

TURBITS END-SEMINAR VALUABLE MOLECULES FROM PEAT LAND SOURCES

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IMPORTANT FINDINGS FOR PROCESS AND PRODUCT DEVELOPMENT

- Why something happens and why sometimes it does not happen
- Back-ground of further development of products
- Optimizations
- Activation of products
- Cost savings
- Avoid of accidental mistakes with process conditions
- Shortening the product development time
- Tailor made products
- Home-land security and improved sustainability to help agricultural activities



Over-view of peatlands resources:

Peat itself:

Well preserved plant material >5000 years having still active component

More peat is produced than consumed like forest trees (non-fossil substances)

Slowly fermented and ready to be utilized molecules available

Unique phenolic components to boost cell life (animals and plants)

Above the peat layers:

Harsh growing conditions favors production of protective (bio)chemistry

Plenty of active lignin-based humus chemistry, residuals and plant metabolites

High diversity of active components and microbes

Sustainable “agriculture” not using the field area

Some components and be activated or size reduces to be more active

= Finnish national treasure (we don't have oil – we have even better)

CASES and Evaluation

- Biomass production (for energy and material)
- Water treatment cases
- Stress releasing cases
 - Phenolic components and humic substance
 - Bioactive components
 - Antioxidants / hormone like components
 - Antimicrobial / pre-biotic properties
 - Binding properties
 - Stress reduction / health promotion
- GROWTH increase (Food & Feed)
- NEOVA AGRO CURRENT EXAMPLES



<u>BIOMASS CASES</u>	Fiber use or separation, burning	Extraction	Side products / lignin	Pyrolyze liquid / carbon
IDEA / REASON	Cheap biomass / environmental	Steam (explosion) or chemical extraction	Environmental, process economy	Biocontrol or biocarbon
Process	Chemical pulping / burned	Thermo-Chemical	Variable, combinations	Thermic
Economy	Weak	OK	Price of energy	OK
Funding possibility	NO	Not anymore – well studied	Weak	Still
Maturity	Good / factory could be build	Good	OK / Fair	Good
Success / Faillior	Old fashioned, not popular (maybe textiles)	To be seen in real life	Low product prices	To be seen

<u>WATER Treatment CASES</u>	Water absorption	Pollution removal for irrigation	Drinking water safety	Waste water
IDEA / REASON	Lack of water or storm water treatment	Prevention of nutrient leakage	Biofiltration / absorption	Biofilters / microplastic removal
Process	Physical /(biological)	Biological / physical treatment	Removal of toxins	Microbial
Economy	Good in extreme conditions	Poor	Fair	Good
Funding possibility	Available	Needed	Maybe in rich countries	No
Maturity	Very Good	Good	Good	Good
Success / Failure	The price and availability of water	Environmental politics	Traditional chemistry competition	Chemical technology competition



<u>STRESS release CASES</u>	Lack of nutrients or soil carbon	Water stress, usually drought	Salt stress	Microbes / insects
IDEA / REASON	Carbon capture	Protective microbial activity	Increased tolerance	Disease Control
Process	Physical, microbiological	Physical, biological (rooting)	Chemical, biological	Physical, chemical, biological
Economy	Fair	Fair	Fair	OK
Funding possibility	Maybe	Maybe still	Yes	Yes
Maturity	High	OK	Improving	Low/Medium
Success / Failior	Ahead of time	No sales to anyone	Fuel prices	Expensive



<u>FEED&FOOD CASES</u>	Biostimulant	Feed material	Novel foods	Soil improver
IDEA / REASON	Growth increase	Health promoter, stress reducer	Special nutrients and health	Water & Nutrient& carbon absorbent
Process	Chemical, (physical), biological	(Chemical), physical, biological	Chemical, physical, biological	Chemical, physical, (micro)biological
Economy	Good (in normal situations)	OK	Unknown	OK
Funding	Mayby not	Yes	Possible	Maybe
Maturity	High	Improving	Low	Good
Success / Failior	Successfull	Registration / approvals	Acceptance?	Well-going



New NEOVA business areas



BIOSTIMULANTS

We are dedicated to solving global challenges related to efficient food production and the welfare of humans and animals with high-performance humic acid products.



New NEOVA business areas



SOIL CONDITIONERS

NeoTerra Soil Conditioners are made for farmers who want to get the most out of their land – today and in the future. By increasing organic carbon in the soil, they improve soil structure, water retention, nutrient uptake and microbial activity. Healthier soil means stronger, more resilient crops and higher yields – helping you farm more efficiently and profitably, season after season.



New NEOVA business areas



ANIMAL FEED

Promoting food security is part of Neova's strategy. We want to be involved in ensuring the production of clean food at its source. New and innovative peat-based animal feed products are Neova's opening for the feed business. Our peat has been proven to support animals' welfare and improve growth performance.



SUMMARY / LESSONS LEARNED

Need for invention = Driving force
Scientific back-ground (Finding new molecules in Turbits project)
TEA = Techno-Economical analyses in early start
Research funding or otherwise lots of testing money
Smart combination Chemistry & Technology
Right partners and customers
Using of existing infra and knowledge
Most sustainable are often most economical solutions
Lean designs

Interesting exploring to peat land biomass

