

# Argania spinosa

## How ecological farming, fair trade and sustainability can drive the research for new cosmetic active ingredients

### INTRODUCTION

In their search for original sourcing of new active molecules, Laboratoires Sérobiologiques have many years ago embarked upon an ethnobotanical approach. Today, this strategy takes a step forward: not only should foreign cultures teach us traditional cosmetic uses; they should also reap the benefit of any economical development, directly for their own standard of living as well as via the maintenance of the local biotope.

This notion of sustainability has driven our program for the valorisation of the Argania tree.

### THE ARGAN: DESCRIPTION – DISTRIBUTION

The Argan (*Argania spinosa* - Sapotaceae) is an indigenous tree of South Morocco. The main zone extends South East from Essaouira to the Souss plain. The forest of Argans covers about 800,000 ha and contains more than 2 million trees.

The Argan is the second most common species in Morocco, behind the evergreen oak and ahead of the thuya. It is the last wall against the encroaching desert.

### Traditional uses

The Argan is mainly known for its oil, which is used by Berber women for skin, hair and nail care and is found in hundreds of different



Fig. 1 - Argan fruits



Fig. 2 - Argan – South Morocco



Fig. 3 - Traditional preparation of argan oil

beauty recipes. It is obtained manually from the fruits using traditional methods. The women do the work involved in preparing the oil and are also responsible for harvesting the fruits. But the local rural population uses every part of the Argan for their own needs:

- the fruits, for extracting the oil,
- the fruit husks, as fuel for fires,
- the oil cake, a by-product of oil production, as an animal feed,
- the leaves, eaten on the tree by goats,
- the wood, for construction and as firewood.

### The Argania forest: socio-economic role

The Argania forest has a very important socio-economic role. Its special legal status has made it a state owned forest with extensive rights of use reserved for the local populations: right to harvest fruits and collect wood for personal use, right to free passage. At the same time, the right to cultivate is subject to authorisation by the local administration and a fee has to be paid.

Furthermore, each village is obliged to keep its trees in good condition. It is suggested that exploiting the Argania forest provides 20 million days of work per year, allowing rural populations to stay in the countryside and limiting the rural exodus. It provides subsistence for over 3 million people in a country with a population of 30 million.

### A fragile ecosystem

Unfortunately the Argania forest is fragile, partly as a victim of its riches but also because of changes in the rural way of life and climate. Over-cultivation, soil erosion and advancing desertification are amongst the threats to this unique heritage. The natural increase in the population leads to an increase in wood collection, which is used for both construction and as firewood. UNESCO recognised this issue and classed the Moroccan Argania forest as a Biosphere Reserve (MAB) in 1998.



**Actions to promote the protection of the Argania forest**

The need to protect the Argania forest has not gone un-noticed either by the local authorities or at an international level. Many initiatives have been launched to help preserve and develop the Argania forest and to reverse its regression.

With this aim in mind, Professor Zoubida Charrouf from Rabat University, who has campaigned for many years to improve the status of Moroccan rural women, created Targanine in 1996. Targanine is a network of cooperatives whose objective is to save the Argania forest: firstly, by educating the local populations in the protection of their heritage and, secondly, by providing the means for them to organise the traditional production of Argan oil and to develop its commercialisation. The cooperatives, which consist and are managed solely by women, provide them with a supplementary source of income and thereby increases their social status.

In addition to producing oil, these cooperatives have the following objectives:

- making women aware of how to harvest the fruit whilst respecting the Argania forest,
- participating in the replanting of the Argania forest, each women agrees to plant 10 Argans per year
- organising and monitoring of literacy programmes.

In 2005, no less than 6 extracting and commercialising cooperatives and 30 milling cooperatives made up an economic organization, which has a business that was initially centred on Argan oil production but has now grown to include creating value for other by-products from the Argania forest and its protection. Fair trade and sustainable development are the central pillars of this initiative. It is important to support these actions today to ensure the long-term protection of the Argania forest. Using known or new fractions of the Argan for cosmetic purposes directly linked to well being can not be considered unless the complete respect of this weakened ecosystem can be guaranteed. For the sustainable development of this business, the collection conditions must be rational and strictly monitored. For this reason, Laboratoires Sérobiologiques have launched a number of initiatives in this respect in collaboration with recognised local actors.

