Saliva Improves *in vitro* Protein Digestion of Buriti-containing Yoghurt

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Background

Buriti (*Mauritia flexuosa*) is an under-utilized Amazonian fruit with a high content in phenolic compounds. Polyphenols have health benefits but they may also hinder protein digestibility. However, salivary proteins might counteract this negative effect through binding to polyphenols (Morzel et al., 2022). The objective of this work was to describe the impact of saliva on protein digestion of yoghurt containing buriti.

Materials and methods

1- Buriti fruit → Buriti Flour → Water extraction.
Impact of polyphenol extract at 1.66 mg (GAE)/ml on pepsin and trypsin activity
Extract included in commercial saliva (Lee Biosolutions ®) at a concentration of 0.05 or 0.5 mg (GAE)/ml and measurement of particle size distribution by laser diffraction (Mastersizer)

2- Plain yoghurt +/- buriti flour (3:1 w/w) submitted to the INFOGEST static *in vitro* model of human digestion (Brodkorb et al., 2019) with modifications.
Oral phase: 5g of food + 5g of simulated salivary fluid (ionic solution) or human saliva.
Gastric / intestinal phases with pepsin and pancreatin, respectively: 60 min-long each.
Evaluation of proteolysis by OPA measurement (accessible NH_2 groups) in digestates sampled at 5, 15, 30 and 60 min of gastric and intestinal phases.

Interactions between buriti extract and saliva: particle sizes

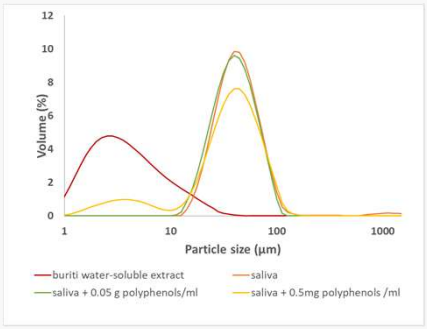

Figure 1. Particle size distribution in the buriti extract and the mixtures saliva + buriti extract

- No detectable impact of the buriti extract on larger particles in saliva.
- Saliva increases slightly the size of the smallest particles in the buriti extract (peak at 3.4 vs 4.0 µm): binding of small salivary proteins to polyphenols?

Impact of buriti extract or flour on proteolysis

♦ No significant effect of buriti extract on pepsin or trypsin activity (data not shown).

♦ gastro-intestinal proteolysis of buriti flour-containing yoghurt :

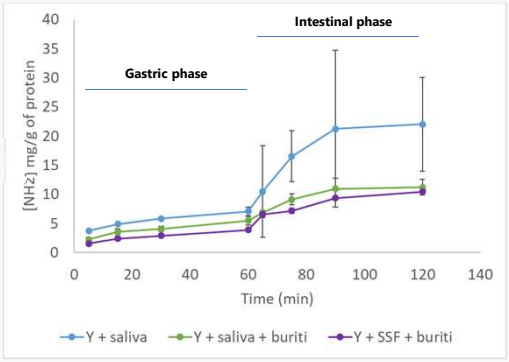

Figure 2. Release of accessible NH_2 groups during gastro-intestinal digestion of yoghurt (Y) in presence of saliva, saliva and buriti flour, or simulated salivary fluid (SSF) and buriti flour. Mean (n=3) ± SEM.

Proteolysis was overall significantly ($p<0.05$) lower in buriti-containing yoghurts.

The presence of saliva instead of SSF during digestion of buriti-containing yoghurt increased slightly the digestive proteolysis, both in the gastric and intestinal phase. This effect was significant ($p<0.05$) in the gastric phase.

Conclusions / perspectives

Although the water-soluble extract of buriti exhibited no significant effect on pepsin or trypsin activity, buriti flour decreased overall gastro-intestinal proteolysis.

Compared to SSF, **saliva** improved **protein gastric digestion** of yoghurt containing buriti flour, but it is unclear whether this occurred through binding of salivary proteins to polyphenols. Further investigations are required.

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References ***1***: Morzel M, Canon F & Guyot S. 2022. Interactions between salivary proteins and dietary polyphenols: potential consequences on gastro-intestinal events. Journal of Agricultural and Food Chemistry, 70: 6317−6327 ***2***: Brodkorb et al. 2019. INFOGEST static in vitro simulation of gastrointestinal food digestion. Nat Protoc 14: 991–1014