www.cropwatch.org

CROPWATCH

THE FIRST TRULY INDEPENDENT WATCHDOG FOR THOSE WORKING WITH NATURAL AROMATIC MATERIALS

E: info@cropwatch.org T: ++44 (0)7771 872 521

Argan Oil: A Truly Sustainable Commodity??

[Slightly modified Oct 2009 from *Cropwatch Newsletter* No. 4 - July 2006]

Pre-amble As the cosmetics trade relentlessly searches for, and consumes, more & more novel functional ingredients, Moroccan Argan oil has been the subject of several articles (e.g. Elnat 2005) & marketing campaigns in cosmetic trade magazines over the past few years. The Argan tree will already be familiar to travellers in Morocco, if only from the widely available picture postcards of goats climbing the gnarled branches of Argan trees to graze on the leaves & fruits. However, it appears that little direct information on sustainability of the Argan Tree has been provided in trade journals to date.

The Argan Tree & its Products. The Argan tree *Argania spinosa* (L.) Skeels may reach 250 years of age & is of twisted & convoluted appearance, growing in the harsh conditions of the semi-desert scrub on both calcarious & silicaeous soils at elevations up to & around 1800m. It rarely exceeds 10-12m. in height, being mainly found within in some 871,210 ha in South (or rather South Western) Morocco, and to some extent in S.E. Algeria (Mardaga 1999) - although this latter fact seems to have escaped other reporters. Hmamouchi (2001) reports that *A. spinosa* var. *apiculata* is found at Saffi & at the plains of Souss, Tindouf, Saquiat el Harmram Essouira, Agadir & Beni znassen, and *A. spinosa* var. *mutica* is found between Berkane & Moulouya totaling over 850,000 ha.

For various reasons the tree enjoys some notoriety as a biological curiosity, growing best in moist air, and able to survive both drought and heat. The small dropped fruits (drupes) of the tree, which appear from April to June, are gathered in July to September & the kernels are exploited for their fixed oil by Berber women (yield under 5%); the resulting oil has been compared with olive oil and is used in cooking, although two grades of oil are described by Elnet (2005) – a nutty more orange-coloured oil for cosmetic use (arganium) and a lighter refined oil for edible use (argenti). It is traditionally consumed with bread or mixed with almonds & honey ('amlou beldi'), the ethnic peoples value it for its vitamin (tocopherol) & carotenoid content, and its reputation for combating both sterility in females and azoospermia in males (Madarga 1999). It is also used for soap-making. Its unsaturated fatty acid content is around 80%, made up chiefly of linoeic acid (to 37%) and oeic acids (to 43%), with some additional palmitic (12%), alpha-linoleic & stearic acids (6%). H. & E. Brand (2002) note the use of Argan oil in cosmetics for anti-acne and anti-wrinkle purposes, and point to an efficacious 1% unsaponifiables content, which includes the rare plant phytosterols spinasterol and schottenol, and small amounts of 2 isomeric sigmadienols. The oil also contains squalene (to 3.2 g/Kg - Khallouki, 2003; Khallouki *et al*. 2003). Anti-oxidant & anti-aging properties have also been claimed for the oil together with the ability to mop-up free radicals. A perfumery absolute is also produced from Argan drupes.

Sustainability Issues. Clarius *et al.* (2006) report on the fact that over-exploitation and the harsh environment are endangering the species and that UNESCO declared the Argan forests - 'the Arganeraie' - a biosphere reserve in 1998. Starting in 1995 the German Association for Technical Cooperation (GTZ), commissioned by the Federal Ministry for Economic Cooperation, has been carrying out reforestation work of Argan woodlands; the IRDC also carried out a 3-year project with the Université Mohammed V starting 1998 on the valorisation of argan oil. Elnat (2005) describes the mechanical harvesting of Argan fruits and modern extraction technology associated with the setting up of various womens co-operatives under the biosphere reserve project including the organisation Targanine, all of them providing much needed income for local Berber women. Apparently it has been determined that hydraulically pressed argan oil has a better keeping quality, but elsewhere however, we learn that the traditional process of obtaining the oil is described as being still currently operative. This consists of sun-drying the drupes to 50% of their weight, cracking open the nuts with stones to extract the kernels, roasting them over an open fire and pulping in a stone mill before adding water. Kneeding the ensuing mass results in exudation of the oil. Clarius *et al.* describe how Laboratories Serobiolgiques are working in co-operation with the Moroccan organisation Targanine (Targanine have an informative website at http://www.targanine.com/).

