AGE-RELATED GASTROINTESTINAL ALTERATIONS AFFECT ADIPOLYSIS INDUCED BY DAIRY AND HYBRID HIGH-PROTEIN YOGURTS IN DIFFERENTIATED 3T3-L1 ADIPOCYTES

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INTRODUCTION

The partial replacement of animal-derived ingredients with plant-based ingredients can represent interesting alternatives in the process of transitioning to a more sustainable diet. This replacement can impact the products' fatty acid profile, nutritional quality indexes and adipolysis. This study compared adipolysis in *in vitro* cellular models of high-protein dairy-based and hybrid yogurts after in vitro gastrointestinal digestion under conditions that simulate digestion in adults and elderly people.

MATERIAL AND METHODS

Dairy and hybrid yogurts, with 50% replacement of dairy protein by almond protein, were evaluated for fatty acids profile, nutritional quality indexes and adipolysis (Figure 1). The effect of treatments on the fatty acid profile and nutritional quality indexes was evaluated by one-way ANOVA. The effect of treatments, digestive conditions, and the interactions of these factors on adipolysis was evaluated by factorial ANOVA.

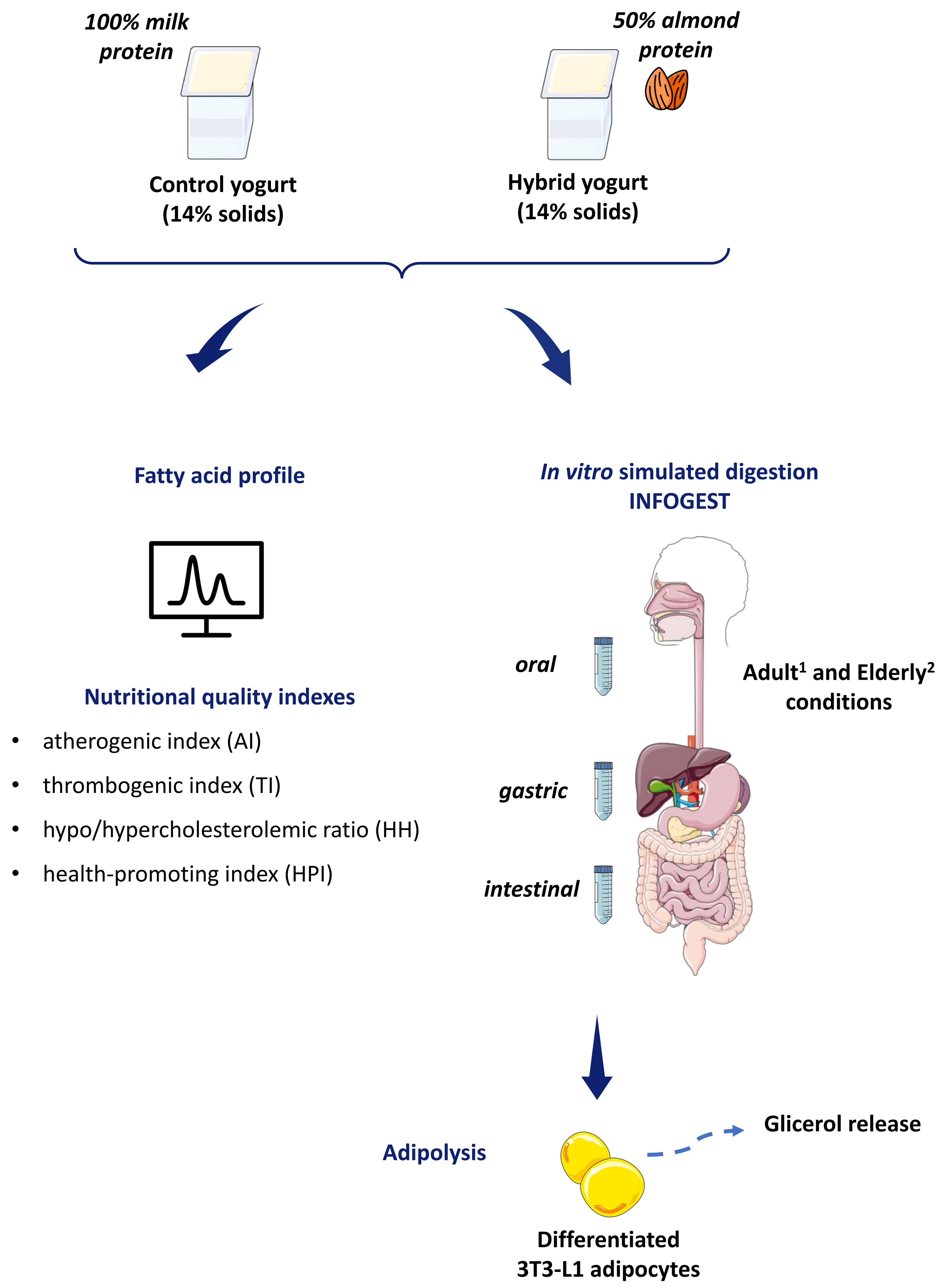

Figure 1. General scheme used to evaulate control and hybrid yogurts.

