IECN 2024 Conference

The 4th International Electronic Conference on Nutrients

16–18 October 2024 | Online

MDPI

Antioxidant Capacity of Hydrolysates from Macauba (*Acrocomia aculeata*) Kernel Protein Isolate Produced Under Different Conditions

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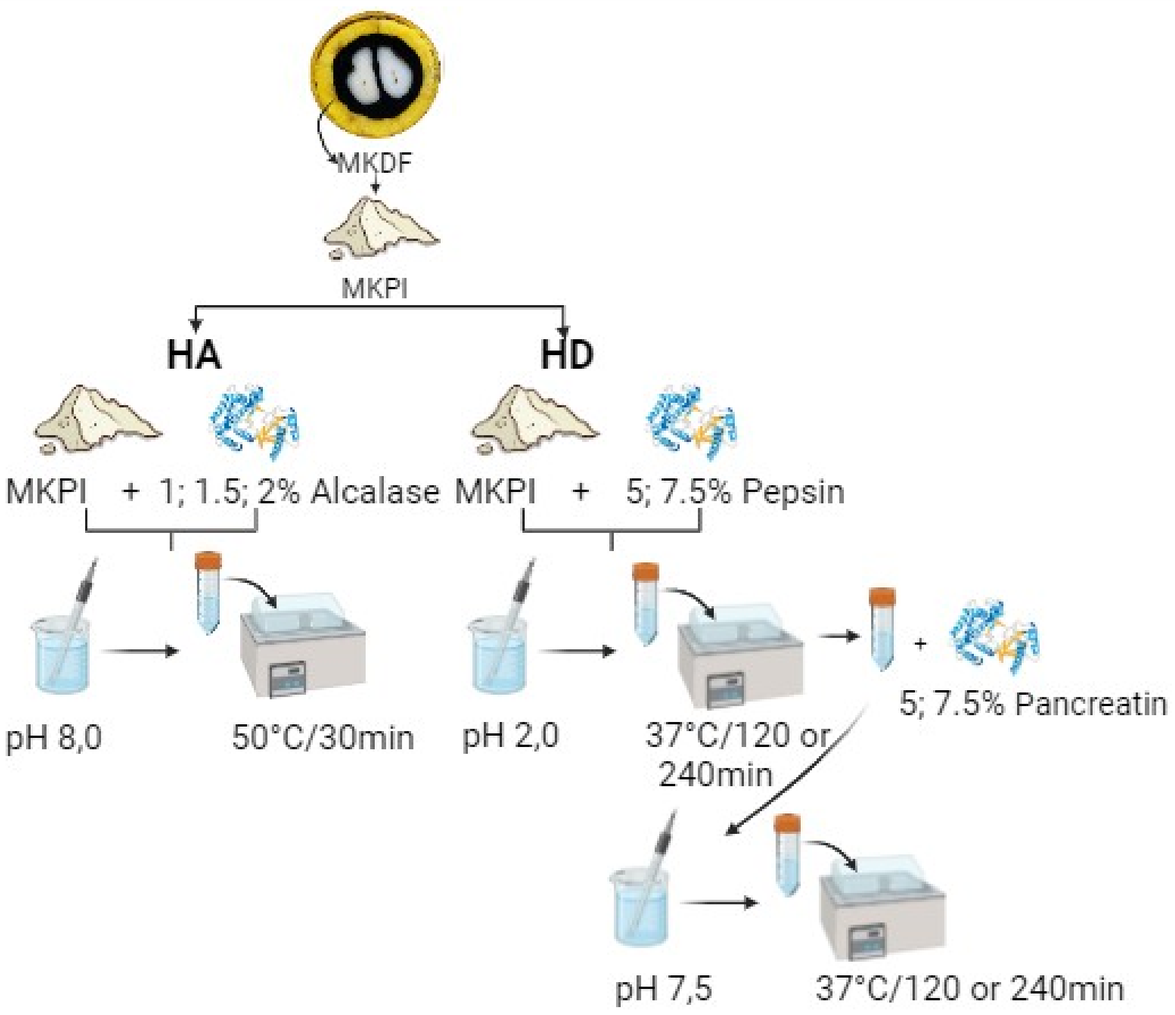
INTRODUCTION & AIM

Protein hydrolysates are the product of protein hydrolysis by enzymes, which in addition to improving the physicochemical properties of proteins, leads to the generation of bioactive peptides. Peptides extracted from food proteins have attracted much attention due to their special physiological functions, such as antioxidant, hypoglycemic and antibacterial activity. The choice of enzymes and hydrolysis conditions are crucial in producing biologically active peptides, and suitable proteases can exert maximum biological activity. Many factors have stimulated the search for protein, such as population growth, increased global meat consumption, demographic changes and the popularity of protein-rich diets, so changing the basis of the diet from animal proteins to plant proteins provides beneficial results for both public health and the environment. Macauba (*Acrocomia aculeata*) is a palm native to the tropical regions of the Americas and its kernel has high nutritional value, rich in oil, dietary fiber and protein. Macauba has great potential for use by the food industry, so research is needed to develop processes and products to promote its use in food formulations as a potential source of protein and bioactive peptides with both tecno-functional and biological properties. This study aimed to obtain hydrolysates from macauba kernel protein isolate (MKPI) using different enzymes and hydrolysis conditions and evaluate their antioxidant capacity.

