Pomegranate Flower Complex a Novel Anti-ageing Active

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Abstract

This multi-active complex based on pomegranate flowers was developed to address the growing demand for botanical-based anti-ageing actives. It is a multi-functional active designed to reduce the visible signs of ageing by increasing skin density and decreasing the appearance of wrinkles. Skin ageing is the result of two processes, intrinsic or chronological ageing and extrinsic ageing, which is due to environmental factors, the most important being exposure to UV. It is the balance between these two processes which plays a crucial role in the process of skin ageing. Environmental factors acting on the skin and genetically-determined processes cause an increase in collagen breakdown and at the same time a reduction in the synthesis of new collagen, which results in the increased appearance of wrinkles. One of the enzymes responsible for the breakdown of collagen is matrix metalloproteinase 1 (MMP-1). It was demonstrated that an extract of pomegranate flowers (PGFE) reduced MMP-1 mRNA gene expression in UVA irradiated and non-irradiated primary human dermal fibroblasts. The pomegranate flower extract (PGFE) was then combined with sodium ascorbyl phosphate (SAP), a derivative of vitamin C and a well-known antioxidant and collagen booster, into a single product (PGFE/SAP). The combined product (PGFE/SAP) was shown both to successfully promote collagen synthesis and to inhibit its breakdown resulting in measurably and visibly reduced depth of facial wrinkles and increase in skin density.

Introduction

Today's understanding of skin ageing describes two processes - intrinsic and extrinsic skin ageing. In both cases there is an imbalance between collagen breakdown and collagen synthesis which, in the long term favours collagen breakdown.

Dermal fibroblasts play a significant role in these processes and produce both the components of the extracellular matrix (ECM) and the enzymes responsible for its breakdown and restructuring [1]. The main components of extracellular matrix are collagen and elastin fibres. Among other things they provide structure, softness and elasticity to the skin and absorb mechanical stresses [1]. Matrix metalloproteinases (MMP) possess endopeptidase activity and are also responsible for the breakdown and modelling of the ECM. There are more than 20 different known types of MMP [2]. For the investigations into MMPs in skin ageing processes, MMP-1, MMP-3 and MMP-9 are of interest because they induce the breakdown of collagen.

Intrinsic or chronological skin ageing is based on genetically determined loss in the skin's ability to regenerate. Literature discusses three mechanisms responsible for this, continuous metabolic stress-induced reactive oxygen species (ROS), telomere shortening and changes in hormone balance [5,8]. The number of dermal fibroblasts drops, collagen breakdown increases and at the same time collagen synthesis decreases. Unlike extrinsic skin ageing, the thickness of the skin is reduced and small, fine lines are formed [5,8].

Skin ageing caused by external influences is called extrinsic skin ageing. Extrinsic factors such as radiation, physical and mental stress, alcohol and nicotine, environmental toxins or poor nutrition lead to greater MMP production while at the same time reducing collagen synthesis [4,5]. Among the ageing factors named, UV irradiation plays a major role. Photoageing, as it is known, describes the process of skin ageing caused by UV irradiation. UVB irradiation with a wavelength of 315 nm – 280 nm acts on the epidermis and damages the DNA of keratinocytes and melanocytes [5]. The longer-wave UVA irradiation (380nm - 315nm) also damages the epidermis but also penetrates into the dermis beneath. Here it acts on fibroblasts disturbing the synthesis of collagen and encourageing its breakdown [5]. In addition ROS are generated which are also evoked by the extrinsic ageing factors mentioned above [4,6,8]. A thickening of the skin, even a leathery appearance, counts among the signs of extrinsic skin ageing together with pigmentation spots and the formation of deep wrinkles [4]. In particular areas of the skin affected are those which are continually exposed to the sun such as the face, the lower part of the neck/upper chest, the nape of the neck, hands and forearms. Wrinkles caused by solar irradiation and facial expressions develop particularly on the forehead (worry and frown lines), around the eyes (crow's feet) and around the mouth.

The common factors in both types of ageing are the effects of ROS and an increase in collagen breakdown coupled with a reduction of collagen synthesis. These common factors are

11-19 Cosmetochem.indd 11 19/04/2013 12:52