[1]Brodkorb et al. *Nature Protocols*, v. 14, p. 991-1014, 2019.
[2]Menard et al. *Food & Function*, v. 14, p. 4569, 2023.

RESULTS

Hybrid yogurts had lower AI and TI and higher HH and HPI, suggesting that the partial replacement of dairy protein with almond protein affected nutritional quality indexes (Table 1).

Table 1. Fatty acids profile of control and hybrid yogurts and their nutritional quality indexes.

	Control	Hybrid
C4	0.22 ± 0.03	n.d
C6	0.27 ± 0.01	n.d
C8	0.18 ± 0.02	n.d
C10	0.41 ± 0.05[a]	0.15 ± 0.00[b]
C11	0.75 ± 0.28[a]	0.53 ± 0.33[a]
C12	0.63 ± 0.02[a]	0.29 ± 0.07[b]
C14	2.57 ± 0.02[a]	1.01 ± 0.00[b]
C14:1	0.40 ± 0.02[a]	0.21 ± 0.01[b]
C15	0.34 ± 0.01[a]	0.17 ± 0.01[b]
C16	8.89 ± 0.30[a]	3.90 ± 0.08[b]
C16:1 c9	0.45 ± 0.01[a]	0.43 ± 0.02[a]
C18	3.41 ± 0.12[a]	1.44 ± 0.01[b]
C18:1 t9	0.67 ± 0.03[a]	0.28 ± 0.01[b]
C18:1 c9	6.05 ± 0.17[b]	6.56 ± 0.12[a]
C18:1c11	n.d	0.17 ± 0.02
C18:2	0.46 ± 0.02[b]	1.60 ± 0.05[a]
C20	1.15 ± 0.03[a]	0.75 ± 0.08[b]
C20:1	0.38 ± 0.01[a]	0.21 ± 0.02[b]
Nutritional Quality Indexes		
AI	2.36 ± 0.00[a]	0.87 ± 0.01[b]
TI	3.45 ± 0.00[a]	1.10 ± 0.00[b]
HH	0.63 ± 0.00[b]	1.72 ± 0.01[a]
HPI	0.42 ± 0.00[b]	1.15 ± 0.02[a]

No significant difference was observed in the release of glycerol between the control and hybrid yogurts, which indicates that the yogurts did not show a significant difference in triglyceride accumulation in differentiated 3T3-L1 adipocytes after digestion. On the other hand, lower glycerol release was observed in conditions that simulate the digestion of elderly people (Figure 2).

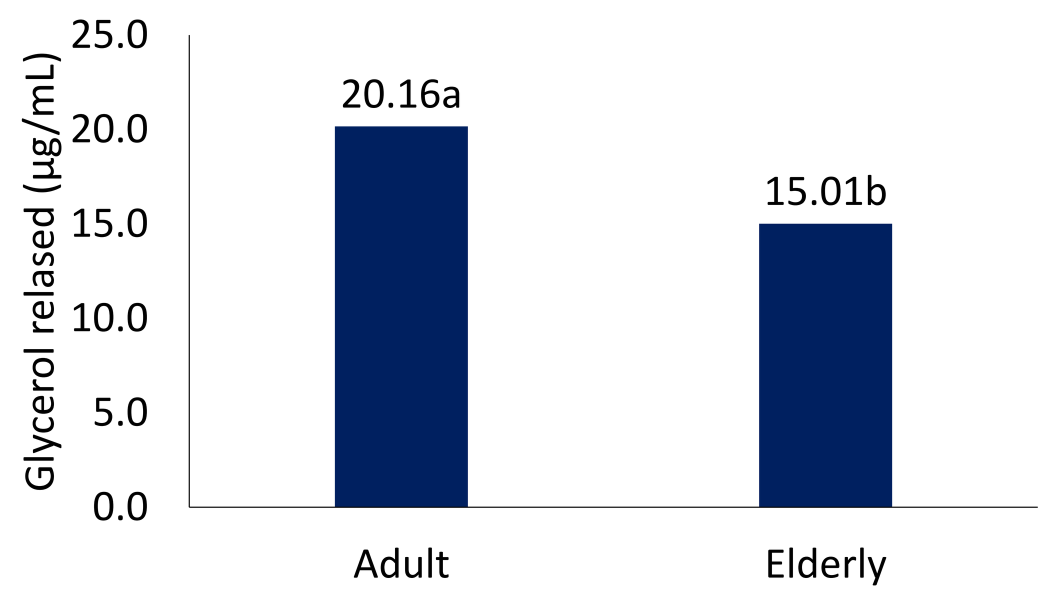

Figure 2. Effect of age-related gastrointestinal alterations on adipolysis.

CONCLUSIONS

These results suggest that nutritional quality indexes obtained from fatty acid profiles are not directly associated with the prevention or modulation of obesity. Furthermore, digestive conditions must be considered when designing healthier products for specific age groups

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