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Alkali extraction of rice residue protein isolates: Effects of alkali treatment conditions on lysinoalanine formation and structural characterization of lysinoalanine-containing protein

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ABSTRACT

The influence of alkali extraction conditions on the formation of lysinoalanine (LAL) and the structural characterization of lysinoalanine-containing protein in rice residue protein isolates (RRPI) were explored in this study. It was found that LAL content increased from 0.256 to 13.079 g/kg as NaOH concentration increased from 0.03 to 0.09 M and then decreased to 1.541 g/kg at 0.13 M NaOH. The extraction temperature and time were found to have a positive correlation with LAL content. The highest LAL content (25.679 g/kg) was observed with alkali extraction using 0.09 M NaOH at 75 °C for 120 min. The comparative structural analysis results showed that alkali treatment could degrade cystine, lysine, threonine and arginine to generate LAL; increasing alkali content would cause variations in secondary structure and micropore appearance on the surface of lysinoalanine-containing protein, whereas increasing alkali treatment temperature and time could enlarge the surface particle size of the protein.

Abbreviations: LAL, Lysinoalanine; FTIR, Fourier Transform Infrared Spectrum; SEM, Scanning Electron Microscopy; AFM, Atomic Force Microscope; RRPI, Rice Residue Protein Isolates.

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