SKIN CARE

MOISTURIZING

Monoi oil

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Monoi oil

Monoi means sacred oil. It has been used since the mists of time by Polynesians for its moisturizing virtues as well as in traditional pharmacopoeia. No other product can boast 2,000 years of successful individual testing. It is specific to French Polynesia because it is made from 'tiare' flowers (Gardenia tahitensis) that are soaked in copra oil (Coconut Oil).

COMPOSITION OF THE MONOI OIL

1. GARDENIA TAHITENSIS FLOWER

Botany

Gardenia tahitensis (also called Tiare māori or Tahitian Gardenia) belongs to the Rubiaceae family.

Tiare is a type of gardenia which grows on Tahiti, the largest Island of French Polynesia in the southern Pacific Ocean. Native to the highland shores of the South Pacific, it has the distinction of being one of the few cultivated plants native to Polynesia. That variety, which is adapted to the Polynesian soils, grows everywhere in French Polynesia and blossoms all year long. The leaves are opposite and obovate in shape, they can measure up to 15 cm long and 8 cm wide. They are dark-green color on the side exposed to light, and light-green on the other side. The leaves are shiny and smooth. The very fragrant flowers appear in the axils of leaves and are white. The flowers have 5 to 8 petals united at their base and form a narrow tube that can be green or yellow. The corolla is attached to the calyx at the top of the ovary. The number of yellow stamens always corresponds to the number of petals. The flowers are always sterile. The air is full with the sweet-smelling fragrance of this small white flower that grows on bushes.

This flower requires the action of men for its asexual reproduction, which therefore is achieved without seeds. The Gardenia Tahitensis bushes grow best on soils of coral origin.

Chemistry

The concrete tiare is very rich in aromatic compounds and esters, which form a highly complex mixture of 80 characteristic aromatic constituents of the scent of the tiare flower. Alcohol dihydroconiferylic (DHC) and its natural derivatives, extracts of the tiara, have a vanilla-floral note that intervenes powerfully in the sensory component of the concrete tiara. Its composition is rich in terpenic alcohol, esters and especially methyl salicylate. Their abundance in the tiara is one of the features of this species and one of its main particularities.

The tiare flower exhales perfume attractive refined which is a source of inspiration for perfumers and chemists. The tiare flower bouquet has a very pleasant complex spicy mainly honey, chocolate and cinnamon with notes of green and earthy. Vanillin, aromatic constituent miner tiara, plays a fixer.

Traditional uses

Tiare is a soul and symbol of Tahiti. Both men and women wear these fragrant flowers during special ceremonies and holidays. The name Tahitian Gardenia is somewhat a misnomer because it is neither native nor naturalized in Tahiti. The first acceptable scientific name for the plant was based on Tahitian specimens collected by Jules Dumont d'Urville in 1824. Hence the scientific name of *Gardenia taitensis*, and the English name of Tahitian Gardenia. It is interesting to note that it was also first collected in Tahiti, by the Forsters on Captain Cook's first Pacific voyage (1768-1771), although it was mis-identified as *Gardenia florida*.

The tiare flower is the national flower of French Polynesia and the Cook Islands. They are deeply rooted in the Polynesian cultural life. Indeed, they are used in the flower necklaces, which are called "Ei" (in the Cook Islands and Tahiti) or "Lei" (in Hawai'i), which are offered to tourists as a welcome token on their arrival. The vahine (Polynesian women) also uses them every day to enhance their beauty.

Among all Tahitian plants, the tiare is the one which is most used in traditional medicine. Although its active principles are not known yet, one thing is certain: the tiare is absolutely NOT toxic. In infusion with other essential oils or as an external remedy, it is used to treat various problems, from mosquito bites to headaches, and even liver cancer. Its flower buds, when crushed with a few drops of MONOI, are used to

soothe ear-aches or can be applied on wounds after mixing them with breadfruit tree latex (Artocarpus altilis). "It appears undeniable to us that the tiare has a soothing effect." (Pétard, 1986. Plantes utiles de Polynésie).

This flower has several traditional uses:

- In some pacific island, wearing a flower indicates relationship status. A flower worn on the left ear means the person is taken and on the right ear means available.
- Parts of the plant are believed to relieve migraines, ear-aches, insect bites, rashes, cure some forms of eczema and even heal wounds.

