The Antioxidant Activity of Olive Leaf Extract and its Anti-Inflammatory Effect

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Introduction

Eurol BT is an active ingredient for cosmetic and cosmeceutical applications that is a 100% natural aqueous extract derived from olive tree leaves. Eurol BT is endowed with very interesting properties that mainly rely on its free radical scavenging action (1). The concept of using olive tree leaves arose from the observation that the olive trees are not only amongst the most ancient plants in the world but also are resistant to a variety of diseases. More specifically, when a leaf falls from the tree it remains green for a long time, revealing the presence of a highly potent and protective anti-oxidant activity.

Eurol BT is a water-based extract that contains bio-polyphenols and bioflavonoid compounds that synergistically operate to provide a biological action. Oleuropein is the predominant molecule found in Eurol BT. It consists of a glucosidic form of the ester formed by elenolic acid and diihydroxyphenylethanol and its two OH groups, placed in position 3 and 4 towards the ethoxylic chain. The position of the two hydroxyls determines particular resonance conditions that stabilise the intermediate radical, through an intra molecular hydrogen-bound. (2,3).

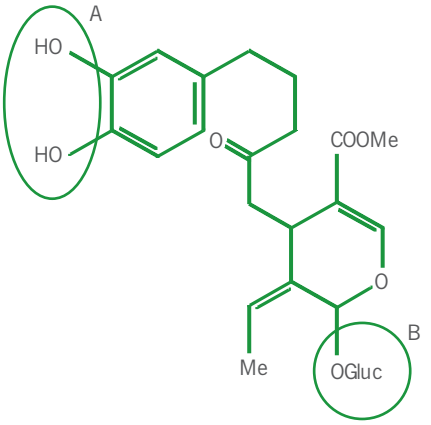

Figure 1. Oleuropein molecular structure

In this structure we can notice two parts performing different activities: the di-phenolic part (A) is responsible for the free radical scavenging action, while the glucosidic part (B) is responsible for water solubility. Oleuropein may be defined as a chemical exception in nature, in fact the glucosidic bound is usually a very feeble one, impossible to keep safe in the extraction process, whilst in this case we are able to maintain exactly the same structure that we find in nature.

The benefits of Eurol BT as an active cosmetic ingredient are described below. Other advantages of Eurol BT as an active ingredient come from its excellent safety profile (LD_{50} not detectable) and its easy use in formulation due to its complete water solubility. Eurol BT is endowed with numerous applications and we will focus here on its anti-oxidant and anti-inflammatory properties.

Protection against the oxidation of polyunsaturated fatty acids

The aim of this test is to evaluate the anti-oxydant action of Eurol BT towards plasma lipoproteins by dosing the peroxidation of polyunsaturated fatty acids (PUFA) submitted to an oxidative stress (4) induced by copper salts. Briefly, samples of plasma lipoproteins were incubated overnight in the presence of 6 mM $CuSO_4$ to trigger the oxidation reaction. The rate of PUFA oxidation was assessed for samples pre-incubated in the presence, or the absence, of Eurol BT at a final concentration of 0.01% and 0.1%. The anti-oxidant action of Eurol BT was verified for linolenic acid (C18:3), arachidonic (C20:4), eicosapentaenoic acid (EPA) (C20:5) and docohexaenoic acid (DHA) (C22:6). At the end of incubation, samples were immediately submitted to extraction of fatty acids from proteins and the former analysed by HPLC (Pecosphere column CR C18 8.3 cm x 4.6 mm, and using a linear gradient with solvents: methanol and solution acetonitrile/water 50/50). Results showing the extent of the $CuSO_4$ oxidation and the protection in the presence of Eurol BT are shown in Figures 2 and 3.