

Foundation of Anti-ageing and Skin Lightening Skincare Products

Nimal Punyasiri

Institute of Biochemistry, Molecular Biology and Biotechnology, University of Colombo

The use of natural-based cosmetic active ingredients is on the rise worldwide, particularly in anti-aging and skin lightening (brightening) skin care cosmetics. The bulk of the world's aging population seeks anti-aging cosmetics that are derived from nature. As a result, there is a surge in demand for natural components to make anti-aging treatments. Asian, African, and other dark-skinned people, on the other hand, are looking for cosmetics to help them acquire lighter complexion.

The PI of this project did some study in this area and was able to provide a leaflet to the public outlining the dangers of mercury-containing creams. As a result, formulating highly effective skin lightening skincare with natural ingredients may be critical.

The world demand for cosmetics is expanding year after year, and the market is growing at an exponential rate. Cosmetics market was estimated to be \$380.2 billion in 2019, and is predicted to enhance at a rate 5.3% from 2021 to 2027, to achieve \$463.5 billion by 2027. The exponential expansion of the worldwide cosmetic market is depicted in Figure 1. (<https://www.alliedmarketresearch.com/cosmetics-market>).

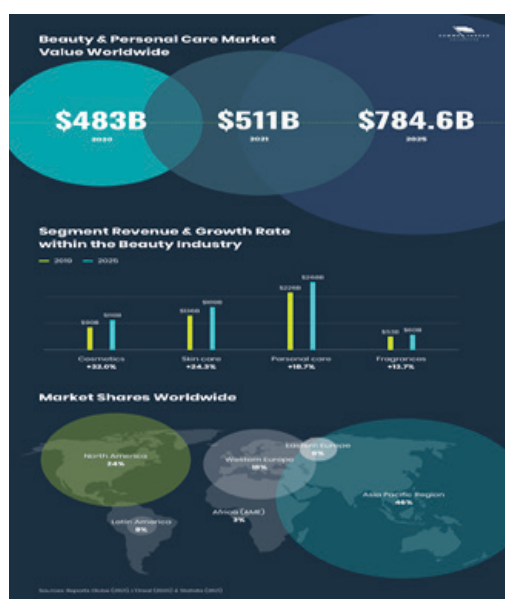


Figure 1: (Source -<https://commonthreadco.com/blogs/coachs-corner/beauty-industry-cosmetics-marketing-e-commerce>)

The world demand and value for nature-based cosmetics is estimated to increase by two-fold from 2018 to 2027 to around 553.5 billion USD, indicating global preference for nature-based and organic cosmetics (Figure 2)

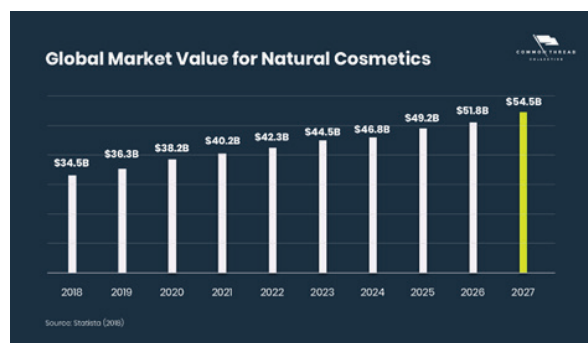


Figure 2: (Source - <https://www.alliedmarketresearch.com/cosmetics-market>).

As per one of the major leading cosmetic producers, the demand for cosmetics has not been diminished even during the COVID-19 pandemic which affected the markets in late 2020. The rise of the middle and upper classes, as well as the increasing number of old citizens and other people on the lookout for items that match their various targets are driving the lasting perspectives (<https://www.loreal-finance.com/en/annual-report-2020/cosmetics-market-2-1-0/>)

Anti-aging and skin-brightening skin care products are among the most in-demand cosmetics. The following four factors, according to market researchers, are contributing to the global skincare products market's growth:

- Mounting need for anti-aging cosmetics
- Growing need for skin lightening skincare
- Ever increasing requirement for natural and organic cosmetics
- High demand for men's skin care cosmetics

Skin ageing can be intrinsic, or age-related and genetically determined, or extrinsic, or photoaging, which is caused by external factors such as UV

exposure, which causes oxidative stress and the creation of reactive oxygen species. This could cause elastin, collagen, and hyaluronic acid degradation, as well as melanin production, resulting in wrinkles, creases, and uneven skin pigmentation.

This is because UV light can stimulate the development of enzymes such as elastase, collagenase, and hyaluronidase, which destroy the molecules essential for photoaging reduction. A person's self-esteem and confidence may be lowered as a result of aging and damaged skin. As a result, many synthetic skin care products are widely available and in high demand; however, the toxic substances used in these products may have other negative consequences, and certain products may cause diseases such as cancer. As a result, scientists are researching the skin-enhancing qualities of natural-source compounds, which may have fewer side effects and other advantages. Hence, the most effective anti-aging treatments would be to inhibit the key enzymes elastase, collagenase, and hyaluronidase, which might be accomplished with plant extracts.

