

!Nara (*Acanthosicyos horridus*)

Description and Distribution

The !Nara is a leafless, thorny, melon-bearing bush. It is found in the Namib Desert, sporadically occurring along this coastal desert between Port Nolloth (South Africa) and Namibe (Angola), though its greatest concentration lies around the Kuiseb River Delta. The plant stretches over large surface areas, forming hummocks of ridged stems and paired spines, which enables it to photosynthesise. The tap-root anchors the plants into the sand and draws moisture from deep underground. The !Nara is dioecious, i.e. male and female plants are separate. The male plant flowers throughout most of the year and the female plant flowers mostly during spring. The !Nara fruit is round, melon-like and pale-green. It weighs between 1kg and 2.5kg, and its inside is a watery orange-yellow pulp with seeds.



Harvesting



The !Nara is harvested from January to April. When the melon is a yellowish colour it is ready to harvest. The melons are loosened and teased away from the bush with long, wooden sticks to reduce the impact on the fruit and the plant. The fruit can be eaten raw or cooked, and has a sweet cucumber and pineapple taste. Processing the fruit involves removing the pulp and boiling it in large drums over open fires. Thereafter the pulp is strained

and the seeds are removed.

!Nara supply and value chain

A !Nara bush can produce 20-500 melons, with each fruit containing 50-200 seeds. 10-20 melons are needed to yield 1kg of seeds. Harvesters sell coated and uncoated seeds to primary consumers and manufacturers around Walvis Bay and Swakopmund. Due to the limited extent of the resource base and sustainability issues, the seed supply is limited to about 3-4 tonnes a year.

Uses and Properties

The fruit-roll product is rich in vitamins, minerals and trace elements, and the harvesters use it as part of their staple foods. The fruit pulp is used medicinally to relieve stomach ache, and the root is used to treat internal diseases and aid wound healing. The seeds contain 57% oil and 31% proteins, and are processed into a lipid oil. This oil is bottled or mixed with other ingredients. The oil contains a high percentage of specific fatty acids namely Linoleic acid (said to keep the skin impermeable and prevents the progression of atherosclerosis), Oleic acid (said to normalise high blood pressure and to protect cell membranes from free radicals) and Palmitic acid (an antioxidant and may assist in the prevention of atherosclerosis). These aid in the protection of the skin as well as promotion of general health. Therefore the oil is used in skin care products and sunscreen as well as used for food consumption purposes.



References for !NARA

http://www.nara.com.na/index.php?option=com_content&view=article&id=8&Itemid=7 (!NARA products from desert hill)

TRIAL PRODUCTION OF FRESH !NARA SEED OIL – report

<https://www.news-medical.net/health/What-is-Linoleic-Acid.aspx>

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<https://www.livestrong.com/article/521518-palmitic-acid-health-benefits/>

Indigenous Natural Products in Namibia – book

Picture 1 <https://www.pinterest.cl/pin/289215607297534613/?autologin=true>

Picture 2 from book

Picture 3 from book

Aloe (*Aloe vera*)

Description and Distribution

The aloe is an evergreen succulent with a number of growth forms, from small (miniature), stemless bushes to tall single stemmed trees. Aloes are found throughout Africa, mainly in the tropical and sub-tropical regions, and are common in parts of the southern sub-continent, including South Africa and Namibia. Generally, aloes prefer sandy soils in dry shrub-lands and woodlands at elevations of 200-1065m. Aloes are drought resistant and when cultivated prefer full sun in a well-drained area.(4)

All indigenous aloe species are protected in Namibia.

Aloe vera:

(1)The leaves of the *Aloe vera* are a greyish green colour and marked with small white spots. The margins of the leaf have little “teeth” that are a red-brown colour. The flowers of the Aloe grow out the centre of the plant and are yellow with a silvery sheen due to the waxy layer on them.

