PLASMA LEVELS OF CLA ISOMERS AFTER SINGLE ORAL ADMINISTRATION OF TONALIN OIL TO RATS

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Background and Objectives:
The two principal CLA isomers: Rumenic acid (RA: C18:2 c9, t11), found to be associated with anti-carcinogenic, anti-atherogenic, antioxidative and immune system stimulation, and the C18:2 t10, c12 isomer related with reduction of body fat activities, are present within a concentration of 80g/100g oil and a 1:1 ratio in the synthetic commercially available Tonalin TG-80 oil. Previous data from animal experiments stated that the effective dose in humans to obtain healthy biological effects could be between 3-6 g CLA/day. However, no data are available on the absorption, distribution and elimination characteristics of the Tonalin oil. The aim of this study was to characterize the absorption grade of CLA isomers administered intragastrically as a single dose in rats.

Methods:
Tonalin oil was administered orally by gavage (3000 mg/kg bw) which correspond to 1200 mg of C18:2 cis9, trans11/kg bw and 1200 mg C18:2 trans10, cis12/kg bw to male Wistar rats (n=60). Serial blood samples were collected after oral administration (15 min, 30 min, 1h, 2h, 4h, 6h, 8h, 12h, 24h, 48h). Four animals were assigned to the control group for characterization of the basal fatty acid composition. Plasma concentrations of the two active conjugated linoleic acid isomers were determined by GC/MS after direct transmethylation process of the samples.

Results:

The plasmatic levels of the CLA isomers: RA and C18:2 t10, c12 after oral administration of Tonalin oil is shown in Fig.1. Palmitic acid (C16) was the major compound with 1850 μg/mL plasma, together with stearic acid (C18) with 665 μg/mL of the saturated fatty acids fraction (SFA). Among the monounsaturated fatty acids (MUFA); oleic (C18:1 c9) was in a concentration of 520 μg/mL while in the polyunsaturated fatty acid fraction (PUFA), the amounts of linoleic acid (C18:2 c9, c12) and arachidonic acid (C20:4 AA) were 1096 and 436 μg/mL plasma respectively. The CLA isomers: RA and C18:2 t10, c12 were not detected in the control group. In the experimental group both CLA isomers were rapidly and partially absorbed (Fig.2). These two fatty acids were detected in plasma after 15 minutes but absorption was compound specific: 0.61 μg RA/mL and 0.03 μg C18:2 trans 10, cis 12/mL. The maximum concentration for both isomers was registered at 2h after Tonalin oil administration reaching a value of about 7 μg/mL. Concentrations decreased from the maximum concentration until the end of the assayed time (48h) where amounts below 0.6 μg/mL were detected.

Conclusions:
The present study showed that after oral administration of Tonalin oil, low concentrations of the active CLA isomers (C18:2 cis9, trans11 and C18:2 trans10, cis12) reached the blood circulation intact. CLA isomers plasma disposition and characteristics should be considered in choosing regimens dosage that maximize efficacy of Tonalin oil for the use in functional food and dietary supplements.

Keywords: CLA isomers, Oral absorption, Plasma concentrations.

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