In the same manner inhibition of tyrosinase activity, which is the most prominent enzyme in the biosynthesis of melanin. This could be used to enhance skin lightening (brightening) and reduction of melanin synthesis. Inhibitory effects of tyrosinase are shown by many plant species.

Melanin, a pigment, is primarily responsible for skin color. Melanin is made by melanocytes during a

process known as melanogenesis. The difference in skin color between people who are lightly pigmented and those who are darkly pigmented is attributable to their level of melanocyte activity.

Melanogenesis is the process of synthesizing melanin, imparts colour to human skin, eyes, and hair. Tyrosinase, in particular, is a crucial enzyme that catalyzes a rate-limiting step in melanin formation, and inhibiting tyrosinase is the most common technique for developing melanogenesis inhibitors. As a result, various tyrosinase inhibitors have been produced in recent years. Tyrosinase is an oxidoreductase that is significant in medicine and cosmetics because hyperpigmentation is caused by excessive melanin production. The search for new and effective tyrosinase inhibitors has been going on for a long time.

By studying the enzymological data from assays on anti-ageing, anti-collagenase, anti-elastase, anti-hyaluronidase, and anti-tyrosinase activities of plants, a fresh set of skincare products (Anti-ageing and Skin Lightening creams, body lotions, and facial cleansers) can be developed. The plant extracts could be screened using these assays to identify them as possible cosmetic ingredients.

In addition, the plant species could also be quantified for secondary metabolites where flavonoids are of paramount importance imparting anti-ageing and skin lightening to plant extracts. The quantification of the flavonoids, mainly Flavone (Apigenin & Luteolin),

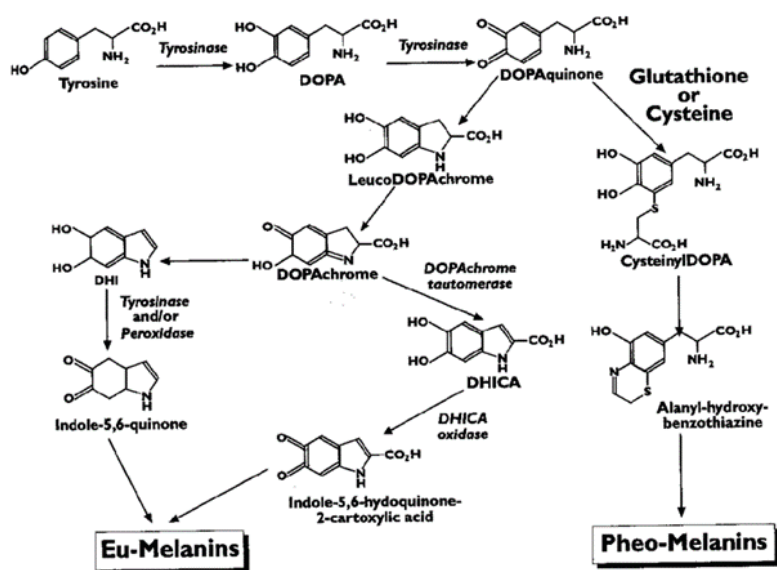


Figure 3: Melanin Biosynthetic Pathway – note the first 2 steps involving Tyrosinase

Flavonols (Quercetin, Kaempferol, Myricetin), Flavanols (all the catechins) and Anthocyanidins (Cyanidin, Delphinidin, Pelargonidin, Malvidin, Peonidin, Petunidin), is done by High Performance Liquid Chromatography (HPLC) and Liquid Chromatography – Tandem Mass Spectrometry (LC-MS/MS).

Enzymological screening for anti-collagenase, anti-elastase, anti-hyaluronidase, and anti-tyrosinase activity is required for any researcher looking for new plant species with anti-ageing and skin lightening potential.

Most essential, the selected plant species' sustainability should be preserved without allowing

their natural habitats to be abused. Following the identification of the plant species, a propagation method (tissue culture, cell culture, etc.) is developed in consultation with experts in the field of agriculture / plant breeders, etc.

There is no doubt that the universal market for nature-based and organic cosmetics products is rising and developing, with a forecasted value of USD 15.98 billion by 2020. To enhance the presence and percentage of natural skincare and cosmetic goods on the global market, North American and international enterprises are conducting strategic activities from now through 2027. Rather than synthetic products.

Prof Nimal Punyasiri obtained his GIC qualification from the College of Chemical Sciences, Institute of Chemistry Ceylon and received a Postgraduate Diploma in Advanced Biochemistry and Phd in Biochemistry from the University of Peradeniya. He has served at the Tea Research Institute of Sri Lanka, Industrial Technology Institute, Nature's Beauty Creations Ltd, and currently serves as Professor and Chair of Biochemistry at the Institute of Biochemistry, Molecular Biology & Biotechnology (IBMBB), University of Colombo.