Harvesting and Processing

The leaves of the *A. vera* contain a clear gel, that when broken off from the plant can be applied directly to the skin. The gel is extracted by removing the skin of the leaves. Care should be taken to remove the inner layer of the skin as this layer is toxic (contains Aloins). If not removed and added to the gel, the gel cannot be used. Therefore the gel is pasteurised and stabilised. During this process the residual Aloins in the gel are removed and the product is safe to use. (2)



Uses and Properties

The *A. vera* gel contains various Vitamins (Vitamin A, C, E and B12), various minerals (calcium, chromium, copper, selenium, magnesium, manganese, potassium, sodium and zinc). It also contains phytonutrients such as Acemannan, lignans, saponins, sterols and anthraquinones, which help in the immune response to damaged tissue. The enzymes in the gel, such as Bradykinase, are said to aid in reducing skin swelling and irritation.

Therefore ingesting the gel may aid an anti-aging diet (due to the anti-oxidants), balance blood composition (normalises blood sugar and cholesterol levels), stimulate the immune system (with its compounds it stimulates protein production to boost the immune system), encourage wound repair (as it nourishes and stimulates the skin), support oral health (by soothing the gums and protecting them from germs), and promote digestive comfort and gut health (by promoting probiotic production and preventing harmful organisms from growing in the gut). (3) (5)



References

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3. <http://aloe-maxx.com/about.php>
4. <http://www.succulents.co.za/aloes/single-stemmed-aloes/aloe-littoralis.php>
5. <https://www.globalhealingcenter.com/natural-health/benefits-of-aloe-vera/>
6. https://www.naturalnews.com/PhotoTour_Aloe_Vera_13.html

Bulbine (*Bulbine frutescens*)

Description and Distribution

Bulbine is a perennial, fast growing, evergreen, prostrate 'aloe-like' succulent. It grows in the northern cape, western cape and eastern cape of South Africa, as well as along the Fish River Canyon in Namibia and the southern most regions of the Namib Desert. The Bulbine is a drought resistant plant but if cultivated it prefers compost and regular watering. (1)

Harvesting and Processing

The leaves are harvested and used to make a juice or gel. The leaves are simply cut off whenever needed. Once the leaves have dried, one cannot make a gel. The freshly cut leaves are cold pressed, filtered and pasteurised into the gel. As the plant is mainly found in South Africa, the production of the gel is done there. (2) The roots and stems of the plant are used less. They contain knipholone-type anthraquinones. (3)



Uses and Properties

The leaf gel is said to be used in the healing of cuts, burns, rashes, cracked lips, acne, cold sores, mouth ulcers, areas of cracked skin, eczema and mosquito bites. The leaf gel is also may also be used in many cosmetic products. It is claimed to enhance cell-cell interactions, help lipid synthesis, enhance aquaporin-3 expression, improve elasticity and tensile strength of the skin, and reduce water loss from the skin. Therefore the leaf gel is used in anti-aging creams, moisture creams, skin repair creams and after-sun soothing creams. It is also used in oral care products and deodorants due to its ability to reduce odour producing microorganisms. (2)

References

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2. <https://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&source=web&cd=13&cad=rja&uact=8&ved=0ahUKEwj3nv6Nu4zXAhWHtxQKHeOSAKkQFghcMAw&url=https%3A%2F%2Fwww.researchgate.net%2Ffile.PostFileLoader.html%3Fid%3D57ad89b5615e270bf326ab01%26assetKey%3DAS%253A394178027638790%25401470990773640&usg=AOvVaw1q8iiJS1mYVKOK9sFX2xVQ>
3. <http://www.happinessis.co.za/PDFdocs/Bulbine%20frutescens.pdf>
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Commiphora (*Commiphora wildii*)

Description and Distribution

There are over 200 species of *Commiphora* worldwide, occurring in Africa, Arabia, the Indian Ocean islands and India. Many *Commiphora* species exude an aromatic resin that has a pleasant smell.(1) The Arabic *C. myrrah* produces a resin which is used medicinally and as incense, while *C. gileadensis*, occurring in Arabia and north-east Africa, produces a “Balm of Gilead”.(1) Namibia has a large number of *Commiphora* species and is considered the centre of diversity.

