

Results since last meeting

Work Package 5: Utilisation of kenaf for
industrial products and energy.

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Kenaf a (sub)tropical plant ??

Longitude	5° 41"
Latitude	52° 0"
Altitude	+ 5 m
weather	miserable
rain fall	God's record



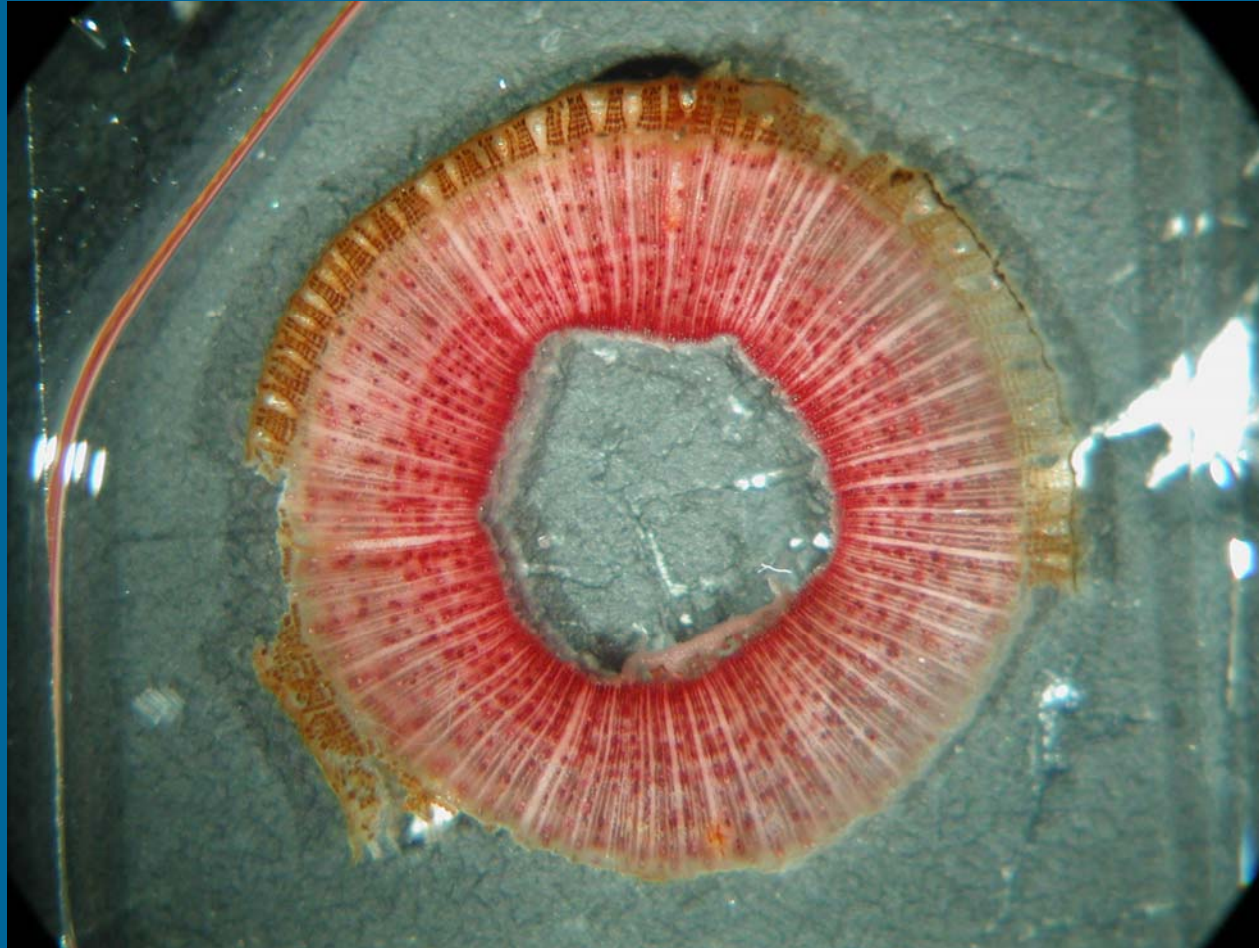
Work package 5

- **Task 5.1.1 Fractionating of kenaf stems (A&F)**
- **Task 5.1.2 Market and techno-economic feasibility studies for industrial application. Application tests on two or three selected areas (A&F)**
- Task 5.2 Thermal conversion experiments with combustion, pyrolysis and gasifier equipment (BTG and CRES)

A&F Research Focus and priority list

- **Insulation mats of bast fibres.**
- **Comparison of kenaf core with hemp and flax core in stable bedding and oil spill absorber.**
- If time and budget allows
 - Compounding of microbiological partly degraded kenaf bast fibre.
 - APMP comparable to already done jute experiment
 - Binderless insulation boards of core fibres

