BIOLOGICAL POTENTIAL COMPARISON OF AMAZONIAN OILS AND THEIR STRUCTURED LIPIDS FORMED AFTER ENZYMATIC INTERESTERIFICATION

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Abstract

Many Amazonian oils a have high biological potential that are poorly explored. This work investigates the antioxidant potential of buriti oil (BO.), murumuru fat (MF.), the blend of these lipids (BL.) and structured lipids produced with these oils through enzymatic interesterification reaction, performed at 40°C for 24 hours under constant agitation, using TL-IM® lipase (SL-TL.), Rhizopus sp. Lipase (SL-RH.) and the two lipases concurrently (SL-TL/RH.). The content of β-carotene, α-tocopherol and total phenolics were analyzed. The antioxidant potential was analyzed by DPPH and ORAC method. The MTT assay tested the samples citotoxicity. The structured lipids kept the β-carotene content of the buriti oil. The antioxidant activity of these lipids was superior or equal to the blend. The samples showed low cytotoxicity to concentrations lower than 1mg/ml.

Key words: Amazonian oils, Interesterification, Antioxidant Activity.

Introduction

The biotechnological process of enzymatic interesterification produces structured lipids through the exchange of fatty acids on the glycerol molecule without generating trans fats. This process occurs at low temperatures, maximizing the retention of bioactive compounds. Enzymatic interesterification of buriti oil, which is rich in β-caroteno, and murumuru fat that has high content of medium and low chain saturated fatty acids and has low acidity, produces structured lipids with different physicalchemical characteristics from the original lipids. This research investigates the antioxidant potential and the content of bioactive compounds of these Amazonian oils, their blend and their structured lipids produced with different lipases (TL-IM® lipase, Rhizopus sp. lipase and TL-IM® lipase with Rhizopus sp lipase).

Results and Discussion

The SL-TL., SL-RH. and SL-TL/RH. presented β-carotene content statistically similar to BO.. The α-tocopherol and phenolic compounds content of SL-TL., SL-RH. and SL-TL/RH. were statistically similar to the BL., indicating that the enzymatic interesterification process is mild and does not destroys the bioactive compounds completely. The SL-TL/RH. showed higher antioxidant potential than the BL. at DPPH assay, all the other structured lipids (SL-TL. and SL-RH.) had antioxidant potential statistically similar to the BL. At the ORAC assay, the antioxidant potential of SL-TL. and SL-RH. was superior to the BL. and statistically similar to BO.. The SL-TL/RH. showed antioxidant potential statistically similar to the BL. The samples showed low toxicity at concentrations lower than to 1 mg/ml evaluated by MTT assay.

Conclusions

The lipases blend did not show positive synergest, thus, the SL-TL. and SL-RH. had a better results than the SL-TL/RH. in the ORAC assay. The three structured lipid showed performance equal or superior to the blend in the analysis, indicating that the enzymatic interesterification reaction retains or enhances the potential antioxidant and the content of bioactive compounds.

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