



Phytocosmetics in Africa

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Abstract

The demand for cosmetics from natural sources is increasing. It is attractive to the consumer market due to their functional benefits. The phytocosmetics market of toiletries, perfumes and cosmetics has grown in the world market. This article aims to focus on and examine the state of phytocosmetics in Africa (Fig. 1). A survey from United States showed growth in the use of herbs by adults for cosmetics use and for the treatment of medical conditions, at a rate of 3% – 12% – 21% in the years 1990 – 1997 – 2001 respectively.¹ It was reported² that 38 million people from US used herbal therapies. Development of cosmetics from Africa, from seed oils and their components, are attracting international companies with their marketing potential. The African beauty market is expected to double in the next decade with the rate of sales increasing up to a rate of 5 – 10 % of beauty care products. In Africa the per capita spending on cosmetics ranges from 10 – 20 times lower than in developed market, but Africans can look forward to a resurgence of phytocosmetic products and an increase of marketers who are interested in their future growth.

Keywords: Phytocosmetics, Africa, future market, beauty herbs

Introduction

Phytocosmetics are products of natural origin or containing natural ingredients from plants or algae. Natural components in phytocosmetics could be the extracts, essential or fixed oils or unorganized substances (such as, resins, waxes, fats, etc...) which are the active ingredients in the product. These formulations composed partially of synthetic ingredients, are primarily of vegetable origin according to Marçal.³ There is a trend to replace the synthetic oils with natural ones in pharmaceutical industries and cosmetics due to the toxic effects of the former.

The definition of natural ingredients is unclear or uncertain and is understood in two meanings: either a pure natural source and not chemically modified, or derived from natural or synthetic origin.⁴

Natural ingredients are totally derived from natural or organic sources with no synthetic compounds. This doesn't ensure that all natural oils are safe.

"Organic" ingredients are cultivated without the use of synthetic chemicals, pesticides or irradiation. There is no reported data substantiating that organic ingredients are better, cleaner or safer than synthetic ones. Rather, the ingredients themselves are good or bad. The type of skin and its susceptibility to be irritated, is another related consid-



Figure 1. Phytocosmetics in Africa

eration. Even the use of the term "organic content", could mean that synthetic ingredients may be included amongst the ingredients of the phytocosmetics. Therefore, the term "organic" doesn't necessarily apply to the entire formula. Some natural ingredients such as, peppermint, lavender, sandalwood, rosemary, eucalyptus, included in natural or organic products may cause irritation and break down of collagen and hurt the skin.⁵

Cosmetics are defined as perfumes and toiletries from nat-





Figure 2. Uses of natural cosmetics by Ancient Egyptians

ural or synthetic components used externally on human body, genital organs, mucous membranes, oral cavity, gums and teeth with the aim of cleaning or perfuming these parts to keep them in a good condition.⁶

Ancient Egyptian Uses of Plants in Beauty

As early as 4000 BC, ancient Egyptians used natural resources to produce cosmetics (Fig. 2). They used what was available in their environment. Examples of natural sources used by ancient Egyptians are:

- Henna, to stain the finger tips and toes.
- Kohl, to draw the eyes creating an almond-shape.
- Red Ocher used as lip color or rouge.
- Malachite, providing the green eye makeup color, and others.
- They ground minerals into powder and mix them with a carrier agent (as animal fat) to stay on the skin and to be easy applied.
- They used chalk and oils in combination to prepare a cream for cleaning of the skin.



Figure 3. Cosmetic jars used by Ancient Egyptians

Egypt one of the earliest civilizations on the earth is considered to be the home of cosmetics, gifted by gods. The purpose of cosmetics is not only enhance appearance, but also for medical benefits. On a ceremonial palette, from 3100 BC, ingredients used in cosmetics were presented in the grindings and mixings. Cosmetic jars of cleansing oils, used to remove or clean the eyeshades, lipsticks and mascara were found in the tomb of Pharaoh Thutmosis (Fig. 3). Brushes, made of *Salvadora persica* tree, were the most important tool used by Ancient Egyptians (Fig. 4).