**LABORATOIRES SEROBIOLOGIQUES AND TARGANINE: A PARTNERSHIP BASED ON FUNDAMENTAL VALUES**

For many years Laboratoires Sérobiologiques have applied ethno-botanic and sustainable development methods. After their experiences in French Guyana (FLUXHYDRAN® programme), they have become involved in initiatives for the preservation of the Moroccan Argania forest. For nearly 4 years, Laboratoires Sérobiologiques and the Targanine network of cooperatives, under the initiative and with the close collaboration of Professor Zoubida Charrouf, have been developing a partnership aimed at identifying new sources of cosmetic active ingredients but with one overriding condition: the new developments must support and encourage the protection and add value to the Moroccan Argania forest.



Fig. 4 - Argan nursery

This North – South partnership is centred on three main elements:

- Identification of specific fractions (leaves and oil cake) of the Argan that could be of value to the cosmetic industry and which will provide additional incomes for Moroccan women.
- Perform a study to evaluate the effects of harvesting leaves on Argan growth and to define the most appropriate specifications. The selected procedure, which has been approved by the local authorities, has a positive effect on the environment because it provides a perpetual improvement to the Argans in the forest. By purchasing these leaves to add value later, Laboratoires Sérobiologiques create an incentive for the local population to perform this often neglected but important maintenance task.
- Involvement of local populations in the protection and added value process of the Argania forest, specifically by initiating a tree nursery.

In 2004, the objective of ensuring sustainable development was also translated into the implementation of a technology transfer programme based on an existing nursery with the aim of creating a new tree nursery in one of the Targanine network cooperatives. The project has been submitted to the provincial governor, the Water and Forest Government Agency and local authorities who have given their approval and offered their support. Laboratoires Sérobiologiques have financed this project which aims to extend and increase reforestation of the Argania forest, and it has developed a protocol for germinating Argan seeds and planting new trees. A forestry engineer has trained the staff who manage and monitor the nursery. A 10-year protocol has been established which will not only result in environmental education and increased awareness of the frailty of this ecosystem amongst the local population but will also ensure the long-term sustainability of the existing Argania forest. Other types of plant (ornamental, and fodder herbs) are also part of the program and will provide the local populations with complementary incomes.

**THE RESULT OF A NORTH-SOUTH COLLABORATION: THE "LS ARGAN PROGRAM", A RANGE OF COSMETIC ACTIVE SUBSTANCES FROM THE ARGAN TREE FOR SKIN CARE**

By combining local traditional knowledge with their scientific expertise, they have developed a complete range of several active ingredients for cosmetics for skin care that have been created using different fractions of the tree, whilst respecting the fundamental values involved in sustainable development and fair trade.

**Argan leaf extracts: the polyphenols – ARGANYL™**

The Argan leaves have a high concentration of polyphenols, known for their anti-free radical properties and for the prevention of skin ageing. A series of tests has demonstrated their anti-collagenase, anti-MMP-1 and anti-free radical properties. A consumer test has shown their potential for protecting the skin against premature ageing.

