



Abstract

Gastric Lipase and Cholesterol Esterase in the INFOGEST Model: Evaluation of Sterol Bioaccessibility in Plant Sterol-Enriched Wholemeal Rye Bread [†]

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Abstract: The effect of the incorporation of key enzymes of the lipidic metabolism to the INFOGEST (Improving health properties of food by sharing the knowledge on the digestive process) digestion method on plant sterol (PS) bioaccessibility is evaluated in a PS-enriched wholemeal rye bread. The assayed conditions were: (i) INFOGEST method; (ii) INFOGEST+gastric lipase (GL) (60 U/mL gastric digesta); and (iii) INFOGEST+GL+cholesterol esterase (CE) (0.075 U/mL intestinal digesta). The contents of PSs were determined in bioaccessible fractions after saponification and derivatization into trimethylsilyl ethers and were then analyzed by gas chromatography-mass spectrometry (for identification purposes) and gas chromatography-flame ionization detection (for quantification). The identified PSs from the PS-ingredient and rye flour were: campesterol, campestanol, stigmasterol, b-sitosterol, sitostanol, D5-avenasterol, D5,24-stigmastadienol, D7-stigmasterol and D7-avenasterol. The incorporation of the lipidic enzymes slightly reduced the bioaccessibility of the total (from 23.2 to 17.6–18.2%) and individual PS (from 22.6–57.7 to 17.3–44%). In addition, no differences in bioaccessibility were detected when GL or GL+CE were used. The largest bioaccessibility values were shown for D5-avenasterol and D7-avenasterol, regardless of the conditions assayed. In conclusion, the use of GL and CE means a closer approach to *in vivo* conditions, and we propose their inclusion in the INFOGEST model for the evaluation of the bioaccessibility of sterols and other lipid bioactive compounds.

Keywords: enzymes of lipid metabolism; simulated gastrointestinal digestion; plant sterols; solid matrix

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