

# **Lutein bioavailability from lutein ester-fortified fermented milk: in vivo and in vitro study.**

Granado-Lorencio F., Herrero-Barbudo C., Olmedilla-Alonso B., Blanco-Navarro I., Perez-Sacristán B.  
Unidad de Vitaminas, Servicio de Bioquímica Clínica, Hospital Universitario Puerta de Hierro, 28035-Madrid, Spain.

## **Abstract**

We assessed the bioavailability of lutein from lutein-fortified fermented milk using in vivo and in vitro approaches. Twenty-four volunteers were randomized to take lutein-fortified fermented milk at two levels of fortification. Single-dose bioavailability study (2x100 ml, ca. 8 or 16 mg of lutein) was performed using a three-point approach (baseline, 3.5 and 6.5 h). Multiple-dose study consisted of consuming one serving/day (ca. 4 or 8 mg/100 ml) for 14 days. Blood samples for biochemical, hematological and lutein analysis were drawn at baseline, Day 7 and Day 14. In vitro bioaccessibility was assessed by a static gastrointestinal digestion model. Lutein content, in vitro ester hydrolysis and micellarization, and lutein concentrations achieved in serum were analyzed by HPLC. In vivo, post-prandial response was higher using the high content fermented milk, but the percentage of absorption was not different according to the dose consumed. Net increments at Day 7 and Day 14 were significantly higher on consuming the high-dose milk as well. In vitro, lutein ester hydrolysis was incomplete regardless of the amount initially present. Free lutein released was higher using the high-dose fermented milk, but the percentage of hydrolysis was similar at both levels of fortification. In the micellar phase, the percentage of free and total lutein was not different according to the dose. Our results support the suitability of the fermented milk as a carrier of lutein esters and an in vivo dose-dependent effect upon regular consumption and suggest the usefulness of in vitro models to provide relevant information to predict in vivo responses.