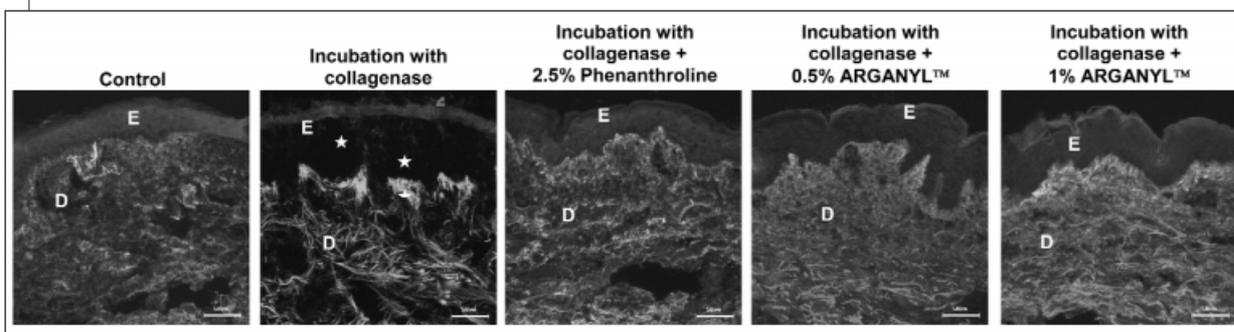


Fig. 5 - Immuno-fluorescence of collagen fibres – demonstration of the inhibitory effect of ARGANYL™ on collagenase.  
E: epidermis D: dermis ★: collagen lysis

ARGANYL™ is able to work against the damaging effect of MMP on the collagen fibre network and thereby preserve the quality of the tissues supporting the skin. This action is complemented by an upstream effect due to its anti-free radical properties. These free radicals, whose production is boosted by environmental stress such as UV exposure, also contribute to the skin ageing process. ARGANYL™ is a new and natural solution for protecting skin against premature ageing and especially UV induced ageing.

**The proteins: ARGATENSYL™**

A fraction rich in high molecular weight proteins (> 200 000 Daltons) has been identified and isolated from the oil cake. Its composition gives it very interesting surface properties. When it is applied to the

skin, the molecules form a network with a high affinity for the cutaneous surface and develop an instant and perceptible tightening effect. ARGATENSYL™ is a cosmetic active ingredient constituted from this specific active fraction. Its instant skin tightening

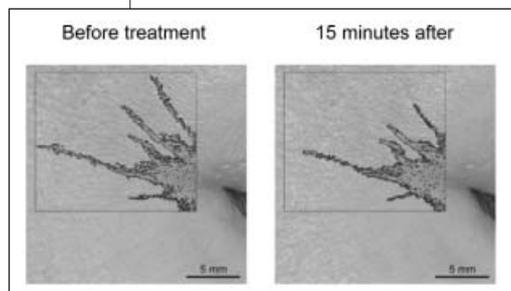


Fig. 6 - Before and after application of a serum containing 5% ARGATENSYL™.

properties and its ability to correct wrinkles, have been demonstrated by clinical trials. ARGATENSYL™ has a good anti-wrinkle effect when applied for a long term

treatment of 28 days. The Argan proteins have a special interest for products with instant tightening properties for a 'flash' effect especially on crow's feet wrinkles as well as for anti-ageing and anti-wrinkle facial care products. They can also be used in products for the neck, the décolleté and for the body.

**Argan oil: LIPOFRUCTYL ARGAN™**

Argan oil is widely used by Moroccan women, both in their cooking for its taste and for many traditional beauty rituals, for skin, hair and nail care, and has been for centuries. Many traditional beauty secrets are based on Argan oil; e.g. Berber women cover themselves in a mixture of equal parts of Argan oil and almond oil before going to the hammam (steam bathes).

Thanks to the special efforts of the Targanine network, this oil has been certified ECOCERT and received the Slowfood 1st prize in 2001.

In terms of its composition, Argan oil is exceptionally rich in poly-unsaturated fatty acids (including linoleic acid, omega-6) and natural tocopherols. It helps restore the skin's hydro-lipid film. Linoleic acid, one of the omega-6 fatty acids, is a vitamin F precursor. It is present at a concentration that is three times greater than in olive oil. As an essential fatty acid, it has an important role in preserving cellular integrity. The concentration of natural tocopherols is especially high and gives the oil excellent anti-radical and anti-stress properties in addition to natural self-protection against oxidants. The argan oil presents a lot of cosmetic applications in skin, hair and nail care.

**CONCLUSION**

The Argan, the tree that symbolises Morocco, is an incontestable source of richness however we must understand how to preserve it so as to ensure its long term existence and preserve the ecological and economical future of this part of Morocco.

The "LS Argan program" combines identifying sources of new and attractive active ingredients for the well being of everyone whilst respecting man and his environment, using concrete actions that favour sustainable development and, above all, the conservation of the Argania grove.

**REFERENCES AND NOTES**

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