

## The Fate of Olive Oil Secoiridoids in the Gastrointestinal Tract

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Bioavailability studies in animals and humans administered Virgin Olive Oil (VOO) have demonstrated that hydroxytyrosol is absorbed and excreted in urine as a response to the intake of VOO as well as to intake of oily and aqueous preparations. Studies on the bioavailability of secoiridoids have not been performed except for oleuropein<sup>1</sup> that was shown to be not absorbed in the small intestine. However, oleuropein aglycones, with a higher lipophilicity than oleuropein, may be present in plasma after their ingestion. The aglycones 3,4-DHPEA-EDA and 3,4-DHPEA-EA are present in a particularly high concentration in extra VOO. 3,4-DHPEA-EDA may be present in olive oil at a concentration up to 780 mg/L and 3,4-DHPEA-EA in a concentration up to 160 mg/L<sup>2</sup>.

The aim of this study was to investigate the absorption, subsequent biotransformation and potential modification of the main phenol found in VOO, the 3,4-DHPEA-EDA, in the gastrointestinal tract. This phenol have shown important antioxidant activity and protective effects against cell injury *in vitro*<sup>3</sup>, but their biological properties *in vivo* will depend on the extent of their absorption and metabolism. In particular we focused in its absorption and metabolism in the small intestine. Transport and metabolism experiments were conducted using the *in vitro* intestinal preparation of Fisher and Gardner<sup>4,5</sup> and for all transcellular transport studies Caco-2 cells were used.

<sup>1</sup>Corona *et al.* (2006) *Free Radical Research*, **40**: 647-658.

<sup>2</sup>Brenes *et al.* (2001) *J. Agric. Food Chem.*, **49**: 5609-5614.

<sup>3</sup>Paiva-Martins *et al* (2009) *Mol. Nutr. Food Res.* **53**, in Press.

<sup>4</sup>Fisher *et al.* (1974) *J. Physiol.* **241**:211–234.

<sup>5</sup>Spencer *et al.*(1999) *FEBS Lett.* **458**:224–230.