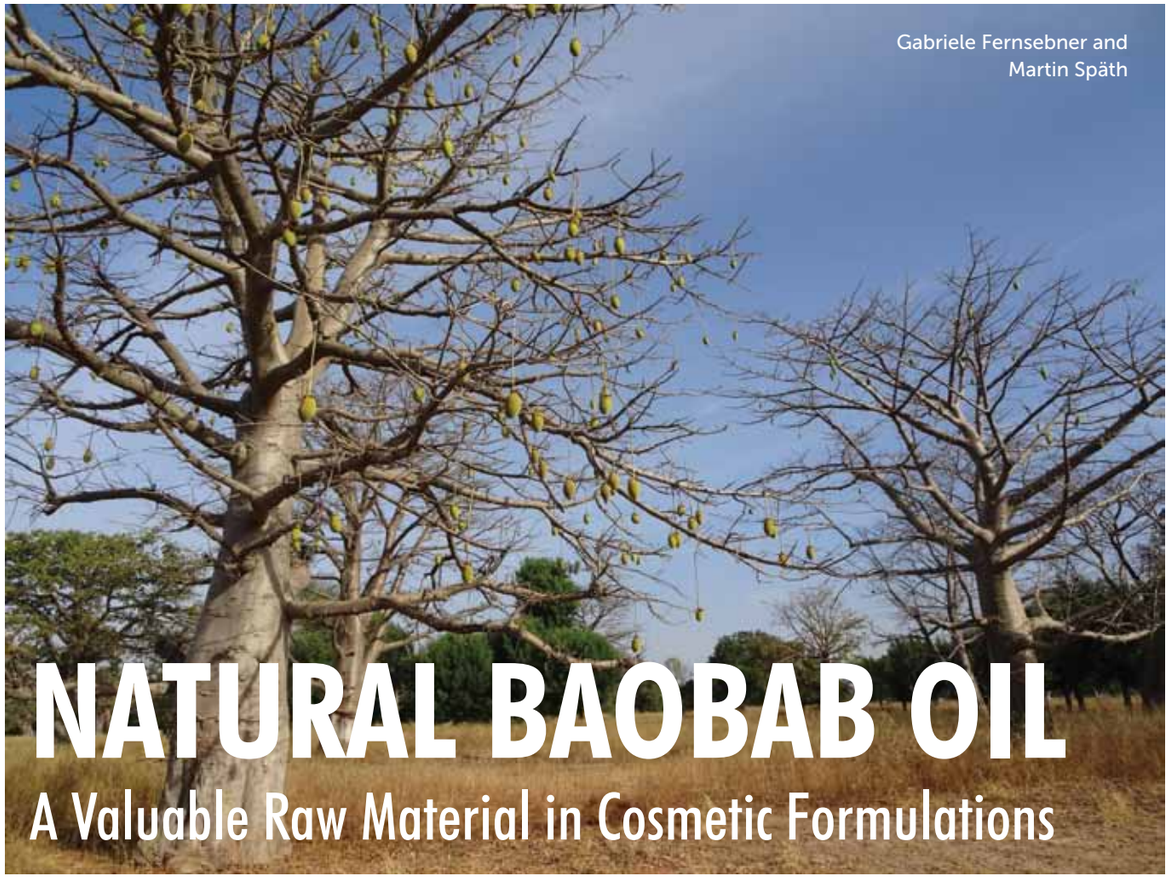

Gabriele Fernsebner and
Martin Späth

NATURAL BAOBAB OIL

A Valuable Raw Material in Cosmetic Formulations

Baobab oil is becoming increasingly valued as an integral vegetable oil with a multifaceted portfolio of cosmetic activity. In Africa, it has been utilized in skin and hair care since long times. In addition, natural baobab oil is particularly interesting for the formulation of modern cosmetics for its stability and odour neutrality. Due to its special composition, baobab oil may also be used for dermo-therapeutic purposes, especially on problematic skin and against infections of the mucous membranes.

Description

The African baobab tree (Adansonia digitata L.) belongs to the Bombacaceae family. The genus Adansonia presents with eight species of trees. The species digitata is widely distributed throughout the savannas and drier regions of Africa. However, it is also common in the Americas, India, Sri Lanka, Malaysia, China and Jamaica.

The genus Adansonia was named after Michel Adanson, a French naturalist who first described it. Digitata refers to leaves of the tree that remind of the fingers of a hand. Other common names of the baobab tree are upside-down tree, bottle tree, and monkey-bread tree.