2. COPRA OIL

Botany

Cocos nucifera L. (= *Cocos mamillaris* Blanco) is a palm tree that belongs to the *Arecaceae* family. It is commonly known as coconut or coconut palm. Copra oil is the refined coconut oil.

Coconut palm grows up to 10-20m. The trunk is slender, often curved, and is wider at the base than at the top. An apical crown of leaves protects the only growing point of the plant, the terminal bud. The pinnate leaves, or fronds, are 1.5-4m long and bear yellowish-green coriaceous leaflets, which are 50- 70cm long. Under favorable environmental conditions, an adult plant produces 12 to 14 new fronds per year. The top, which is not very wide, bears 25-36 fronds. The root system is fasciculated. The primary roots attach the plant to the ground and absorb water. The tertiary roots, which emerge from the secondary roots, are the actual nutrient absorbers.

Since *Cocos nucifera* is a monoeciuous species, its inflorescences bear female and male flowers. The inflorescences are panicles born in the axils of lower leaves, each protected by a large bract (up to 70 cm long) called husk. Inflorescences grow during 3-4 months and flowers bloom between November and March.

The fruit is a large ovoid drupe containing a single seed known as coconut. A coconut is essentially a large hollow seed with a hairy coat, made of the following parts from outside to inside:

- ✓ an outer 4-5 cm thick fibrous husk called exocarp
- ✓ an intermediate, also fibrous though thinner layer called mesocarp
- ✓ a hard, bony shell called endocarp, with three pores arranged in a triangle
- ✓ a white edible pulp layer called endosperm
- ✓ a central cavity containing sweet liquid known as *coconut water*.

Depending on the variety, the ripe fruits may be green, orange or yellowish. However, all of them turn to an opaque brown color when dry, before falling from the plant. A single coconut may weigh up to 2.5 Kg.

Coconut palms grow on the sandy shorelines of all tropical and most subtropical areas. The areas where coconut palms grow, either natural or introduced, are tropical warm and humid areas with average annual temperatures of 27-35°C and mil d variations along the day. Annual rainfall in areas with productive plantations is between 1200 and 2300 mm. Most experts believe that it is native to the Indo-Malaysian region on the West Pacific coasts. Probably, coconut palm present distribution is directly or indirectly a consequence of human cultivation. Major World coconut producers include the Malaysian archipelago, Southeast Asian countries, India, Sri Lanka, some Pacific islands, eastern African countries and Central and South American countries.

Coconut oil is produced by expression and subsequent refining of *Cocos nucifera* L. fruits' pulp. The coconut tree, called "haari" in Tahitian (*Cocos nucifera*), and which was introduced during the first migrations, perfectly adapted itself to the Polynesian soil and climate. Since the export of coconut oil resulted in a substantial need in coconuts a century ago, the coconut tree has ranked first in the Polynesian flora, which is reflected by the great number of coconut groves around Polynesia.

Chemistry

Fresh, not-dried endosperm contains 35-40% oil, 10% carbohydrates, 3% proteins and approximately 50% water.

Fatty acids

Saturated fatty acids

The main characteristic of coconut oil is the high content of saturated short and medium-sized chain fatty acids:

- ✓ 45-53,2% lauric acid (12:0)
- ✓ 16,8-21% myristic acid (14:0)
- ✓ 7,5-10,2% palmitic acid (16:0)
- ✓ 4,6-10% caprylic acid (8:0)
- ✓ 5-8% capric acid (10:0)
- ✓ 2-4% stearic acid (18:0)

Unsaturated fatty acids

Coconut content of essential fatty acids is smaller (Codex Stan 210; 1999):

- ✓ 5-10% oleic acid (18:1)
- ✓ 1.0-2.5% linoleic acid (18:2)

Traditional uses

The name *Cocos*, seems to come from a Portuguese word meaning "monkey" probably because of the tree marks on each coconut, which resemble an ape's mouth. The species name *nucifera* is a Latin formation meaning "bearing nuts" (*fero* = "I bear" and *nux-nucis* = "nut").

Coconut has been cultivated and used in India and the southeast area of continental Asia for at least 3000 years. Prior to the European colonization of the New World, coconut had been introduced in islands and continental areas along the Pacific coast of Central America, as documented in reports dated on the beginning of the XVI century, which describe coconut uses by the natives of Panama. During the early times of the Spanish and Portuguese colonization, coconut was introduced into Asia, the Caribbean and northeast

regions of South America and Brazil. Nowadays, coconut is a pantropical plant and grows in every suitable place between 26°N and 26°S latitude.

