Paper Mulberry Extract: A New Approach to Skin Whitening

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Abstract

Skin whitening products are commercially available for cosmetic purposes in order to obtain a lighter skin appearance. They are also utilised for clinical treatment of pigmentary disorders such as melasma or post inflammatory hyperpigmentation. Whitening agents act at various levels of melanin production in the skin. Many of them are known as competitive inhibitors of tyrosinase, the key enzyme in melanogenesis. Others inhibit the maturation of this enzyme or the transport of pigment granules (melanosomes) from melanocytes to surrounding keratinocytes. In this review we present an overview of *Morus alba L.* (white mulberry) that may decrease skin pigmentation by their interference with the pigmentary processes.

Introduction

Skin whitening refers to the practice of using chemical substances in an attempt to lighten skin tone or provide an even skin complexion by lessening the concentration of melanin. Skin whitening is a term used for lightening the complexion of the skin through artificial means such as creams, lotions, soaps and injections. In recent years, skin whitening products have become and continue to be the best selling skin care products in Asia. Several materials such as arbutin, kojic acid and its derivatives were developed for the treatment of hyperpigmentary disorders. However, a variation in clinical effect of these materials is usually found. Some of the depigmenting agents will produce a toxic effect. For this reason, new whitening agents free from harmful side-effects are in great demand within the market. Recently, safe and effective tyrosinase inhibitors extracted from natural sources have been reported for their potential applications in improving hyperpigmented disorders. For example, the extracts from *Glycyrrihiza glabra* (liquorice), *Morus alba L.* (white mulberry), *Carthanus tinctorius L.* (safflower), *Arctostaphylos uva-ursi* (bearberry), camomile flowers and *Oryza sativa* (rice bran) have been used as skin whitening agents. These materials are mostly free from harmful side-effects. For this reason, there is an increasing interest in finding natural tyrosinase inhibitors from natural sources. Additionally, an attempt to search for substitute materials with multifunctional activities in melanogenic inhibition is warranted since the synergistic effects of each activity may be taking place.

Colouration of the Skin[1]

Normal skin colour is the expression of a combination of three pigments: melanin, carotene and haemoglobin. Melanin is a brown-black pigment produced in the melanocytes of the *stratum basale* as depicted in Figure 1 next page. All individuals of a similar size have approximately the same number of melanocytes but the amount of melanin produced and the distribution of the melanin determine racial variations in skin colour, such as black, brown, yellow and white.

Melanin protects the basal layer against the damaging effect of the ultraviolet (UV) rays of the sun. A gradual exposure to sunlight promotes the increased production of melanin within the melanocytes and hence tanning of the skin. The skin of a person with albinism has the normal number of melanocytes in the epidermis but lacks the enzyme tyrosinase that converts the amino acid tyrosine to melanin. Albinism is a hereditary condition. Other genetic expressions of melanocytes are more common than albinism. Freckles, for example, are caused by aggregated patches of melanin. A lack of melanocytes in localised areas of the skin causes distinct white spots in the condition called vitiligo. After the age of 50, brown plaque like growths, called seborrheic hyperkeratoses, may appear on the skin, particularly on exposed portions. Commonly called 'liver spots', these pigmented patches are benign growths of pigment-producing melanocytes. Usually no treatment is required, unless for cosmetic purposes.

Haemoglobin is not a pigment of the skin; rather, it is the oxygen-binding pigment found in red blood cells. Oxygenated blood flowing through the dermis gives the skin its pinkish tones.