The trees reach heights of 20 m with a trunk diameter of up to 10 m and branches of 50 cm in diameter.

Baobab trees have long been an important source of human nutrition. Indigenous peoples traditionally use the leaves, bark, roots, fruits and seeds as foodstuffs, as well as in medical applications for both humans and animals.

Above the pulp and the leaves, which are best known as food, the cooked seeds or roots and the flowers of the baobab are edible (Wickens and Lowe 2008).

The pulp of the baobab fruit has a refreshing taste and is very nutritious. It contains particularly high amounts of carbohydrates, approximately 50 % thereof being dietary fibres. In addition, the pulp is a rich source of calcium, potassium and vitamin C. Recently, dietary fibres have gained increased importance as a component of a healthy diet, thanks to their ability to influence multiple aspects of the digestive physiology.

Harvest and Production

The seeds of the baobab fruit bear oil. Thus, the fruit is wild harvested and processed in large parts of Africa. The fruit powder is the final product of this process and has been an important source of income for the local population for about 20 years.

The kidney-shaped seed is about 1 cm long and covered by a very strong coat. With 15 % the oil content is rather low, and therefore the yield is moderate. In the past, the oil has been separated from the powdered seeds with water. Only with the advent of the screw press, a larger production scale became available.

Baobab oil is usually produced in Africa where the fruits are processed. Unlike the powder, the oil can be extracted throughout the whole year. Therefore, a robust and wear-resistant screw press is necessary. Native oils are often only sedimented and can therefore appear a bit cloudy. However, the presence of sediments does not impair the oil's quality. Of course, filtration is always possible to remove sediments and clarify the oil.

Vegetable Oils in Cosmetics

Skin lipids are mainly made up of oxidation-stable saturated fatty acids (e.g. palmitic acid) as well as mono- and polyunsaturated fatty acids, particularly oleic acid and linoleic acid. The latter is usually found in bound form, e.g. in ceramides.

Moreover, the skin holds various antioxidant molecules, including sterols, squalene and lipophilic substances, such as tocopherols and carotenoids, which are primarily found in the cell membranes.

In cosmetic formulations, it is beneficial to provide substances that are similar to the skin's own lipids, because the active components of a cosmetic formulation are mainly the natural saturated and unsaturated fatty acids (Lautenschläger 2003).

Natural oils offer many functional advantages: First, they contain the same range of fatty acids as the skin itself and are thus physiologically active. Moreover, they support the regulation of transepidermal water loss (TEWL) (Komane et al. 2017). Furthermore, they contain lipid-accompanying substances, such as lipid-soluble vitamins (tocopherols), antioxidative carotenoids and phytosterols that support the barrier properties of the skin. In addition, they contain phospholipids which activate the cell membranes.

African Baobab in Cosmetics

At present, the bark, roots, leaves, red fibres as well as the press cake are used in cosmetic products. Recently, baobab oil has become increasingly popular in cosmetic formulations (Komane et al. 2017).

Properties of the Oil

Almost one third of the baobab oil consists of the saturated palmitic acid, which stabilises the oil and protects it from oxidation. In addition, oleic and linolenic acid are present at a very advantageous ratio. Tab. 1 shows the fatty acid distribution of an analysis of baobab oil from 2020.

Interestingly, baobab oil contains approximately 6 % cyclopropenoic acids (CPFA), which have the potential to suppress or kill harmful bacteria (e.g. Bacil-

lus cereus) and yeasts, such as Candida sp. (Binder and Chan 1982, Kabore et al. 2013, Moreton 1985).

An additional 0.5 % of phytosterols (mostly ß-sitosterol) as well as a high content of tocopherols complete the profile of baobab oil.

Profile - Organic Baobab Oil (Analysis 2020)
Status: 100 % pure, natural
INCI: ADANSONIA DIGITATA SEED OIL
Appearance: golden-yellow
Odour: unobtrusive, slightly nutty
Best before: > 2 years
Density at 20 °C: 0,9 g/cm^3
Saponification value: 189 mg KOH/g
Free of allergens, vegan

16:0	Palmitic acid	24,2 %
18:0	Stearic acid	5,1 %
18:1	Oleic acid	37,6 %
18:2	Linoleic acid	27,6 %
18:3	Linolenic acid	0,3 %

Tab. 1: Fatty acid distribution in % of total fatty acids (Analysis 2020)

Cosmetic use

The colour of baobab oil is golden-yellow. The consistency is dense and rich. The smell is unobtrusive and slightly earthy and nutty. The oil is easily absorbed into the skin and leaves a very pleasant skin feel. Therefore, it is well-suited for all sorts of cosmetic formulations.