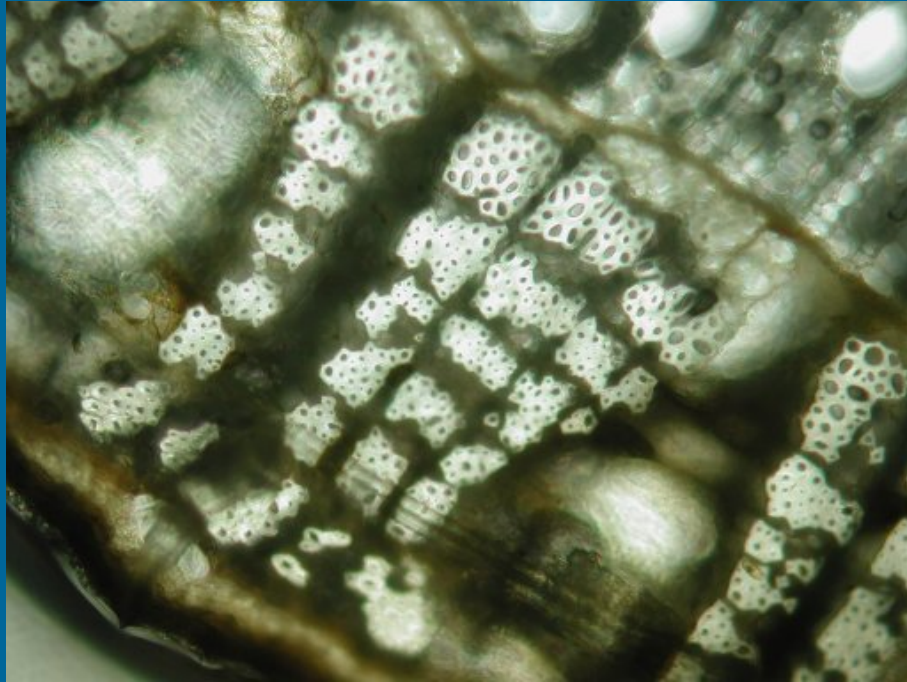
Structure of kenaf stem (Everglades 41)



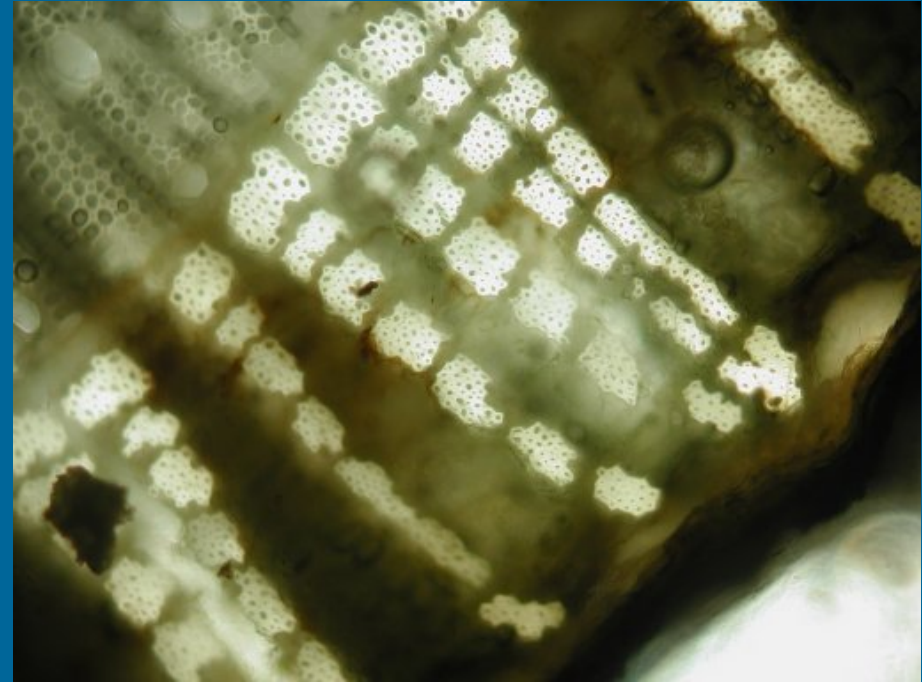
Structure of kenaf stem (Everglades 41)