Many *Commiphora* species exude a resin that has a pleasant smell.(1) The *Commiphora wildii*, a small tree is near endemic in Namibia, extending from the southern parts of Angola to just south of the Ugab River, along the western parts of the Kunene Region. The trees grow on rocky slopes of hills and mountains. (2) The stem has a peeling bark and large stalk-less leaves that are glossy green.(1)

Harvesting and Processing

An essential oil is produced from the resin of *C. wildii*. The resin naturally exudes from the tree and hardens on the stem. It can be harvested during the dry summer months. Once the rainy season starts the resin production stops. The resin is harvested by picking it up from the ground or off the bark of the tree. This is usually done with a stone or piece of bark to avoid harming the tree. The harvesting process is non-destructive. The resin is then taken to be distilled to produce the concentrated essential oil known as Namibian Myrrh. (2)



Uses and Properties

Due to the high concentration of the essential oil only little needs to be used in products. The oil is found as a flavour additive in many everyday products such as toothpaste, soap, perfume and lip balms to name a few. *Commiphora wildii* resin was originally used by the Himba as a perfume.(2) The essential oil has a smooth, fresh and slightly spicy aroma, which is rich in anti-oxidants and claimed to make it a great anti-inflammatory product. The essential oil has anti-oxidant, anti-bacterial and anti-fungal activities, and soothing, moisturising and aroma-therapeutic properties. (3)

The Namibian Myrrh is found in products for athlete's foot, weeping eczema, bedsores, acne and boils. It is present in mouthwashes and can be applied to gums and teeth. (4)



References

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3. <http://www.mbiri-skincare.com/product/namibian-myrrh-essential-oil/>
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Kalahari Melon (*Citrullus lanatus*)

Description and Distribution

The Kalahari melon is a prostrate or climbing annual plant. It is monoecious, having male and female flowers on the same plant. These appear between January and April. The fruiting time is usually from February to May.

The melon is similar to the watermelon, but is small and round with pale yellow or green flesh. (1)

The Kalahari melon is known as “*Tsamma*” in Namibia, Botswana and South Africa. (5)



Harvesting and Processing

The melon is easily harvested from the plant. The seeds are removed from the plant, washed clean and dried. The kernels are then removed from the seeds either with or without a decorticator. The oil is then extracted by pressing the kernels with a hydraulic press or screw press. (3)



Uses and Properties

Each seed contains about 51% oil. The oil contains an omega-6 essential fatty acid (linoleic, oleic and palmitic fatty acids), has a high sterol content (β -sitosterol, campesterol, stigmasterol and 5-avenasterol), and is stable to oxidation.(4) Because of these properties, the oil helps regulate the hydration, regeneration and restructuring of the skin as well as the suppleness of the skin. The oil is added to face and body creams for these reasons. (1) (6)



References

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3. <http://www.afrinatural.com/kalahari-melon-seed-oil-profile>
4. <http://oils.phytotrade.com/portfolio/kalahari-melon-seed-oil/>
5. <http://pza.sanbi.org/citrullus-lanatus>
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Manketti (*Schinus molle*)

Description and Distribution

The manketti tree grows in the deep sands of the Kalahari.(1) They grow 7-20 meters high and only start bearing fruit very late. The leaves, flowers and oval shaped fruit start to grow in from mid-October. The fruit ripens from February to April. The production of nuts is affected by the rainfall. (2)



Harvesting and Processing

When the manketti fruits are ripe, they are collected from the tree or the ground surrounding the tree. The flesh of the fruit is removed and used for nutritional purposes. The kernel or nut is removed from the seed. Originally the kernel was removed with an axe, but due to the high demand of the oil a decorticator is now used. The extracted oil is a rich, yellow-lime green colour with a fresh nutty flavour. (2)



Uses and Properties

Manketti oil is a thick, dense, rich oil that is also known as the “hair oil”. The oil is multi-purpose, with a high content in Vitamin E and C, minerals, B-complex Vitamins, Linoleic acid, fats and proteins. It is used to soften, moisturise and repair skin when used topically. It reportedly supports the metabolism and maintains healthy muscles and skin by enhancing the function of the immune system when ingested. Its high fat and protein content also may help with dry hair, as well as relieving dandruff and an irritated scalp when applied to the hair.(2) The unique eleostearic acid in the oil polymerises rapidly under UV light (sun) and forms a protective film. Therefore the oil may be used as a natural conditioner, without making the hair feel oily. As well as protecting the hair, the oil may be used to protect the skin from the sun. Its saponification and refitting agent makes the oil good for soaps as well. (1)