METHOD



The protein profile of the hydrolysates was determined by SDS-PAGE, and antioxidant capacity was assessed using the ABTS method, with MKPI as a control.

RESULTS & DISCUSSION

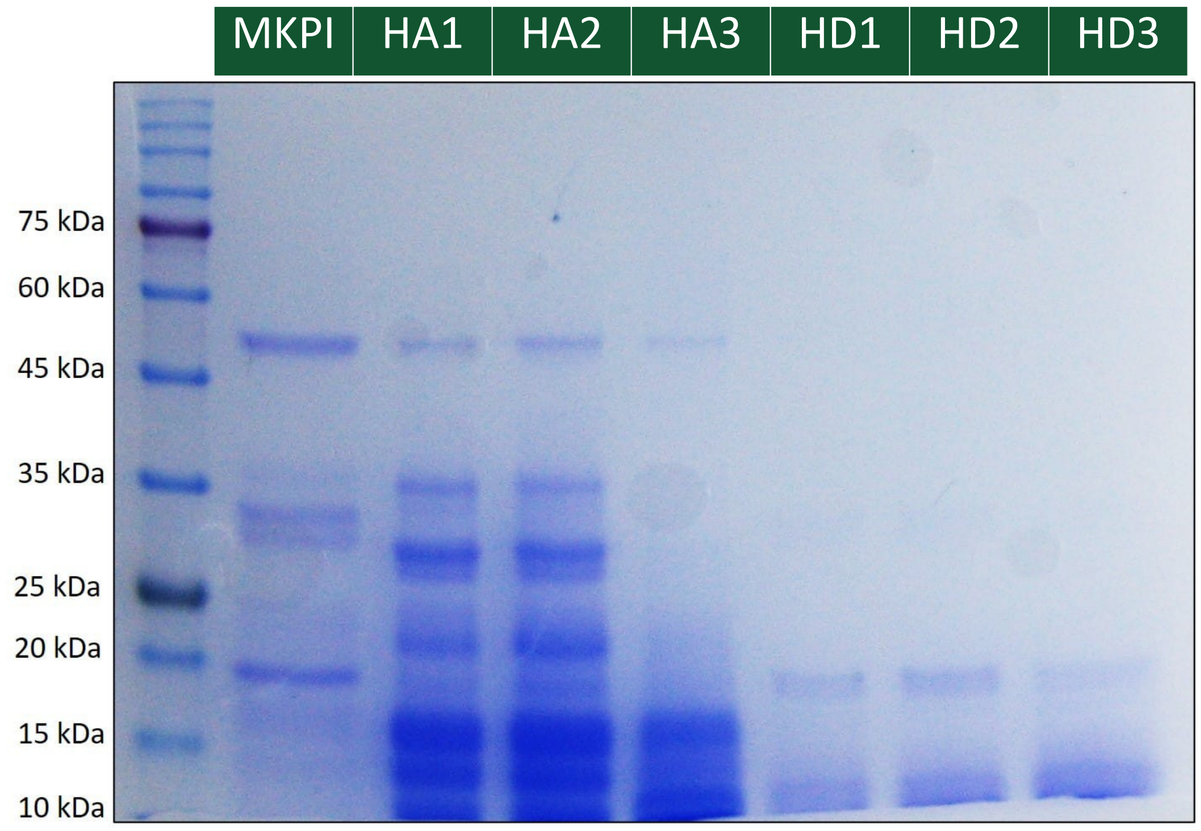


FIGURE 2. Polyacrylamide gel electrophoresis with SDS (SDS-PAGE) in MKPI and hydrolysates. MKPI: macauba kernel protein isolate; HA: hydrolysis using alcalase; HD: hydrolysis simulating gastrointestinal digestion.

Gel electrophoresis indicated that there were no proteins larger than 20 and 35 kDa after HD hydrolysis and HA3 (2%), respectively. Even though HA1 and HA2 showed proteins up to 45 kDa a larger amount of protein smaller than 15 kDA was also observed. MKPI showed proteins with molecular weight up to 50 kDa, indicating the effectiveness of enzymes in hydrolyzing MKPI.

TABELA 1. Antioxidant capacity of MKPI and hydrolysis according to ABTS method.

	MKPI	HA1	HA2	HA3	HD1	HD2	HD3
%	52.69	102.25	96.88	70.73	102.49	101.78	101.52

Results expressed in reduction percentage (%).

Overall, HD had a higher antioxidant capacity than HA, but both were higher than MKPI, indicating that hydrolysis improves antioxidant capacity. Observing the group that used Alcalase as an enzyme, the parameters that used the lowest % of enzyme (HA1 - 1% and HA2 - 1.5%) resulted in greater reducing capacity than parameter HA3, which had smaller protein sizes, indicating that the enzyme concentration affects the biological activity of the hydrolysate.

CONCLUSION

This study highlights hydrolysates from macauba kernels with significant antioxidant activity and bioactive peptides, particularly those produced through gastrointestinal digestion simulation, which showed smaller proteins (20 kDa) and greater antioxidant capacity. Future research should identify peptides with the strongest biological activity and elucidate their mechanisms of action.