BIOMASS PRODUCTION CHAIN AND GROWTH SIMULATION MODEL FOR KENAF

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Biokenaf project QLK5 CT2001 01729

 The overall objective of the project is to introduce and evaluate kenaf as a non-food crop through an integrated approach for alternative land use in South EU that will provide diversified opportunities for farmers for biological materials for the "biobased industries" of the future.



Specific objectives

- ★ Determination of the sustainable yielding potential of kenaf
- ★ Development of a dynamic growth simulation model
- ★ Evaluation of the effect of harvesting time and storage methods to the quantity and quality of harvested material.
- ★ Evaluation of the suitability of kenaf for both selected industrial and thermochemical energy applications
- Environmental assessment and LCA to make scenarios for alternative land use in South EU
- ★ Economic evaluation of kenaf for alternative land use
- ★ Preparation of a handbook and booklet for kenaf
- ★ Link establishment between Biokenaf and AKS



Consortium

Partners	Country	Main involvement	
CRES	Greece	WP1, WP2, WP4, WP8	
University of Catania	Italy	WP2	
University of Thessaly	Greece	WP2,WP3	
BTG	The Netherlands	WP5	
CETA	Italy	WP2, WP4	
INIA	Spain	WP2	
FCT/UNL	Portugal	WP2	
ΑΤΟ	The Netherlands	WP6	
UNIBO	Italy	WP2	
INRA	France	WP2, WP6	
ADAS	UK	WP7	



Graphical presentation of project's components



Geographical presentation of the projects' components



Details of the experimental trials

Experimental field trials	Countries	Factors under study	Experimental design	Plot size
Screening trial	Greece	Six kenaf varieties	Randomized complete block design in three blocks	6x6 m ²
Sowing times and plant populations	Greece, Italy, Spain, Portugal and France	2 varieties 2 sowing times 2 plant populations	A factorial in three blocks	6x8 m ²
Irrigation and nitrogen fertilization effects	Greece, Italy, Spain, Portugal and France	4 irrigation rates 3 nitrogen fertilisation rates	A split-split split plot design in three blocks	6x8 m ²
2 ha kenaf field trial	Greece, Italy	The best-performed variety will be sown under the best plant population and will be irrigated and fertilized according to the results from the previous trials		

Varieties

Everglades 41 (late variety that produce reasonable fiber production and a cotton-like leaf shape)

Tainung 2 (late variety, with superior raw fiber production and palmate leaf shape)

Gregg (is a new variety with slightly longer growing period that may contributes to greater fiber production and palmate leaf shape)

Dowling (new variety, that may prove to be a very high fiber producer with non-palmate leaf shape)

SF 459 (new variety that is favored for soils with nematode problem and palmate leaf shape)

G4 (it is considered as a photoperiod-insensitive variety that combines a short maturity cycle (100-130 days between emergence and flowering) and high productivity when grown in the Mediterranean region)



Expected results

Adaptability and Productivity Trials (WP2)

- Evaluation of the adaptability and productivity of several kenaf varieties in South Europe.
- ✓ Selection of the appropriate kenaf varieties in the pedoclimatic conditions of Southern EU.
- Determination of the appropriate combination of irrigation and fertilization inputs that will result in the maximum biomass yields and under minimum production cost.

Development of the crop growth model (WP3)

- Energy balance of the crop under different cultivation and harvesting and storage methods, which can lead to management improvement of the crop.
- ✓ The dynamic growth and biomass production model that will be a useful tool for yields and energy production prediction of kenaf.



Harvesting and Storage Trials (WP4)

- ✓ Determination of the appropriate harvesting time to ensure higher yields.
- ✓ Information on the application of various harvesting machines commonly used in the agricultural practice.
- Information on the application of various storage to ensure minimum losses in quantity and quality of feedstock.

Utilization of kenaf (WP5)

- Establishment of a market-driven demand for kenaf as alternative source for energy production.
- ✓ Increased demand for annual fibre based renewable and sustainable products.
- ✓ Increased European market potential for kenaf based industrial products.



Environmental impact assessment and LCA (WP6)

- ✓ Environmental impact assessment covering the whole production chain of kenaf.
- LCA considering the potential of kenaf as a biofuel for thermochemical conversion processes (combustion, gasification, pyrolysis).
- ✓ Scenarios for alternative land use in agriculture regions of south EU.
- Economic analysis for the crop production chain (WP7)
- Cost of kenaf at farm and at plant gate (including harvesting, storage and transportation).
- Economic comparison of kenaf with other annual conventional crops.



Preparation of Handbook and Booklet for kenaf (WP8)

- Evaluation of the collected data of the project as well as of all the relevant bibliography that will be recorded in the Handbook and the Booklet.
- ✓ Handbook can be used as a pilot for the future development of the crop



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Thank you for your attention

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