They used “kohl”, as eyeliner, eye shadow, from green malachite, and mascara. These toiletries were used not only to make them beautiful but related to medical benefits, as they protect their eyes and skin from diseases. Also, ancient Egyptians used hair colors and oils containing heavy metals (as lead, copper, etc.) to protect them from bacterial infections.⁷

From 2000 BC, ancient Egyptians used containers made of alabaster, wood or ceramic for preservation of cosmetic powders. It was reported that the cosmetic powders consisted of chemical compounds such as, as Laurionite and Phosgenite, which are rare in nature.⁸ It thought that these latters (lead-based compounds) were artificial and would



Figure 4. Brush, the most important tool used by Ancient Egyptians

be synthesized using wet chemistry.

Ancient Egyptians were concerned about weight gain, hair condition and skin wrinkles. They used oil from natural sources — sesame, olive, bitter almond and cardamom — for moisturizing their skin. Henna was used for dying of hair, skin and fingernails. It was reported that Cleopatra used a bath of honey and milk to keep her skin youthful. A creamy oat-milk bath, containing frankincense oil, cedar wood oils and cocoa butter were used to create a bath for the queen. Rose water, bees wax and almond oil were used by Ancient Egyptians for preparation of cold cream. They bathed several times per day in water mixed with soda for their hygiene and improving personal appearance.⁹

Traditional Beauty Products Booming in Africa

The sales of personal care products have increased globally and reached around 12.7% to about \$2.35 billion.¹⁰ There has been a remarkable growth in natural cosmetic products sales worldwide through pharmacies, skincare clinics, retail outlets, and other sources.^{11,12}

The major markets of interest for natural and organic cosmetics are the consumers in North America and Europe. In South Africa, the non-timber forest products (NTFPs), which are the formal natural products trade, reached 12 million US dollars only per year.¹³ Their use is encouraged to renew the interest in natural beauty products to support the socio-economic impact.

Research and development (R&D) plays a crucial and important role in the manufacturing of plant-based cosmetics. Erborare is an ancient term explains the study of beneficial properties of the collected herbs from the fields. It is founded by l'Erbolario, Franco Bergamashi and his wife,

the cosmetologist, Daniela Villa. It is a quality control laboratory ensuring finished products with highly specified standards.

African Beauty Markets

The cosmetics market has significantly changed around the world in recent years to a significant increase in investment.

Brazil is the third largest perfumery producing country in personal care sector of cosmetics especially in South and Southeast area (locations). Over the past 18 years, the Brazilian cosmetics, toiletries, and perfumes industries showed increases in net income of sales of phytocosmetics from R\$ 4.9 billion in 1996 to R\$ 38 billion in 2013 which means an average growth of $\approx 10\%$.¹⁴

The industry of natural products (including cosmetics, pharmaceuticals, herbal medicines, food, beverages, etc ...) has increased enormously to 15–20% around 1 billion US dollars per year in the sales of natural cosmetics.¹² The income also increased 20.9% due to consumers inclinations towards natural cosmetics in order to avoid the side effects of some products containing chemical synthetic compounds.

Since ingredients in phytocosmetics are natural in composition as they are from plant origin, this makes it not only difficult, but impossible, to statistically specify the percentage market related to phytocosmetics companies. Consequently, absence of these statistical data on quantitative amount of natural components in cosmetic products results in an inability to measure the importance of these products adequately in the cosmetics industry and the economy of the country. Furthermore, many species and sub-products are invisible.¹⁵

Few studies deal with the current state of phytocosmetics industry in Africa and thus, there is little information available to identify the companies that produces phytocosmetics and work with manufacture of cosmetics, perfumery and personal hygiene. Local companies have little involvement in R&D or their intellectual property mechanisms not protected by patents.

The manufacturers of cosmetics, perfumes and toiletries are small; this may be due to financing, R&D, technical standards, relevant legislation to the market, and other similar reasons.

It was reported in 2012¹⁶ that South Africa and Nigeria were the biggest beauty markets in Africa, which were valued of \$3.4 billion and \$2 billion respectively.

