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Innovation Networks for Cork, Resins & Edibles

Theme: **8 - Development of new products and derivatives**
Position in the Value Change: **Secondary industry**
Factsheet type: **Research**

Essential oils of Eucalyptus: Comparative performance and promotion of their use

Leaves and flowers of ***Eucalyptus lehmannii*** – Arboretum of Korbous

Leaves and flowers of ***Eucalyptus gillii*** – Arboretum of HajebLayoun

Leaves and flowers of ***Eucalyptus leucoxylon*** – Arboretum of Korbous

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Context

Eucalyptus species are generally high in EO. Actually the EO yield is closely related to the species. However even among the same species, it widely varies. It depends on several factors including intrinsic factors, specific to the species and extrinsic factors related to the environment. A large number of eucalyptus species, still until now unknown, could be valued and used for example to produce EO. These species are formally introduced by forest research; nevertheless, they are only present, in the arboretums, for experimental purpose.

The present study aims at quantifying and chemical characterising EO obtained from 58 Eucalyptus species of 7 arboretums in the north and center of the country.

Objective

The current exploitation of rosemary and myrtle (native species with relatively high yield of EO) occupies an important place in the forestry sector and a significant socio-economic interest. Eucalyptus trees can play a predominant and substantial role thanks to their richness in essential oils, their composition and their commercial value.

This objective necessarily involves the identification of eucalyptus EO species and the selection of the most efficient in terms of the yield of essential oils and the presence of the most dominant active compounds which are preferentially sought by the industrialists.

Results

17 species (from 58) are high in EO (yield exceed 3%). Moreover among these species, 7 species exhibit a yield that exceeds 4% in which 2 species indicate a yield that exceeds 5% (Eucalyptus oldfieldii (5,0%) and Eucalyptus sargenti (5,6%)). In breif species such : E bicostata, E torquata, E salmonoploia, E citriodora, E sideroxylon, E diversicolor,E stricklandii, E maiden, E cinerea, E astringens, E eremophloia, E gracilis, E globulus,E loxophleba, E transcontinalis, E oldfieldiiet E sargentii seems very productive so that they can be promoted in order to produce EO.

EO composition analysis of eucalyptus reveals that the most frequent compound with the highest levels is 1-8 cineole, its average (all species and all site combined) is 23% (between 2,4% and 70, 4%) (E cinerea). The second major compound is α-pinene with an average of 8.35% (between 0.8 and 27.5%).

Recommendations

On the basis of the results obtained, it is recommended to create Eucalyptus essential oils plantations. They should be sufficiently varied ; either in the form of forest plantations under rainfed conditions on relatively large areas (10 ha or more), moderately dense (2 * 3 m), or in the form of dense agricultural plantations (2 * 2 m) conducted intensively (irrigation, fertilization...) in order to regularly provide small extraction unit with sufficient leaf biomass.

These plantations should be conducted with short cut rotations: 3 to 4 years for forest plantations and 2 to 3 years for agricultural plantations.

Impacts and weaknesses

The use of 'specialized' plantations (EO species) can contribute effectively to the development of the sector at both regional and national levels. The creation of new plantations on the one hand and the encouragement of young people to set up small projects, on the other hand, will surely have a very positive impact on the standard of living of rural populations, as it aims to the diversification of their activities and the improvement of their income.

Future developments

An effort should be made by researchers in close collaboration with forest technicians to popularize research findings regarding the selection of eucalyptus EO species. We must also work for the multiplication of the most interesting species and their distribution for the betterment of rural populations and small farmers. The involvement of agricultural development groups (ADG) in the establishment of new plantations (in the forestry sector and with intentional farmers) and the creation of their own extraction units would undeniably be a guarantee of success for such company.

Bclt	Arb.	Species	Yield/DM	Bclt	Arb.	Species	Yield/DM
Humid	Zerniza	*E alba*	1,40	Humid	Choucha	*E saligna*	0,60
		E bicostata	2,13			*E sideroxylon*	1,17
		E botryodes	1,33			*E teritecornis*	0,87
		E cinerea	2,33			*E viminalis*	2,33
		E citriodora	3,33	Humid	Mrifeg	*E gomphocephala*	0,00
		E cladocalyx	1,78			*E rudis*	1,17
		E diversicolor	1,89			*E sideroxylon*	1,87
		E fasciculosa	0,44			*E teritecornis*	1,80
		E gomphocephala	0,15			*E astringens*	3,83
		E grandis	1,78	Subhumid	Korbous	*E diversicolor*	3,33
		E macarthuri	0,63			*E dundasii*	1,56
		E orientalis	1,33			*E falcata*	1,00
		E paniculata	0,38			*E ficifolia*	0,06
		E resinifera	0,49			*E gomphocephala*	0,22
		E rudis	0,73			*E lehmannii*	1,00
		E saligna	0,43			*E maculata*	2,33
		E teritecornis	1,27			*E platypus*	1,89
		E viminalis	1,03			*E polyanthemos*	1,22
Humid	Souinlet	*E bicostata*	3,00			*E rudis*	2,22
		E cinerea	3,50			*E leucoxylon*	1,11
		E exerta	0,44	Subhumid	JB Abd	*E globulus*	4,44
		E gigantea	1,33			*E kirtoniana*	0,44
		E gunnii	1,56			*E populifolia*	1,11
		E macarthuri	1,78			*E astringens*	2,44
		E macroryncha	0,56	Semi-arid	HajebLayoun	*E brevifolia*	2,93
		E maideni	3,44			*E brockwayi*	0,43
		E odorata	1,67			*E eremophloia*	4,30
		E pauciflora	1,11			*E gillii*	2,93
		E sideroxylon	3,33			*E gracilis*	4,35
		E tereticornis	2,22			*E largiflorens*	1,29
		E viminalis	2,22			*E loxophleba*	4,49
		E astringens	2,27			*E occidentalis*	1,30
Humid	Choucha	*E alba*	1,20			*E oldfieldii*	5,00
		E astringens	2,13			*E oleosa*	2,87
		E bicostata	0,77			*E salmonoploia*	3,08
		E botryoides	0,23			*E salubris*	2,39
		E cinerea	2,83			*E sargentii*	5,60
		E gomphocephala	0,00			*E stricklandii*	1,95
		E grandis	0,50			*E stricklandii*	3,41
		E maculata	1,53			*E torquata*	3,04
		E paniculata	0,08			*E transcontinalis*	4,81
		E pileata	1,07			*E woodardi*	2,56
		E resinefera	0,03			*E accedens*	0,70
		E rudis	0,93				

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Further information

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About INCREDIBLE Project

INCREDIBLE project aims to show how Non-Wood Forest Products (NWFP) can play an important role in supporting sustainable forest management and rural development, by creating networks to share and exchange knowledge and expertise. 'Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin' (INCREDIBLE) promotes cross-sectoral collaboration and innovation to highlight the value and potential of NWFPs in the region.

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