Keywords: Dagaa; Optimization; hydrolysis; Alcalase

Introduction

From previous proximate composition analysis studies of Dagaa, we have established that it is a nutritionally dense sh [1]. In addition, it has the second highest landings (of up to 63%) in Lake Victoria. However, poor storage and handling conditions have led to postharvest losses of 30% which increase to 50% during the rainy season. Alternative methods of using this under-utilized Dagaa sh species are therefore needed to increase its potential utilization and market value [2].

Use of enzymes to recover sh protein hydrolysates (FPH) is a technology that is gaining popularity due to the bioactive properties associated with these compounds. Enzymatic hydrolysis of native sh proteins has been shown to improve their functional properties, including solubility, emulsifying capacity and foaming characteristics hence o ering interesting opportunities for food applications and pharmaceuticals [2].

In any given enzymatic process, the nal product yield depends on several factors. ese include; the type of enzyme and substrate, hydrolysis conditions; pH, temperature, time and enzyme/substrate ratio, solvent ratio and stirring speeds [3-6].

In addition to e ect on yield, enzyme type also a ects the bioactivity of the obtained hydrolysate. erefore, appropriate selection of suitable enzyme and substrate as well as hydrolysis conditions such as; enzyme to substrate ratio, hydrolysis time, pH and temperature are crucial in obtaining protein hydrolysates with desirable functional and biological properties [5]. Moreover, from an economical point of view, the amount of enzyme used should be optimized to prevent enzyme waste and manage its costs [6].

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Optimization for enzyme/substrate ratio

Apart from pH and temperature, enzyme substrate ratio is one of the factor, which shows a marked in uence on peptide bond cleavage of the protein substrate [32]. e pro le of % NR during the 2 h hydrolysis of Dagaa is shown in Figures 4. Maximum %NR was obtained at ES ratio of 2% (v/w).

Approximately 20% of the total nitrogen remained insoluble at the end of a hydrolysis process even if more enzymes were added during the stationary phase of hydrolysis [35]. is insoluble residue contains peptides enriched with hydrophobic amino acids that are highly resistant to further degradation by the enzyme [33]. Furthermore, the increase in peptide concentration in the hydrolysis mixture and

production of protein hydrolysate with antioxidative function, it was a requirement to stop the proteolysis at least at the dipeptide stage.

Consequently, in this study, optimized hydrolysis conditions were xed at minimum stirring speed (overhead Stuart stirrer, UK), 56°C, pH 7, ES ratio of 2% (v/w) and solvent ratio of 0.5 (v/w) for 6 hours. Following continuous hydrolysis at these optimum conditions, an 83% degree of hydrolysis was achieved with a 71% protein yield.

The National Council for Science and Technology-Kenya (NCST) postgraduate ST&I grants NCST/ST&I/RCD/4TH CALL MSC/074

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