Once dried and grated, the pulp gives the famous coconut oil. Coconuts are harvested in the islands and atolls: the pulp is taken out of the shell and then dried under the sun. The dried pulp is then transported to the refinery, where the coconut oil is extracted through a pressing process.

Main coconut palm products are produced from the fruits. Coppra (the dried endosperm) yields oil as a main product and flour as a residue (30-40% of the initial weight). The oil is used for cooking and for making margarine, cocoa butter, soap, lotions, perfumes and other cosmetic products, as well as candles and lantern oil. Coconut oil tends to solidify at room temperature; it does not go rancid. Coconut oil is essential to make soap and shampoo with a rich, creamy texture. Coppra is extensively used in local as well as world-wide manufacture of sweets; it is also added to livestock fodder.

The many medicinal applications of coconut include its use as an antiseptic, astringent, bactericidal and diuretic among others. People in tropical countries usually apply it as a medicine for asthma, bronchitis, bruises, burns, constipation, cough, fever, flu and others. In South Asia coconut oil is taken as a substitute for codfish liver oil, topically applied to relief fever and respiratory conditions, and used on hair to prevent grey-hair. Dry old endosperm is used as an aphrodisiac ingredient of some preparations

Since it is widely used in the domestic life, in the diet and in traditional medicine the coconut tree is closely associated with the settlement of the islands and atolls of French Polynesia. Its dried leaves make up the roofs of "fare" (Polynesian houses); its trunk is used in carpentry work; its roots infused in herbal teas help to struggle against dysentery. The "coconut butter" is easy to digest, does not go rancid easily and has aromatic qualities. The coconut water "pape haari" is the perfect drink and moreover it is completely sterile. It is a harmless diuretic product because of the presence of levulose, a type of sugar that is tolerated by people suffering from diabetes. Its pulp, when grated then squeezed, provides coconut milk, one of the basic ingredients in the Polynesian diet.

COSMETIC PROPERTIES OF THE MONOI OIL

Recently it has been seen that that Monoi oil is rich in methyl salicylate which is a skin-soothing agent. It is a naturally concentrated emollient which penetrates the skin, re-hydrates the layers of the epidermis and shields skin against external damages including sun and wind.

Monoi Oil deeply penetrates the skin and only a small quantity is needed to improve the skin. Results are immediate: skin is softened and less wrinkled, more hydrated, more youthful and healthier looking.

Emollient activity

Monoi oil has been tested several times to prove its hydrating activity. In 1998, a comparative study was realized with monoi oil among others (coprah, vaseline, karité and jojoba oil) to observe which was the best hydrating oil and the effects on the skin after topical application (Groupement Interprofessionel de Monoï de Tahití). Four hours after the application, an evaluation was done and the results show that all oils occlude the skin surface but monoi oil had a similar occlusive capacity as karité oil, which was not really high. However, monoi oil presented a maximum hydrating activity six hours after the application, which means that its effects on the skin are constant and continuous. The other oils had more immediate effects but their hydrating capacity was shorter in time than the monoi oil, which at the end was the best hydrating oil in time.

People in the tropics have used coconut oil as a moisturizer to treat xerosis (a common skin condition characterized by dry, rough, scaly, and itchy skin), associated with a defect in skin barrier function, and treated with moisturizers. Recently, coconut oil has been found to have antiseptic activity on skin. A moisturizer with antiseptic effects has value, but there were no clinical studies to document the efficacy and safety of coconut oil. Thus, Agero, A.L. & Verallo-Rowell, V.M. (2004) carried out a study aimed to determine the effectiveness and safety of virgin coconut oil compared with mineral oil as a therapeutic moisturizer for mild to moderate xerosis.

To that end, a randomized double-blind controlled clinical trial was conducted on mild to moderate xerosis in 34 patients with negative *patch-test* reactions to the test products. These patients were randomly applied either coconut oil or mineral oil on the legs twice a day for 2 weeks. Quantitative parameters for effectiveness were measured with a Corneometer CM825 for skin hydration and a Sebumeter SM 810 for skin lipids. For safety, transepidermal water loss (TEWL) was measured with a Tewameter TM210, and pH was measured with a pH-Meter PH 900.

