Detoxification Benefits of Citrus Paradisi – A Natural Active Ingredient

Author: Maria Lueder, Qenax AG, Zug, Switzerland

Keywords: Grapefruit, *Citrus paradisi*, Detoxification, Anti-Glycation, Bioflavonoids, Naringin, Hesperidin

Abstract

The grapefruit is not a subspecies of the pummelo, as believed by mistake but an accidental hybrid between the pummelo and the orange[1]. The botanical name has been altered and is now generally accepted as *Citrus X paradisi.*

Grapefruits, well known to consumers due to their common use, have been happily used in the cosmetic field as a symbol for healthy freshness. However, studies could quickly prove that grapefruits are not only good for the body as fruit but also as basis for cosmetic ingredients.

Grapefruit juice, applied on the skin, vitalises and provides an auroral complexion. Hesperetin and naringenin, the aglycones of the flavanone glycosides hesperidin and naringin, naturally occur in grapefruit. They exert interesting pharmacological properties such as antioxidant, anti-inflammatory, blood lipid and cholesterol lowering properties[2]. Hesperetin, respectively the aglycone hesperidin and naringenin protect the DNA and induce the formation of phase I and phase II enzymes that provide detoxifying properties to toxins and chemicals[3].

In a new publication a *Citrus paradisi* extract was tested on adipocytes. It significantly reduces a precursor of advanced glycation end products in adipocytes[4] which enforces the use in so called Anti-Glycation Creams and Lotions to prevent this reaction in the skin.

Introduction

Citrus fruits are commonly used in commercial juice preparations for human consumption. Fruits from the citrus species are widely used in traditional medicine, reflecting the particularly high abundance of bioactive compounds in the peel of the fruit. Citrus fruits contain a wide variety of phytochemicals. The biological action of these flavonoids is possibly linked to their interactions with key regulatory enzymes involved in cell activation and receptor binding[5]. In addition, these flavonoids function as antioxidants. Polyphenols such as the flavonoids may be regarded as xenobiotics by animal cells and are known to interact with the phase I and phase II enzyme systems. It has also been shown that flavonoids modulate the expression of glutathione, an important enzyme in both cellular antioxidant defenses and detoxification of xenobiotics[6]. One important task for cellular glutathione is to scavenge free radicals and peroxides produced during normal cellular respiration, which would otherwise oxidise proteins, lipids and nucleic acids (Figure 1, on page 2).

One mechanism operating to counteract oxidative damage involves transactivation of genes encoding enzymes that participate in glutathione metabolism and synthesis. Typically, these enzymes belong to the phase I and II families of detoxification genes[6]. The skin continuously accumulates a variety of endogenous and exogenous metabolites through both routine metabolism and environmental exposure. Without prompt detoxification, these compounds can accelerate the ageing process (Figure 2 on page 2)[7].

The natural defence mechanisms of the skin cells are centred on detoxifying phase I and phase II enzymes that transform the waste molecules prior to excretion from the cell [8]. Phase I and phase II enzymes may be either constitutively expressed or inducible.

Importantly, certain environmental and nutritional agents have been found to influence the induction and activities of specific phase I and phase II enzymes. In these studies, phase I