In Kenya, consumption of natural cosmetics has been increasing since 2012, with the inclusion of natural ingredients such as jojoba oil, coconut oil, neem, aloe vera and shea butter in their beauty care products. Natural cosmetics sales reached \$178,000 by the end of 2013. The sales of deodorants are expected to grow annually by 5%.

According to WHO, Africans are high users of skin bleaching products in the following order, Nigeria 77%, Togo 59%, South Africa 35% and Mali 25%.

Antiageing products for Africans aim primarily at heal-

ing and minimizing dark spots and uneven complexions, which differs from the aims products for western women. The latter's primary aim is for reducing wrinkles. The makeup products for African markets also need to be more resistant to hot and humid weather.

Example of African Beauty Products from Plants

Many natural products, such as essential oils, natural dyes, resins, waxes, are of great potential in the industry of phytocosmetics.

According to Lubbe and Verpoorte,¹⁷ countries responsible for production of 43% of essential oils in the world are: Egypt, Spain, Italy, France, India, Bulgaria, Hungary, Morocco, Indonesia, and Turkey. The US produces 24%, China 20% and Brazil 8% in terms of volume.

The use of seed oils as natural alternative ingredients for cosmetics has increased. Seed oil production reached in 2004/2005, to 113 million metric tons. In 2008, the supply of seed oils was obtained from 15 plant species only¹⁸ out of half million species, especially those of interest in cosmetic industries.^{19, 20} The seed oils are rich in fatty acids which are of a great benefit to the skin.²¹ Among the fatty acids not synthesized in the body is the linoleic acid. Its deficiency may cause water loss from the epidermis of the skin, then dryness and scaling and it may cause cracking of nails and hair loss. This unsaturated fatty acid is the one most frequently used in cosmetic products. It moisturizes the skin and treats sunburns.

Oleic acid is the most effective unsaturated fatty acid as absorption enhancer,²² while palmitic acid is the most potent saturated fatty acid as skin permeation enhancer. These qualities encourage the use of seed oils as carriers or vehicles for other active ingredients.

Certain fixed oils are used as co-ingredients in cosmetic preparations as: avocado oil, almond oil, rapeseed oil, apricot kernel oil, sesame oil, sunflower oil, linseed oil and palm oil.¹⁷ Among traditional African beauty nutrients used for skin and hair care products the followings are presented:



Figure 5. *Schinziophyton rautaneii* (Mongongo)

Mongongo (Fig. 5)

Schinziophyton rautaneii (Schkinz) Radcl. Sm known formerly as *Ricinodendron rautanenii* Schkinz; Family Euphorbiaceae; Common name: Mungongo or Mongongo/Manketti. Its habitat is in wooded hills and deep sands. It is acclimatized to temperature ranges from -5°C in winter weather to over 40°C in summer;^{23, 24} The trees are deciduous, dioecious; the leaves are dark green; the flowers are small, whitish-yellow and flowering starting in October

till December. The fruits are egg-shaped, green, covered with small hairs. The young fruits ripen on the ground after their falling in the months of April and May giving the red-brown color and taste as sweet as dates. The seed consists of 70% of the fruit and has high percentage of lipids reaching 57% and 26% protein. It could be eaten either raw or roasted.^{23, 24}

The cold-pressed oil from Mongongo nut contains:

- **Vitamin E:** Acting as antioxidant and antiageing and rejuvenate skin.
- **Eleostearic acid:** Acting as a protector of hair fibers to give a shiny look and act also as protector for color - treated hair.
- **Zinc:** Acting as a natural sun care component.
- Mongongo (Manketti) seed oil consists of fatty acids as linoleic, oleic, palmitic, linolenic and erucic acids.