The results indicated that coconut oil and mineral oil had comparable effects. Both oils effectively improved skin hydration and increased skin surface lipid levels. Safety was demonstrated through no significant difference in TEWL and skin pH. Subjective grading of xerosis by the investigators and visual analogue scales used by the patients showed a general trend toward better (though not statistically evident) improvement with coconut oil than with mineral oil. Safety of the treatment was demonstrated as well. The authors arrived to the conclusion that coconut oil is as effective and safe as mineral oil when used as a moisturizer.

Therefore, Monoi oil is highly recommendable to formulate cosmetic products with moisturizing and emollient activity for skin and hair.

Hair protection and repair activity

In 1998, a complete study was done on ten women for 4 weeks to observe the properties of monoi oil on damaged hair. After applying the oil three times per week, the hair surface was studied and 70% of volunteers improved their hair condition. Results showed that the oil had a lubricating effect (80%), a coating activity (60%), and that helped to diminish dry ends (70-80%). Moreover, it helped to protect, comb, repair and embellish hair, enhancing its natural look. 70% of volunteers showed a positive response (Groupement Interprofessionel de Monoï de Tahití, 1998).

In a previous study, coconut oil was found to penetrate hair while mineral oil was unable to do so. This results lead to the hypothesis that the reduction in capillary adhesion resulted from the penetration of oil into the hair fiber, leaving a thinner oil film on the surface. Keis, K. et al. (2005) carried out a study to investigate the penetration abilities of various oils into human hair fibers. They found that with coconut,

olive, and sunflower oils the capillary adhesion decreased with time, while with mineral oil it did not. They also observed that application of heat further reduced capillary adhesion for coconut and sunflower oils.

Oil deposition hair forms thick films (approximately 0.5 µm), which mask the scale structure of the fiber surface. As the oil film gets thinner with time and application of heat, the scale structure reappears. Thus, coconut, olive and sunflower oils reduce capillary adhesion because of their penetration ability, leaving a thin film on the hair fiber surface.

Rele, A.S. & Mohile, R.B. (2003) carried out a study to evaluate the activity of coconut oil on prevention of hair damage as compared with mineral oil and sunflower oil.

Previously published results had showed that both *in vitro* and *in vivo* coconut oil treatments prevented combing damages in various hair types. Using the same methodology, the authors studied the properties of mineral oil and sunflower oil on hair.

Since the aim of the study was to cover different treatments on various hair types using the above mentioned oils, the so-called Taguchi Technique for the Design of Experiments was used. The results clearly indicated a strong beneficial impact of coconut oil application to hair as compared to the other tested oils. From these three oils, coconut oil was the only oil found to remarkably reduce protein loss from both undamaged and damaged hair, when used as a pre-wash and a post-wash product.

The difference in results could be accounted for by the different chemical compositions of these oils. Coconut oil, being a triglyceride of lauric acid, has a high affinity for hair proteins and, because of its low molecular weight and straight linear chain, is able to penetrate into the deepest layers of the hair shaft. Mineral oil, being a hydrocarbon, has no affinity for proteins and therefore is not able to penetrate the hair shaft. In the case of sunflower oil, although it is a triglyceride of linoleic acid, it cannot penetrate the fiber because of its bulky structure due to the presence of double bonds.

Therefore, Monoi oil is highly recommendable to formulate hair cosmetic products to protect and repair the hair without flattening it.

Tanning activity

In 1998 a study on this activity was realized, the authors (Groupement Interprofessionel de Monoï de Tahití) wanted to observe the capacity of this oil to accelerate tanning and keeping it for a longer time. Volunteers were exposed to UVA rays, at a rate of 10 exposures in a period of five weeks. After this, monoi oil was applied twice a day on the chosen experimental area for another 5 weeks. Results were obtained comparing the initial color to the final one by clinical scorage and also asking volunteers. Tanning intensity was higher in the group treated with monoi oil.

Therefore, Monoi oil is recommended to create products with tanning and after tanning effects.

COSMETIC APPLICATIONS OF THE MONOI OIL

Action	Active	Cosmetic Application
Emollient	Fatty acids	Moisturizing
Hair protection and repair	Fatty acids	Hair protection Hair repairing products
Tanning	Monoi oil	Tanning products Sun products

RECOMMENDED DOSE OF THE MONOI OIL

The recommended dose is between 0.5% and 5.0%.

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