References

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Marula (*Sclerocarya birrea*)

Description and distribution

The marula tree is found throughout much of sub-Saharan tropical Africa. In Namibia it occurs in the northern parts of the country. The marula is drought resistant and found in open woodlands. It is related to the mango, and is a large, single-stemmed tree with a wide spreading crown. The marula is dioecious, having separate male and female trees, with the female tree being the one carrying the fruits. The fruit is the size of a golf ball, with leathery skin that is yellow when ripe. The pulp of the fruit is scented and juicy and surrounds a stone that contains two to three oil-rich seeds.



Harvesting and local use

The tree bears fruit between January and April/May. Most of the fruit ripen in February and March. Mainly women in the surrounding areas then gather under the tree and collect the fallen fruit. They squeeze out the juice to make marula wine. The remaining flesh is used to make juice for the children, while the seeds are removed and dried for a few months. During the dry season (June/July) the women extract the kernels from the seeds. These are then used to make their traditional condiment oil (ondjove) or sold to cosmetics enterprises that formulate and market a range of

skin and hair care products.

Marula Supply and value chain

Marula trees grow mainly on people's property rather than in open communal land. It was found that on average every farm had a ratio of 1:3 male to female trees. The ratio of young to old trees was 10:1, where young trees were still too small to bear fruit (therefore unable to determine if male or female) and old trees were too old to bear fruit. Therefore, the marula population seems sustainable. It was estimated that 85000 to 141000 tonnes of fruit are harvested in the producing areas in north-central Namibia.

There are currently no concerns for resource management, as the trees belong to the property owner where they grow. The harvesting is non-destructive and due to the commercialisation of the product the owners are more protective over the seedlings.

Uses and Properties

The marula fruit is used extensively in food and drinks by the local owners of the trees. The wine, specifically, is used in festivals during the harvest season. The cold pressed oil from the seed contains high levels of Oleic acid (70-78%) and Linoleic fatty acid as well as a relatively low level of Tocopherol content. The oil is easily absorbed, naturally softens, nourishes and revitalises the skin. It is high in antioxidants and has free radical scavenging properties. The oil is a lot more resistant to oxidation and rancidity than e.g., olive oil therefore making it a suitable ingredient in skin-care and cosmetic products. (1)

References

1. Indigenous Natural Products in Namibia
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3. <http://www.stillpure.co.za/body-products.html>

Mopane (*Colophospermum mopane*)

Description and Distribution

The mopane tree is common in many arid areas of southern Africa. It grows in hot, dry, low-lying areas in alkaline soil. They range from shrubs to tall trees, with distinctive butterfly-shaped leaves and kidney-shaped seeds. To adapt to the heat the leaves fold together during the hot afternoon hours and only open again in the late afternoon to photosynthesis. (1)



Harvesting

Until recently the mopane seeds have not had much use, unlike the rest of the tree. Now the seeds are collected between June and September, once the fruits have matured and dropped. Up to ten tons of seeds are collected annually. The seeds are then steam distilled to extract the essential oil. The seeds are high in crude protein, but animals do not generally eat them due to the resin found on the seeds which makes them unpalatable. This oil has antifungal, antiseptic, anti-inflammatory, antibiotic, diuretic and antimalarial properties.(1)

Products of mopane

The wood of the mopane is used as firewood, timber and making utensils. The bark is used for tanning and to produce rope. The tree also attracts a worm which is edible and highly nutritious. The mopane is also used traditionally for medicinal purposes, such as treating a sore eye, chafed inner thighs, stomach pains, and kidney stones. The leaves are traditionally used for disinfecting wounds and reducing bleeding by promoting clotting. The essential oil produced from the seeds, the leaves and the bark is high in crude proteins (reportedly to improve immune response, cell repair, help with blood cell formation and tissue repair), calcium, phosphorus and essential fatty acids. This oil is used in many cosmetic and skin-care products.(1) The oil also contains terpenoids which aid in the repellence of mosquitos. (2) (3)



