The influence of galactooligosaccharide addition to a plant sterol-enriched beverage upon plant sterol colonic metabolization: A clinical trial

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Introduction

The consumption of milk-based fruit beverages enriched with plant sterols (PS) has previously showed a cholesterol-lowering effect in postmenopausal women [1]. The addition of galactooligosaccharides (GOS) to this kind of beverages could enhance their functionality, however, its effect on the colonic metabolism of PS is yet unknown.

Objective

To evaluate the impact of GOS addition to a PS-enriched milk-based fruit beverage on colonic metabolism of PS.

Methodology

Beverages

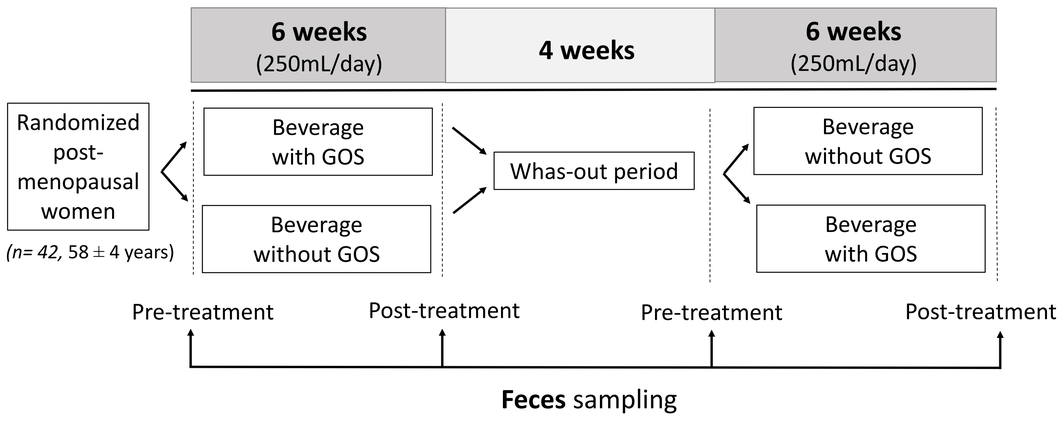
Skimmed milk | Fruit juice | **PS (0.8%, w/v)**

Without **GOS**

With **GOS** (1.7%, w/v)

Clinical trial (NCT03469518)

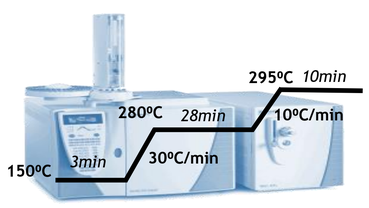
- Randomized, double blind, crossover study



Determination of PS and metabolites [2]

Freeze-dry feces Equivalent to 125 mg fresh feces

Reconstitution with water (5 mL)



Saponification → Unsaponifiable extraction → Derivatization → Sterol quantification GC-MS

100 µL feces + 20 µg 5α-cholestane + 1 mL KOH 0.71M (65ºC/1 h)

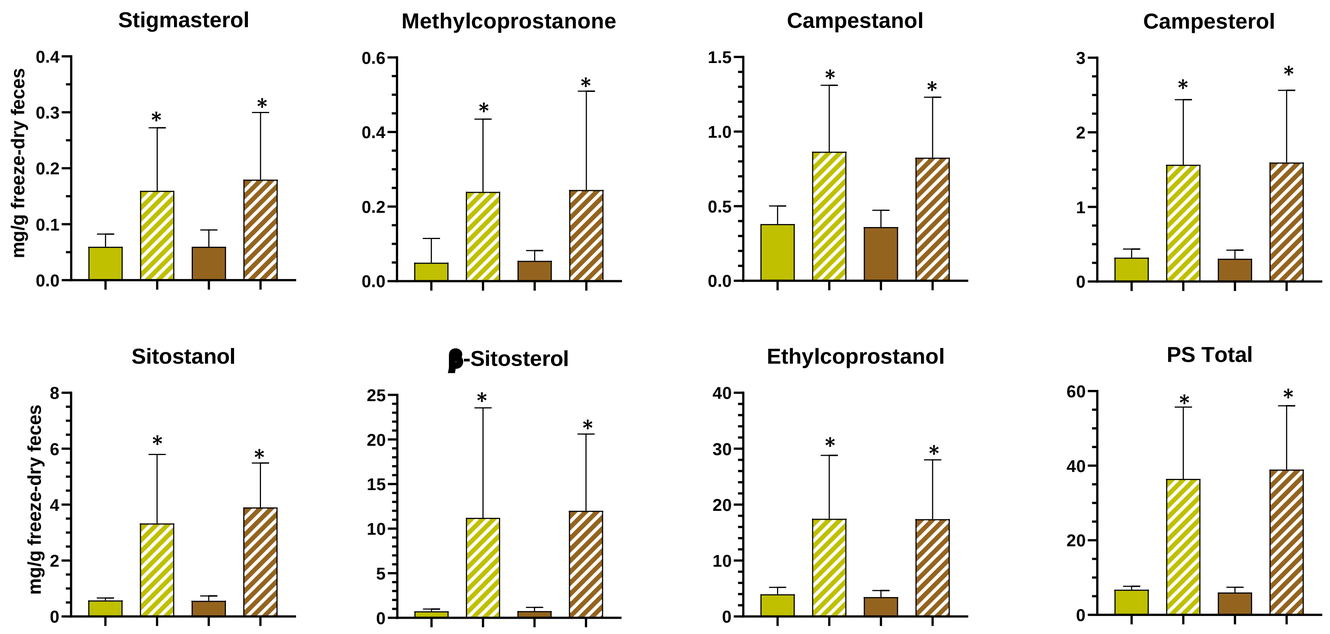
Whases with hexane and centrifugation (18ºC/ 3600 rpm/10 min)

Pyridine:BSTFA+1%TMCS (10:3) (65ºC/ 1 h)

CP-Sil8 CB (50m x 25 mm x 0.25 µm); carrier: H_2 (1 mL/min)

Results

Fecal PS and metabolite contents after regular consumption of the beverages



Data are expressed as median with interquartile range. *Significant differences ($p < 0.05$) in the same kind of beverage among pre-treatment and post-treatment values

Statistically significant increments in sterol concentrations with respect to pre-treatment contents were observed after the consumption of any of the beverages (post-treatment without or with GOS addition): increases of 15- or 16-fold for β-sitosterol, 4- or 5-fold for ethylcoprostanol, 6- or 7-fold for sitostanol, 5-fold for campesterol and methylcoprostanone, 2-fold for campestanol, and 3-fold for stigmasterol. However, no significant changes were observed in ethylcoprostenol contents after the consumption of the beverages. Significant increases were observed in total PS after the intake of both beverages (post-treatment) with respect pre-treatment values (36.49 vs. 6.77 and 6.01 *vs*. 38.99, for the beverage without and with GOS, respectively). No significant differences between beverages were detected for individual or total PS contents.

Conclusions

The results of the present work indicate that the presence of GOS in PS-enriched beverages does not modify the colonic biotransformation of PS.

Acknowledgements

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References

[1] Alvarez-Sala et al. (2018), Food Funct., 91: 5209-5219; [2] Cuevas-Tena et al. (2019), Clin. Nutr., 38:1549-1560.