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Guest Editorial

Phytochemicals and phyto-extracts in cosmetics

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Phytochemicals are generally secondary metabolites produced by plants, and they often possess various biological and pharmacological properties, which have long been exploited to find new drug molecules for the treatment of human ailments. However, because of the properties like antioxidant, emollient and antimicrobial, and also as a colour and fragrance, some of the phytochemicals are used in a number of cosmetic products available to date (Kole et al., 2005; Angerhofer, 2011). Cosmetics, intended to be applied externally, can be described as substances or products used to enhance or alter the appearance or odour of the body. These are the products that can be applied to the face (*e.g.*, skin-care creams, lipsticks, eye and facial makeup), to the body (*e.g.*, deodorants, lotions, powders, perfumes, bath oils, bath salts and body butters), to the hands and nails (*e.g.*, fingernail and to nail polish and hand sanitizer), to the hair (*e.g.*, permanent chemicals, hair colours, hair sprays and gels) (Dudhe and Rothe, 2017). In recent years, inclusion of phytochemicals, as purified compounds or extracts, has become rather fashionable, which has led to a significant increase in popularity and demands for cosmetic products that contain phytochemicals (sometimes referred to as phytocosmetics or natural cosmetics).

Commercially, many plant extracts, both lipophilic and hydrophilic, are available for inclusion in cosmetic products, but if a plant extract is intended to be used in cosmetic products, it is important to choose appropriate solvent for extraction to ensure the presence of the desired active phytochemicals in the extract. For example, both lipophilic and hydrophilic extracts of chamomile, which is an excellent skin-care ingredient, are available in the market, but the active ingredients in its lipophilic and hydrophilic extracts will be considerably different. Therefore, in this particular case, the choice of the extract will depend on the cosmetic product to be formulated. Similarly, if the intention is to use the highly antioxidant polyphenols, especially catechins from green or black tea in the cosmetic products, particularly in anti-ageing products, the use of any lipophilic extract of tea will completely be useless, as there will be no or a little polar polyphenols present in the lipophilic extract. It can be noted that catechins bind collagen, contribute to reduction of *trans*-epidermal water loss (TEWL), increase skin firmness and have overall antioxidative and anti-ageing properties. In fact, most popular cosmetic products that use phyto-extracts or phytochemicals, are skin-care products, and generally aimed at offering defence against oxidative damage of skin, and prevention or slowing down of ageing process. The skin is a vital organ of the body. Skin-ageing happens mainly due to intrinsic factors, but significantly influenced by extrinsic factors, *e.g.*, to pollution, chemicals and UV radiation. Subjecting the skin to these extrinsic factors may damage the epidermis leading to accelerated skin ageing. Among the phytochemicals that are popular in cosmetic industries producing various anti-ageing products include several natural antioxidants, *e.g.*, curcumin, resveratrol, epicatechin, ellagic acid and the flavone, apigenin (Nagi et al., 2000; Reuter et al., 2010; Ribeiro et al., 2015), which are capable of reducing the physiological symptoms of ageing by counteracting reactive oxygen species (ROS), protecting and stimulating matrix-associated proteins, absorbing UV radiations, and maintaining the water-balance in the skin. However, one of the most common adverse effects that may arise from these ingredients is allergic reactions, ranging from itching, rash and inflammation. Many phytochemicals, *e.g.*, phenolic compounds and mono- and sesqui-terpenes, or phyto-extracts, *e.g.*,

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Castanea sativa, are also added to skin-care cosmetic products because of their antimicrobial properties (Ribeiro et al., 2015).

It is not only the main plant products that are used in cosmetics, there are several by-products of plant origins, rind and pith from Agave, pulp and seed core from Apple, outer bracts, receptacles and stems from Artichoke, and so on, have found their way to cosmetic industries (Barbulova et al., 2015). However, like any other chemicals, plant extracts containing phytochemicals may also have various harmful effects, and must be considered carefully when used in cosmetics.

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