Given its high oxidative stability, it is a valuable base oil. As an additive, it prolongs the shelf life of linoleic acid-rich and other oxidation-susceptible oils.

Its high content in palmitic acid supports the skin barrier, so that the oil particularly qualifies for the use on dry, mature and damaged skin.

The abundance of linoleic and oleic acid supports the regeneration of the skin and limits TEWL. Furthermore, the fatty acids help to regenerate the epithelial tissue. Thus, the oil is a very good carrier oil for cosmetic applications (Komane et al 2017).

It is absorbed into the skin very fast thereby increasing its elasticity and smoothness. These properties make it an ideal

oil for the use during pregnancy.

Furthermore, it is suitable in hair care to strengthen the hair and give more elasticity to dry and brittle hair.

Therapeutical Potential of Baobab Oil

Baobab oil may accelerate wound healing. In recent in-vitro studies and topical applications, it demonstrated a regenerating, nourishing and toning effect on healthy skin and promoted healing of skin damage due to acne, rosacea, dermatitis, eczema and scars. Analgesic effects were found on burned skin (e.g. sunburn) and after insect bites (Wickens and Lowe 2008, Komane et al. 2017).

In radio-chemo-therapy, baobab oil is used topically as a complementary application. The oil regenerates and supports the healing process of the skin and alleviates mucosal disorders, which are common undesirable side effects of both local and systemic anti-cancer therapy (Bickert 2014).

Conclusion

Baobab oil was placed on the international markets only a decade ago. The discovery of its beneficial cosmetic activity is progressing only slowly, partly because its global availability is still very limited. However, due to its increasing popularity in cosmetic products baobab oil will soon be an indispensable part of the cosmetic oil portfolio.

Baobab oil is offered pure as a base oil for blends with other fatty oils or with essential oils. Furthermore, it is a valuable compound of ointments and creams, particularly for stressed, damaged or injured skin as well as against inflammation.

Its special compositions, in particular with regard to CPFA, render baobab oil an interesting raw material which deserves further investigation. Current scientific research as well as feedback from practical experience strongly suggest interesting cosmetic and therapeutic properties of this promising oil that are waiting to be discovered and applied in the future. ●

Acknowledgement
The authors wish to thank Dr. Eva Heuberger, St. Ingbert, for her input and improvement of the manuscript.

Literature

Bickert A, Baobaböl in der komplementären ganzheitlichen Behandlung von Krebspatienten. Fachzeitschrift FORUM 2014; 44: 17-19

Binder R, Chan B. Effects of cyclopropanoid and cyclopropenoid fatty acids on growth of pink bollworm, bollworm and tobacco budworm. Entomologia Experimetalis et Applicata 1982; 31: 2-3

Kaboré D, Nielsen D, Sawadogo-Lingani H, Diawara B, Dicko M, Jakobsen M, Thorsen L. - Inhibition of Bacillus cereus growth by bacteriocin producing Bacillus subtilis isolated from fermented baobab seeds (maari) is substrate dependent. Int J Food Microbiol 2013; 162: 114–119.

Komane B, Vermaak I, Kamatou G, Summers B, Viljoen A. Beauty in Baobab: a pilot study of the safety and efficacy of Adansonia digitata seed oil. Brazilian Journal of Pharmacognosy 2017; 27: 1-8

Lautenschläger H, Essenzielle Fettsäuren – Kosmetik von innen und außen, Beauty Forum 2003 (4), 54-56.

Moreton R. Modification of fatty acid composition of lipid accumulating yeasts with cyclopropene fatty acid desaturase inhibitors. Appl Microbiol Biotechnol 1985; 22: 42.

Wickens G, Lowe P. The Baobabs: Pachycauls of Africa, Madagascar and Australia, Springer Verlag 2008

| Available by **subscription** only |

nutraceuticals NOW

IFT 20 Virtual Preview

NATURAL BAOBAB OIL
A valuable raw material in cosmetic formulations

"THE BOOM OF ZOOM"
What's happened to our trade shows this year

FLAVOUR ENHANCEMENT
Is it the next 'great wave' of innovation in nutraceuticals?