So where are we with sustainability issues here? Clarius *et al*. (2006) describe the Laboratories Serobiolgiques/Targanine venture where 'no trees are harmed in the operation'. The tree with its deep & extensive roots are a crucial factor in

holding the soil if not the biodiversity of the S.W. region together, and the lives & well-being of 3 million Moroccans are very much dependent on this property. Provided no uncontrolled Argan business operations, illegal harvesting of Argan tree branches for leaves/drupes to feed animals, & creeping development, desertification, erosion, fire damage & over-grazing by animals etc. are also monitored, then Argan trees look to have a sustainable future. But drawing attention to commodities from threatened species via marketing campaigns and thereby creating an enhanced demand is a strategy which is not without risk, sustainable operations or not, and control of this type of operation has been lost before (e.g. with so-called 'sustainable harvesting' of *Prunus africana* at the Plantecom factory in Mount Cameroon, for example which was eventually abandoned 'for complex reasons' as previously reported by Cropwatch). So, as far as Cropwatch is concerned we regard the jury as still being out on the question of whether the species can survive exploitation of any major kind – after all, a third of Morocco's Argan forest has disappeared in the last 100 years, and the tree density is down from 100 to a current 30 trees per hectare.

Other Developments In 1999, UNESCO added the argan tree to the World Heritage List, thus protecting it under the auspices of the World Biosphere Reserve Network. Hoiwever the `FRA`declared the Argan tree *vulnerable* in 2005.

The Mohammed V Foundation for Research and Argan Tree Preservation revealed (in 2002) a cooperation agreement between Midi Pyrenees regions and the region of Marrakech-Tensift-El Haouz. This involved a sceme for reforesting 36 300 ha of argan forest, schemes for upgrading & marketing the oil produced by womens co-operatives, & the setting up of 500 solar ovens, which will save 50 to 100 ha/y of argan forest being used for firewood. A profile of Prof. Zoubida Charrouf of the Science Faculty of Mohamed V. University in Rabat and her work with argan conservation etc. is presented at http://www.idrc.ca/en/ev-5483-201-1-DO_TOPIC.html

References.

Brand H. & E. (2002) "The Unsaponifiable Fraction" *Soap, Perfumery and Cosmetics* Sept 2002 p39-44.

Clarius T., Stussi I., Henry F., Pauly G., Benoit I. & Charrouf Z. (2006) "*Argania spinosa*: How ecological farming, equitable trade & sustainability can drive research for new cosmetic active ingredients". *Journal of Polish Society of Cosmetic Chemists*, **9**(1), No. 1 (2006).

Elnat G. (2005) "Argan – Oil of the Berber". *Aromatherapy Times* **1**(67) Winter 2005 pp 26-27.

Khallouki F, Younos C, Soulimani R, Oster T, Charrouf Z, Spieglehalder B, Batsch H ,Owen RW (2003a). « Consumption of argan oil (Morocco) with its unique profile of fatty acids, squalene, sterols, tocopherols and phenolic

antioxidants should confer valuable cancer chemopreventive effects." *Eur. J. Cancer Prev.* **12,** 67-75.

Khallouki F (2003b). Ethnobotanical, phytochemical and pharmacological studies of 3 African medicinal plants containing potent antiradical principles. PHD dissertation, University of Metz, Metz, France.

Hmamouchi M. (2001) *Les Plantes Medicinales et Aromatiques Marocaines.* 2nd edn. pub. M. Hmamouchi Rabat Morocco.

Mardaga P. (1999) *La livre de la Foret Marocaine* pub. Mardaga P., Belgium.

Background.

See also: http://www.idrc.ca/en/ev-5483-201-1-DO_TOPIC.html

Mellasdo J. (1989) "Argan Forest Destruction in Morocco." *Oryx.* **23**(2), 87-93.