Figure 6. *Adansonia digitata* (Baobab)

Baobab: (Fig. 6)

Adansonia digitata L.; Family Malvaceae; common name: monkey bread tree, bottle tree, upside-down tree. It is indigenous to Madagascar. It is cultivated in South Africa and in many countries in the West and East. It takes from 8 – 23 years to produce seeds. Hot dry regions and low rainfall causes its slow growth. The trees are extremely large and deciduous with huge trunk, (height up to 25 m, and diameter from 10–12 m). The leaves are hand-shaped and present only three months/year. The flowers are pendulous and arise in October–December. The fruits are capsule, egg-shaped covered by velvety hairs, containing numerous seeds.^{27, 28, 29}

Baobab oil has been added recently as the fixed oil component in cosmetic preparations. It is an antioxidant, non-irritating, non-sensitizing, rich oil,²⁵ used for normal and dry skin, beside; it is highly penetrating and softens dry skin with no greasy residue. Hot oil soaks are also used for nail and hair conditioning. Its components are vitamins A and E, which are polyunsaturated fatty acids, causing rejuvenation and responsible for the renewal of cell membranes. Vitamin E is also among its components and is considered as the main antioxidant and responsible for the antiageing activity. There are essential fatty acids present in the plant of prominent effect. Palmitic and oleic acids are the major constituents. Oleic acid has remarkable antioxidant capacities. Linoleic acid acts to renew skin cells. Also, the presence of omega -3, -6, and -9 fatty acids act as

excellent moisturizers for dry skin, beside being effective in reducing eczema and psoriasis. β -sitosterol (about 80% of total sterols) is the major sterol present in seed oil beside campesterol (8.3%) and stigmasterol (2.9%). It is reported that the oil regenerates the epithelial tissues in a short time thus re-moisturises the epidermis and improves elasticity and tone of the skin.^{25, 26}



Figure 7. *Sclerocarya birrea* (Mafura)

Mafura: (Fig. 7)

Trichilia emetica Vahl; it is used throughout Africa for several centuries; Family Meliaceae; common name: Natal mahogany. The trees are evergreen, reaching 20m–35m in height. The leaves are dark, glossy green upper surface and brown hairs on lower surface. The flowers are small, creamy, pale yellowish-green in color with a fragrant odour. The fruit is reddish-brown in color rounded, furry capsules, with aril orange-red in color and flesh. The fruit contains from 3–6 black seeds. It grows in South Africa, Zimbabwe, Cameroon, Sudan and Uganda.³⁰ It is abundant along well-drained or high rainfall coastal areas.³¹

The seed oil content of this plant showed anti-inflammatory activity because of limonoids content (trichilin A). Its butter is used in the manufacturing of natural soaps³¹, candle making³² and for the treatment of leprosy in combination with *Cyathula natalensis* Sond³³; a nourishing, revitalizing effect on the skin and hair due to the presence of essential fatty acids. It has emollient effect when it is combined with coconut oil. It is included in make-up products. The oil of Mafura is rich in fatty acids as oleic and palmitic acids are in lower proportions.³² It is also used as skin permeation enhancer due to the presence of palmitic and oleic acids.²² It is a good antioxidant due to the presence of high proportion of oleic acids.³⁴



Figure 8. *Sclerocarya birrea* (Marula)

Marula: (Fig. 8)

Sclerocarya birrea (A. Rich) Hochst. Subsp. Caffra (Sond.) Kokwaro; Family Anacardiaceae. The trees are deciduous, leafless in winter and grow in sandy loam soil and various woodland. It flowers from September to November. The fruits are edible, yellow and oblong with a mucilaginous flesh juice.³⁶

In Namibia, Marula provides an income to many families, through fruit collection and processing, ranging up to US \$ 15 – 166/year. The oil of the seed kernel is an ideal for moisturizing skin products. It contains 75% oleic acid and also contains stearic and palmitic acids.

It is an excellent source of oleic acid which gives it effective antioxidant properties. The oil is comparable to olive oil in fatty acid composition, and the high content of oleic acid. When it is used in production of Cocoa butter it can be a benefit to cosmetic industries.²⁶ It is used for moisturizing the skin. It treats the skin hydration and reduces skin redness.³⁵



Figure 9. *Citrullus lanatus* (Kalahari)

Kalahari: (Fig. 9)

Citrullus lanatus (Thumb) Matsum. and Nakai; Family Cucurbitaceae; common name is Kalahari Tamma melon. It is indigenous to Namibia and Botswana. It can be either a wild or cultivated plant. It grows in Sudan and arises on river banks, drainage or disturbed areas or dry lakes. The herb is trailing up to 10m long. The leaves are broad. The flowers are yellow in color. The fruits are soft and fleshy, green or yellow. The wild fruits are smaller than the cultivated. They contain compressed, smooth seeds which are yellowish white or black in color.⁴¹⁻⁴³