Structure of kenaf stem

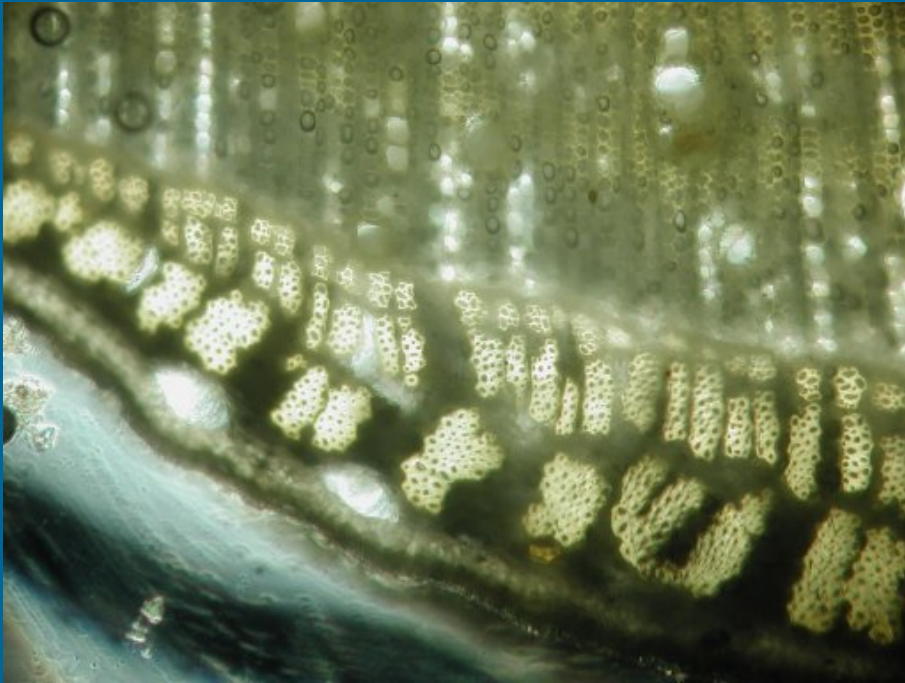


Kenaf stem Everglades 41

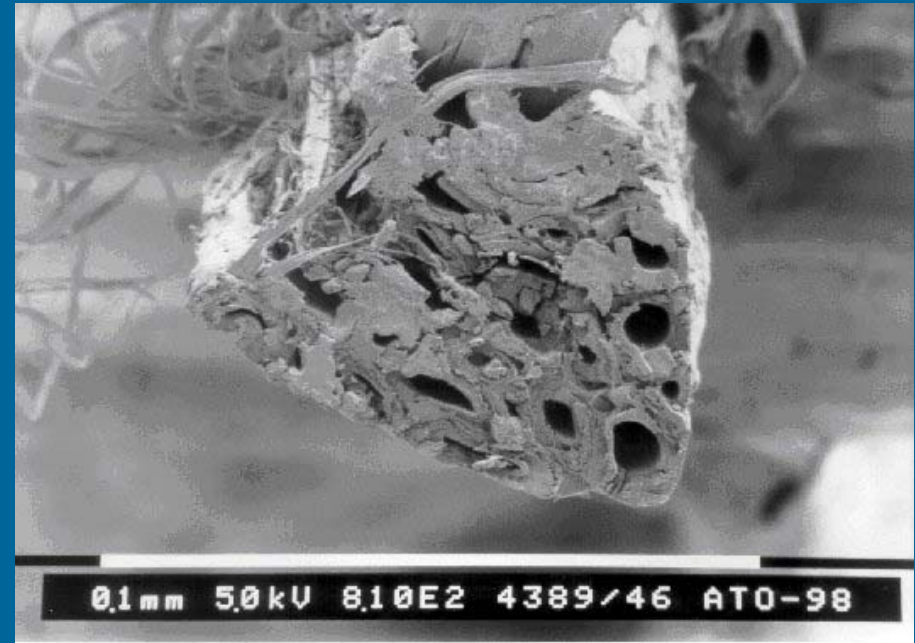


Kenaf stem Tainung 1

Structure of kenaf stem



Kenaf stem Tainung 1



Kenaf fibre bundle

Affected kenaf stems



Unaffected FAIR project



Affected BIOKENAF project

Disappeared epidermis



Fibre bundle strength measurement



Clamping

Measuring strength



Bast and combed fibres



Fibre bundle strength

	Tensile strength (Mpa)	
	Average	St.dev.
BIOKENAF		
harvest december	347	43
harvest februari	382	22
harvest februari after storage*	443	93
FAIR		
retted	556-682	
green decorticated	276-435	

