Conference week RRR2017
Renewable resources from wet and rewetted peatlands

Sphagnum biomass production in Shippagan (Canada) : Characterization of the sphagnum fiber

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Introduction

Experimental sphagnum cultivation began in Canada in 2004. Since then, several sites have been established and different cultivation techniques have been tested. The interest of the sphagnum peat industry is growing. Therefore, the Coastal Zones Research Institute has begun an exploratory project to characterize sphagnum fiber. To reach this goal, chemical, physical, microbiological and water analyses were carried out on different sphagnum species harvested under different conditions (harvesting time and environment). Three drying methods were also tested.

Materials and methods

- Harvest of different species in various conditions;
- Dry with different methods;
- Analyse fiber from all combinations of treatments.

Species	Environment type	Harvest time	Drying method
• *S. rubellum* • *S. rubellum** • *S. magellanicum* • *S. fuscum* • *S. flavicomans*	• Cultivated • Natural bog • Regeneration in the old block-cut bog	• July • August • September • October	• Air dry • Ventilation • Oven

* Mixture of several species : *S. rubellum* (50 %), *S. fuscum* (40 %) and *S. magellanicum* (10 %). For measurements requiring only one fiber, *S. rubellum* was selected.

S. fuscum : FUS

S. magellanicum : MAG

S. rubellum : RUB

S. flavicomans : FLA

Physical analysis	Bulk density (kerosene method)	**Hydrological analysis**	Humidity at harvest
			Humidity after drying
Microbiological analysis	Total and fecal coliforms		Water retention capacity
	Yeasts and molds	**Chemical analysis**	Electrical conductivity
			Standard analysis : Al, B, Ca, Cu, Fe, K, Mg, Mn, Na, Zn, P, total C, total N, C/N ratio, pH H_2O, pH buffer, Lime index, CEC, OM, Saturation (K, Mg, Ca), PSI
	Enterobacteriaceae		Heavy metals : As, Cd, Co, Cr, Cu, Mo, Ni, Pb, Se, Hg
	E. coli, Listeria spp., Salmonella spp., S. aureus		

Sphagnum biodegradability

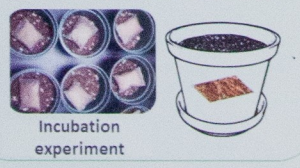
S. magellanicum : MAG | Mix of both (50-50weight%) : MIX | *S. rubellum* : RUB

Fiber particle distribution (mm)
[0,5 : 2] ; [2 : 4,75] ; [4,75 : 6,3] ; [6,3 : 19]

Duration
Date 0 : 0 day
Date 1 : 28 days
Date 2 : 56 days
Date 3 : 84 days
Date 4 : 112 days
Date 5 : 140 days

Buried Sphagnum in blond peat substrate at 25°C and field capacity

Non-compacted substrate


Incubation experiment

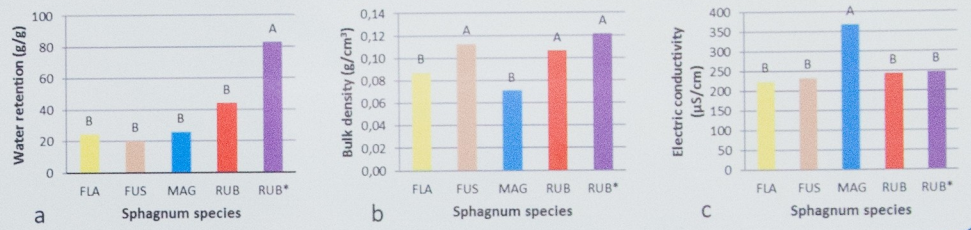
Results

Microbiological analysis
No statistical analysis possible (below detection therehold or too many to count)
Very small amount of bacteria, but many yeasts and molds

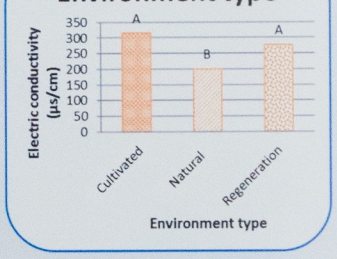
Chemical analysis
No significant differences

Physical and hydrological analysis

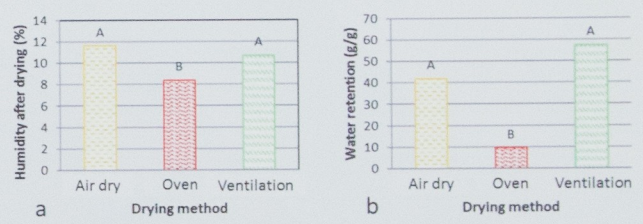
Sphagnum species



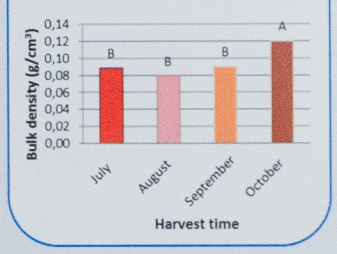
Environment type



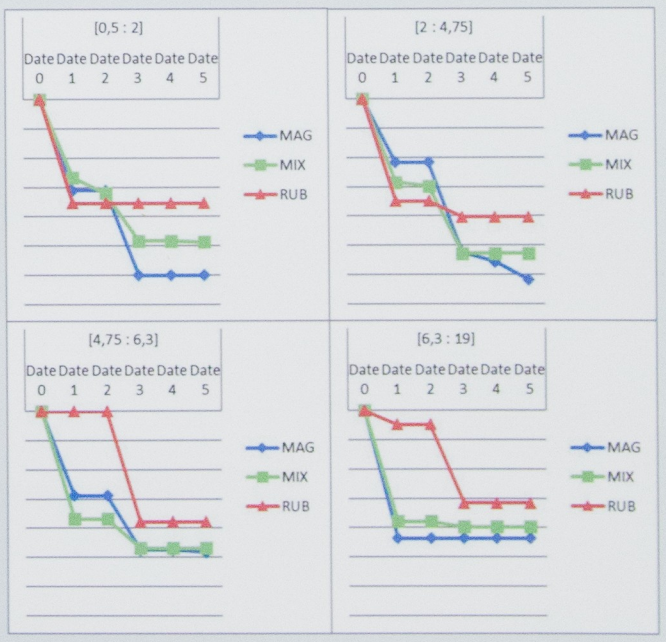
Drying method



Harvest time



Biodegradability



Conclusion

- The harvesting time affects the sphagnum fiber properties very little. The bulk density seems to change in October;
- The drying method affects the water retention capacity of the fiber. A complete drying in an oven at 70 ° C greatly reduces this capacity;
- The cultivated sphagnum has the highest values of electrical conductivity;
- *S. magellanicum* and *S. rubellum* have the best electrical conductivity and water retention capacity;
- There is a peak of degradability between 2 and 3 months in incubation;
- *S. rubellum* degrades less rapidly than *S. magellanicum*.

Acknowledgements

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