References

1. Indigenous Natural Products in Namibia
2. <http://mukwatioils.com/products/turpentine-tree-oil/>
3. <http://desert-secrets.com/content/products/body-care>

Moringa (*Moringa oleifera*)

Description and Distribution

The *Moringa oleifera* is a fast growing, softwood tree. Its leaves are tripinnate and are dark green colour, and its small flowers are white or light pink. It produces tri-lobed, bean-like “pods” that are green when fresh and turn brown when they are dry and matured. The pods contain 15-20 seeds, which are generally black with white kernels. The tree is drought resistant with a tuberous tap root. (2)

This species should not be confused with the indigenous *Moringa ovalifolia*, a protected tree in Namibia.

Harvesting and Processing

When the moringa pods are dry the seeds are removed. The seeds are then cold pressed to produce the oil or the oil is extracted by solvent extraction. (1) Each seed yields around 35-40% oil.

Uses and Properties

The oil contains many essential fatty acids (Oleic acid and Behenic acid). Behenic acid helps with conditioning hair and smoothing skin. Behenic acid, however, can increase cholesterol levels as it is a saturated fat. Moringa oil contains high levels of Vitamin E, sterols (β -sitosterol, campesterol, stigmasterol) and anti-oxidants. The oil is said to help with dry skin and acne, add gloss to the skin. It may also be applied to scars, for fungal infections and is reportedly used in anti-aging creams. The oil is used in products such as skin moisturizers, hair oil, medicine for liver health, hysteria, rheumatic oil, and gum health.(1)



References:

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3. https://www.thebodyshop.co.za/search?CRAFT_CSRF_TOKEN=1_bDJXbVsMVylxMhq_~n905qo4JiB_AmAcRTxjlqR&q=moringa

Sarcocaulon (*Sarcocaulon* spp.)

Description and Distribution

The sarcocaulon plants are also known as Bushman's candle. They are semi-erect bushes with spiny branches and pink flowers. There are a number of species found in the western parts of South Africa, Namibia and Angola, on rocky hills and mountainsides. They have fleshy branches that are covered in waxy, translucent bark. (1)

Harvesting

When the plant dies it leaves behind the waxy bark, which is then collected. The bark can be processed using solvent extraction methods, and the resultant aromatic extract is used in cosmetic products. The harvesting process can only be done by registered and trained people to preserve the plant. The estimated annual yield of this bark is around 1.6 and 2 tonnes. (1)

References

1. Indigenous Natural Products in Namibia

Sour Plum (*Ximenia americana*)

Description and Distribution

There are eight *ximenia* species, two which occur in southern Africa, namely *X. americana* and *X. caffra*. (1)

Ximenia americana is a small, spiny, drought-resistant tree up to six meters tall, growing in savannahs, dry woodlands, forests, coastal areas and along river banks. *X. americana* has a blue-green appearance with purple-red branches, grey-green and white, yellow or pink flowers. The flowers usually appear from July to October. The fruits are plum-like, either yellow or speckled rose-red. (3)



Harvesting and Processing

The fruit of *X. americana* has a seed containing the oil rich kernel. The fruit should not be picked from the tree too early as this influences the quality of the kernel. Therefore, the harvesting takes place once the fruits have fallen from the tree. (4) The seeds are removed from the fruit flesh and the kernels are extracted with or without a decorticator, and pressed. (1) Each kernel yields 60-70% oil when pressed. (5)



Uses and Properties

The Ximenia oil is rich in Oleic acid (50%). This fatty acid penetrates the hair cuticle, making the hair shiny, soft and healthy. (2) The ximenynic acid in the oil has anti-aging effects as well as improving blood circulation/perfusion when applied to the skin. The oil is added to or applied as an emollient, conditioner, skin softener, body or hair oil, as well as in lipsticks and lubricants, soaps and vegetable butter. (1) The fruit is rich in vitamin C, the bark can be used to treat toothache, mouth infections and stomach ache.



References:

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