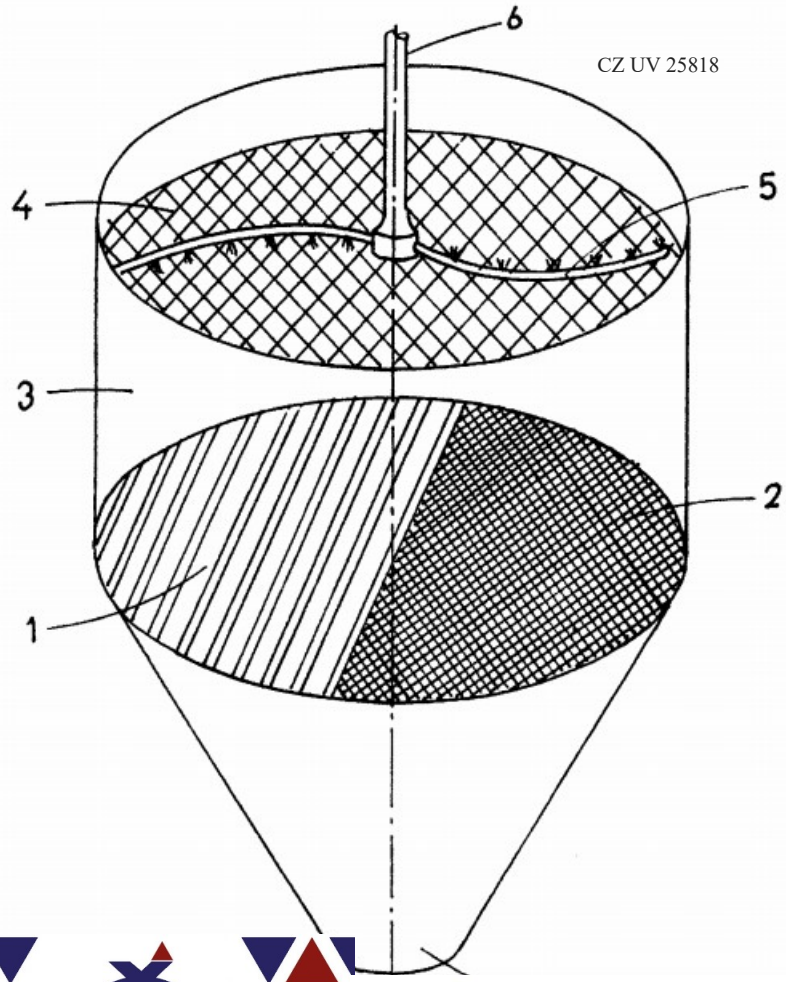
# 6. Others

- Sorbtion of big molecules in chem. indu
- nutrition of farm animals
- solid biofuel
- C and N management
- C sequestration
- Civil engineering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# 6. Conclusion

- Perspective sorbent
- Potential for:
  - Minimize landfilling of biodegradable waste
  - Improve the quality of topsoils and composts
  - Sorbtion on leakage of persisyent organic pollutants
  - Immobilization of heavy metals
  - Recuperation of nutrients from sewage sludge
  - Warming up the surfaces

# 7. Bioeconomy

*Savings on landfilling*
*Savings on logistic*
*Savings on management of fermentation residues*
*Savings on nutrients*

*Improvement of soil fertility*
*Improvemetnt of water management in the topsoil*

*C capture helps to global climate*

*Waste of – **20** EUR per 1 ton*
*Use as a soil improver 450 EUR per ton*
*Use as a fertilizer 800 EUR per ton*
*Use as a solid biofuel 300 EUR per ton*

# Thank you!