The oil extraction from Kalahari melon is optimized by using supercritical fluid extraction method. By this method, the extracted oil is rich in Tocopherol, important as cosmetic ingredient, in comparison to traditional extraction methods.³⁷ Kalahari is an after-sun skin care products, used in South Africa to protect from sun and for moisturizing the skin. It is used traditionally in Namibia for preparing of soap. The seeds contain 35% protein and 50% oil which verify its use as a cosmetic and a nutritive agent. It is rich in essential fatty acids as linoleic, oleic and palmitic fatty acids³⁸ which help in restoring the elasticity and improving the skin. The tar left after extraction of oil from seeds is used in tanning formulations of skin and in treatment of various ailments as scabies.³⁹ It also contains

a high level of γ - and α -tocopherol which makes this oil with prominent antioxidant activity and enhances its potential use in the industry of cosmetic preparations.⁴⁰ It is also reported that its phytosterols content is β -sitosterol, which is considered as the key sterol followed by campesterol and stigmasterol.⁴⁰



Figure 10. *Ximenia americana* (Sour plum)

Ximenia americana L. (Fig. 10)

It is widely distributed in Africa; it belongs to Family Olacaceae; its common names are Sour plum or tallow wood, Cerise de mer, Kleinsuur pruim and others. The trees are small and thorny shrubs up to 7m high;⁴⁴ the leaves are small, pale grey-green, not pubescent. The flowers: are white, yellowish-green or pink in color, and they are fragrant. The fruits are oval and green in color when it is young and turns yellowish or orange red on ripening. It contains one woody seed of light yellow color and brittle shell. The flowering and fruiting occur throughout the year, is not controlled by climatic regime;⁴⁵ it grows at low altitude. Its habitat is varies from savannahs, dry woodlands, forests, to coastal areas and rivers.⁴⁵ The oil of Sour plum composed of the essential oils found in its flowers, bark and heart wood. Analysis of the components of the seed oil revealed the presence of oleic ximenic (hexacos – 17 - enoic), linoleic, linolenic and stearic acids as major components. Other components, in smaller quantities are: lumenic (triacont-21-enoic), ximenynic (octadec-11-en-9-ynoic), arachidonic, nervonic and erucic acids. Sour plum oil is characterized by the presence of very long chain fatty acids, which can reach up to 40 carbon atoms and is rarely found in nature.^{46,47} The plant is used medicinally for a various ailments, such as fever, toothache, angina, headache, skin problems and others. Also it is used as food because of vitamin C content. It is used in tanning of leather due to its tannin content; in cosmetics as emollient, conditioner, skin softener, and body and hair oil, in lipsticks ingredients and lubricant; in soap manufacturing and as vegetable butter.^{45,46} In general, it is beneficial for topical applications due to the presence of several long chain fatty acids (such as linolenic, linoleic, oleic and stearic acids). Ximenynic acid, which was formulated in market as Ximenoil®, improves the blood circulation after one hour, especially on cellulitis areas of very low blood perfusion.

Other Herbs Commonly Used in Cosmetics from African Origin:

Acacia senegal (L.) Willd. (Gum acacia); family Leguminosae, used as demulcent and skin protective agent in West and North Africa. *Aloe ferox* Mill. (Cape Aloe); family Xanthorrhoeaceae, is the most common species in South Africa. Its white gel is used in skin care products. *Centella asiatica* (L.) Urb.; family Apiacea; its main constituent is the ursane-type triterpene saponin, asiaticoside, which stimulate type I collagen synthesis in fibroblast cells.

Conclusion

It could be concluded that the African beauty market from phytocosmetics is expected to double in the future but it is still difficult to specify the statistical data related to phytocosmetics market. Also, many natural sources (terrestrial and marines) still need to be explored as natural cosmetics.

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Conflict of Interest

The author declare that there is no conflict of interest.

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