PHYSICOCHEMICAL PROPERTIES OF COWPEA (Vigna unguiculata) FLOUR BY HYDROTHERMAL MODIFICATION FOR INCREASING RESISTANT STARCH CONTENT

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ABSTRACT

Cowpea (*Vigna unguiculata*) is a minor pulse in Indonesia but its utilization in food products is limited. High dietary fiber content, including resistant starch (RS) in cowpeas, shows its potential as functional foods, i.e. in the form of flour. The objective of this research was to evaluate the physicochemical characteristics of cowpea flour with a physical modification, i.e. hydrothermal treatment.

The research material is cowpea seeds var KT7 from Balitkabi, Malang, East Java. The research stages consist of: 1) preparation of raw materials and chemicals, 2) hydrothermal treatment including steaming 30 min, boiling 90 min, and pressure cooking 30 min, and then followed with cooling at 4?C for 24 h, 3) making cowpea flour, 4) determination of physicochemical properties of modified cowpea flour including color, crystalline pattern, microstructure, pasting properties, spectra of FT-IR, proximate, starch, amylose, soluble dietary fiber, insoluble dietary fiber, and RS contents. Data analysis was conducted using one way anova with Duncan Multiple Range Test.

The physicochemical characteristics of cowpea flour with hydrothermal modification as follows: the lightness and the degree of whiteness in modified flour was lower than its native flour. The crystalline structure was altered from C_A type in native flour into a mixture of type B and V in modified flour. Microstructure of modified flour was in the form of blocks, the surface is not smooth, compact structure, irregular, and not uniform size. The pasting properties and FT-IR spectra of modified flour showed significantly different from their native flour. Protein and fat content of modified flour significantly increased than native flour, while ash content decreased significantly. Starch, amylose and amylopectin contents of cowpea flour with steaming treatment were lowest compared to other hydrothermal treatments. Soluble fiber content did not differ significantly and ranged 7,67-8,44% in modified flour. Insoluble fiber and total fiber contents increased significantly to 20,59-23,77% and 28,27-32,21% in modified flour. RS content of modified flour decreased significantly from 46,33% in native flour to 9,63-14,03% in modified flour. Both native and modified cowpea flours could be used as a source of dietary fiber and RS for developing functional foods.

Kata Kunci: *cowpea, hydrothermal modification, physicochemical properties, resistant starch*