

Physicochemical and Functional Characteristics of Hemp Protein Isolate

Authors : El-Sohaimy Sobhy A., Androsova Natalia, Toshev Abuvali Djabarovec

Abstract : The conditions of the isolation of proteins from the hemp seeds were optimized in the current work. Moreover, the physicochemical and functional properties of hemp protein isolate were evaluated for its potential application in food manufacturing. The elastin protein is the most predominant protein in the protein profile with a molecular weight of 58.1 KDa, besides albumin, with a molecular weight of 31.5 KDa. The FTIR spectrum detected the absorption peaks of the amide I in 1750 and 1600 cm^{-1} , which pointed to C=O stretching while N-H was stretching at 1650-1580 cm^{-1} . The peak at 3250 was related to N-H stretching of primary aliphatic amine (3400-3300 cm^{-1}), and the N-H stretching for secondary (II) amine appeared at 3350-3310 cm^{-1} . Hemp protein isolate (HPI) was showed high content of arginine (15.52 g/100 g), phenylalanine+tyrosine (9.63 g/100 g), methionine + cysteine (5.49 g/100 g), leucine + isoleucine (5.21 g/100 g) and valine (4.53 g/100 g). It contains a moderate level of threonine (3.29 g/100 g) and lysine (2.50 g/100 g), with the limiting amino acid being a tryptophan (0.22 g/100 g HPI). HPI showed high water-holding capacity (4.5 ± 2.95 ml/g protein) and oil holding capacity (2.33 ± 1.88 ml/g) values. The foaming capacity of HPI was increased with increasing the pH values to reach the maximum value at pH 11 (67.23 ± 3.20 %). The highest emulsion ability index of HPI was noted at pH 9 (91.3 ± 2.57 m²/g) with low stability (19.15 ± 2.03).

Keywords : Cannabis sativa ssp., protein isolate, isolation conditions, amino acid composition, chemical properties, functional properties

Conference Title : ICPNFS 2022 : International Conference on Preventive Nutrition and Food Science

Conference Location : Moscow, Russia

Conference Dates : August 30-31, 2022