

EFFECT OF PROTEASE TREATMENT ON ANTIOXIDANT ACTIVITY OF CHICKPEA GLOBULIN AND ITS POTENTIAL USAGE IN PROTEIN NANOPARTICLES PREPARATION

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ABSTRACT

Proteins are large, complex molecules that play many crucial roles in the food industry. In recent time huge attention is given to plant proteins due to their ability to potentially complement or replace proteins from animal origin in various food applications. Chickpea presents important source of consumable proteins with fascinating functional and nutritive properties. Furthermore, chickpea proteins have potential to scavenge free radicals and endow beneficial effect on human health. Enzymatic protein hydrolysis represents a cleavage of molecules into lower molecular weight peptides and probably some free amino acids. The degree of hydrolysis (DH) has considerable effects on the size and the amino acid composition of peptides. Thus biological activity of peptides formed during this process could be improved due to exposure of antioxidant amino acids that are usually buried within protein core. Beside enhancement of protein biological properties, enzymatic hydrolysis can be efficient tool for the fabrication of advanced protein nanoparticles for the application in many food systems.

Focus of this work was on the isolation of chickpea globulin and on the application of enzymatic hydrolysis to produce modified protein with different degrees of hydrolysis. Additionally, antioxidant activity of prepared hydrolysates was determined and compared to native unmodified protein. Possibility of forming nanoparticles from native and enzymatically hydrolyzed protein was assayed as well.

Enzymatic hydrolysis of isolated chickpea globulin was carried out using protease Neutrase (Novozymes) with varying time of hydrolysis (15, 30, 60 min) and concentration of enzyme. Degree of hydrolysis in prepared hydrolysates varied from 16 to 55%. Depending on DH, differences in antioxidant activity were determined. Results showed that prepared hydrolysates had significant enhancement of ABTS radical scavenging from 2 and 3 fold compared to native globulin without enzymatic treatment. It was shown that degree of hydrolysis affected process of preparation and characteristics of protein nanoparticles.

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