Strawberry yogurt incorporation effects on the phytochemical composition

Ana Oliveira[1]; Elisabete Alexandre[1]; Marta Coelho[1]; Manuela Pintado[1], Domingos P. F. Almeida[2,3]

[1]CBQF, Esc. Sup. Biotecnologia, Rua Dr. António Bernardino de Almeida, 4200-072 Porto, Portugal
[2]Faculdade de Ciências, Universidade do Porto, Rua do Campo Alegre, 687, 4169-007, Porto, Portugal
[3]Frulact, S.A., Rua do Outeiro, 589, 4475-150 Gemunde, Maia, Portugal

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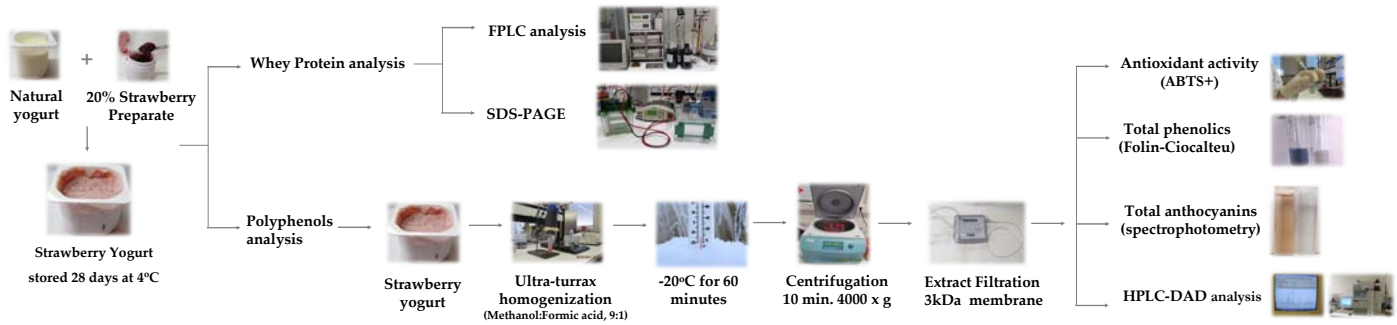
Introduction

Yoghurt is often combined with fruit to create value-added products. Strawberry preparates are the leading fruit used in European fruit yoghurts. Interactions of plant phenolics with proteins may lead to the formation of soluble or insoluble complexes formed by the interaction of polyphenols with exposed hydrophobic and preferably planar aminoacid side chains. These interactions may have a detrimental effect on the *in vivo* bioavailability of both phenolics and proteins.

Objectives

The aims of this study were (i) to evaluate the protein fingerprints of yogurt before and after the addition of strawberry preparate, and (ii) to evaluate the antioxidant properties and fruit phytochemical availability in the final fruit yoghurt.

Methods



Results & Discussion

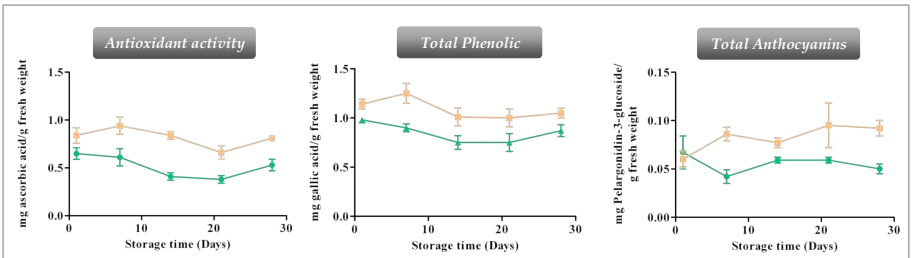


Figure 1. Total phenolic compounds and antioxidant activity of strawberry preparate incorporated into yogurt and stored 28 days at 4ºC.
— Control (strawberry preparate) and —Strawberry preparate incorpored into yogurt.

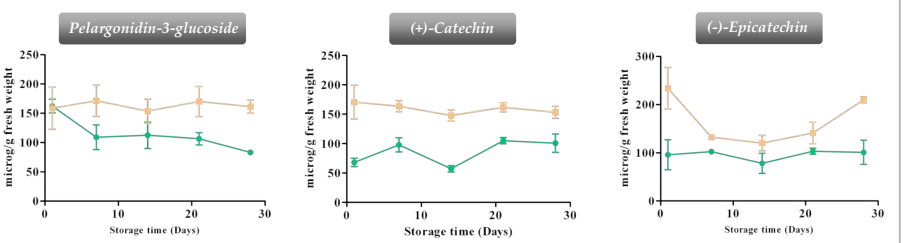


Figure 2. Compounds detected by HPLC-DAD that registered more variations when strawberry was incorpored in yogurt and stored 28 days at 4ºC. — Control (strawberry preparate) and — Strawberry preparete incorpored into yogurt.

FPLC analysis

Table 1. Yoghurt whey proteins analysed by FPLC. Control is natural yogurt without fruit and strawberry yogurt.

	α- lactoalbumin		β-lactoglobulin	
Days	Control (mg/mL)	Strawberry Yogurt (mg/mL)	Control (mg/mL)	Strawberry Yogurt (mg/mL)
0	0.179	0.119	ND	ND
7	0.244	0.122	ND	ND
14	0.176	0.108	ND	ND
21	0.177	0.142	ND	ND
28	0.163	0.062	ND	ND

ND-Not detected.

SDS-PAGE

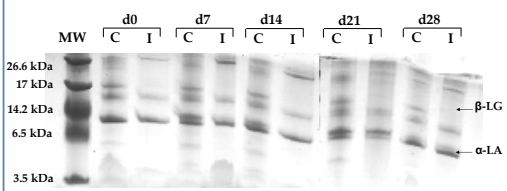


Figure 3. Whey proteins analyzed by SDS-PAGE in yogurt stored at 4ºC. C-control yogurt and I-strawberry yogurt at days 0, 7, 14, 21 and 28.

- Total antioxidant activity, total phenolics and total anthocyanins of strawberry preparate decrease respectively 18%, 11% and 25% at the end of yogurt shelf-life.
- Pelargonidin-3-glucoside, (+)-catechin and (-)-epicatechin decrease significantly when strawberry preparate is incorporated into yogurt when compared with control (48, 34 and 51%, respectively, at the end of shelf-life).
- α-Lactalbumin descreased by 62% at the end of shelf-life of strawberry yoghurt in relation to natural yoghurt. β-Lactoglobulin was not detected
- SDS-PAGE demonstrate a decrease in α-lactalbumin and a complete disappearance of β-lactoglobulin.

Conclusions

- Pronounced reductions were observed in pelargonidin-3-glucoside, (+)-catechin and (-)-epicatechin and the whey protein β-lactoglobulin.
- The reductions in polpyphenols and whey proteins are indicative of complexes formation and losses in their activities.

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