* stored in a pile of 10 mm chopped kenaf

Fibre extraction - breaking



Fibre extraction- bast fraction



Fibre extraction -scutching



Fibre extraction -scutched fibres

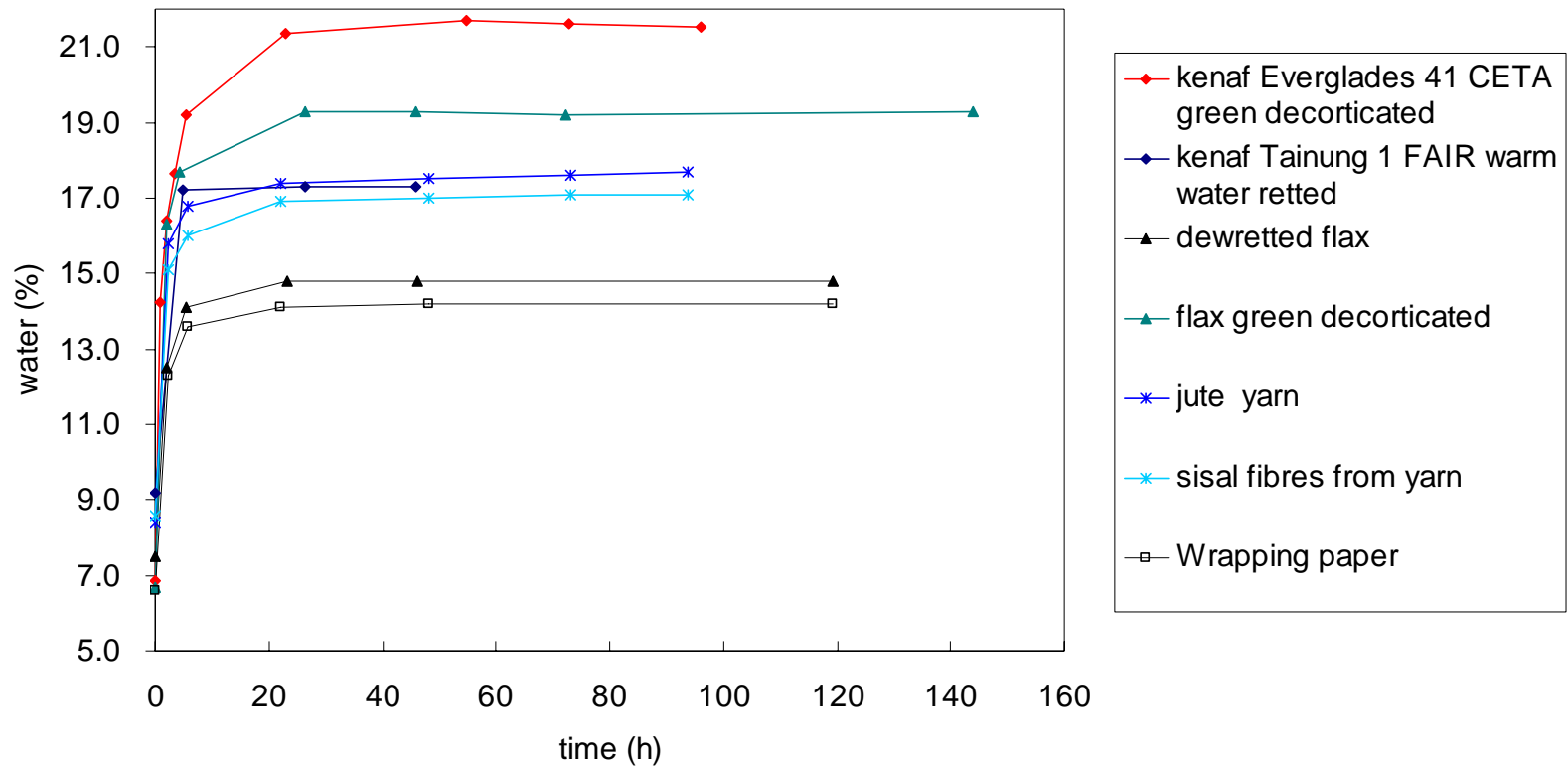
First sowing	Fraction of total [%]	Bast Content [%]	Long fibres after scutching
Base	53.7	27.6	
Middle	32.3	33.5	
Top	14	33.3	
Mixture	(53.7 B+32.3M+14T)	33.3	10.2
FAIR			21.6

Fibre extraction -scutched fibres



Moisture absorption of natural fibres

Water content of natural fibres at 90% RH and 20 °C



Industrial separation



Industrial separation

- Small scale trial with about 50 kg of baled kenaf
- Can the machinery handle the thick woody stems without problems?

Pressing of bales



Pressing of bales



Small trial industrial separation



Small trial industrial separation



Further work

- Separation on industrial scale
- large trial with 3000 kg baled kenaf
- Forming insulation mats with bast fibres
- absorption experiments with core
- water absorption of retted bast fibres in 90% RH