

RESEARCH OF STRUCTURE AND PROPERTIES OF PROTEINS OF LOCAL VARIETIES OF LENTIL GRAIN

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Annotation

Physical-chemical and functional properties of the protein isolate from lentil grains have been determined. The conformational structure of protein molecules has been determined by IR spectroscopy. It has been established that protein isolates retain their native state during deep processing.

Keywords: lentil grains, protein isolate, structure and properties, use, determining factors.

Introduction

In recent years, special attention has been paid to the processing of lentil grains, which are a source for obtaining protein isolate [1-4].

Local varieties of lentils are estimated to have a high content of protein substances [5, 6], containing large amounts of essential amino acids, which are important for human organism [7]. In this regard, the study of the structure and properties of proteins of local varieties of lentils is an urgent issue.

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The objects of the study were local varieties of lentil grains, the study of the structure and properties of the protein isolate, the establishment of the conformational structure of the protein molecule.

Research methods modern methods of physico-chemical analysis are used in the work, chromatographic and infrared assessments are applied.

Experimentally determined physico-chemical and functional properties of a protein isolate from lentil grain (BIZCH) are presented in Table 1., which also provides literature data [8, 9] for industrially produced soy protein isolates.

Comparative characteristics of protein isolates from lentil and soy grains Table1

THE NAME OF THE INDICATOR	THE VALUE OF THE INDICATOR	
MASS FRACTION, %:		
- MOISTURE	6,0±0,3	4-6
- PROTEIN, ON DRY MATTER	90,0±0,2	90-92
- FAT	0,4±0,05	0,5-1,0
- ASH	4,9±0,03	3,8-4,8
PH OF 1% AQUEOUS SOLUTION, UNIT PH	7,2±0,2	6,25-8,09
MOISTURE-HOLDING CAPACITY, %	400±15	400-700
FAT-HOLDING CAPACITY, %	142±10	88-139
FAT-EMULSIFYING ABILITY, %	61±7	91,3-95,1
FOAM RESISTANCE, %	67±3	77
FOAM RESISTANCE COEFFICIENT, %	0,91±0,02	-
FOAMING ABILITY, %	40±3	113
FOAMING CAPACITY COEFFICIENT, %	32,1±0,4	-

Experimental data show that the studied protein isolate from lentil grain is characterized by high values of a number of functional properties and can be used as an emulsifier, foaming agent, as well as to increase the water- and fat-retaining ability of food systems. The high moisture-retaining, fat-retaining, fat-emulsifying abilities of the protein isolate from lentil grains indicate the prospects of its use in the technology of food products of the emulsion and churned type. Comparative analysis of physico-chemical and functional properties of the obtained protein isolate from lentil grain (Table.1.) and industrially produced soy protein preparations indicates that the basic properties of the BISCH are not inferior to analogues and comply with accepted standards. According to microbiological indicators, protein isolate from lentil grain meets hygienic standards.

One of the main factors determining the effectiveness of protein use by the human body is the balance of protein in terms of the content of essential amino acids. Based on the results of the analysis of the amino acid composition (Fig. 1), the biological value of the protein isolate from lentil grain was evaluated by calculating the amino acid composition for each essential amino acid (Fig.2). In terms of biological value, protein

isolate from lentil grain is somewhat inferior to soy, the limiting amino acids, as noted above, are methionine and cysteine.

A comparative analysis of the conformational structure of protein molecules of lentil protein isolate was performed by IR spectroscopy (Fig. 3). It was found that in the process of deep processing of lentil grains to obtain protein isolate, proteins retain their native conformation, as evidenced by the position of the absorption bands Amide I, Amide II and Amide III in the analysis of IR spectra. The band of Amide I shift the lentils to the value of the wave number 1654.5 cm⁻¹, the band of Amide II – to 1542 cm⁻¹, which is characteristic of the a-form [10].

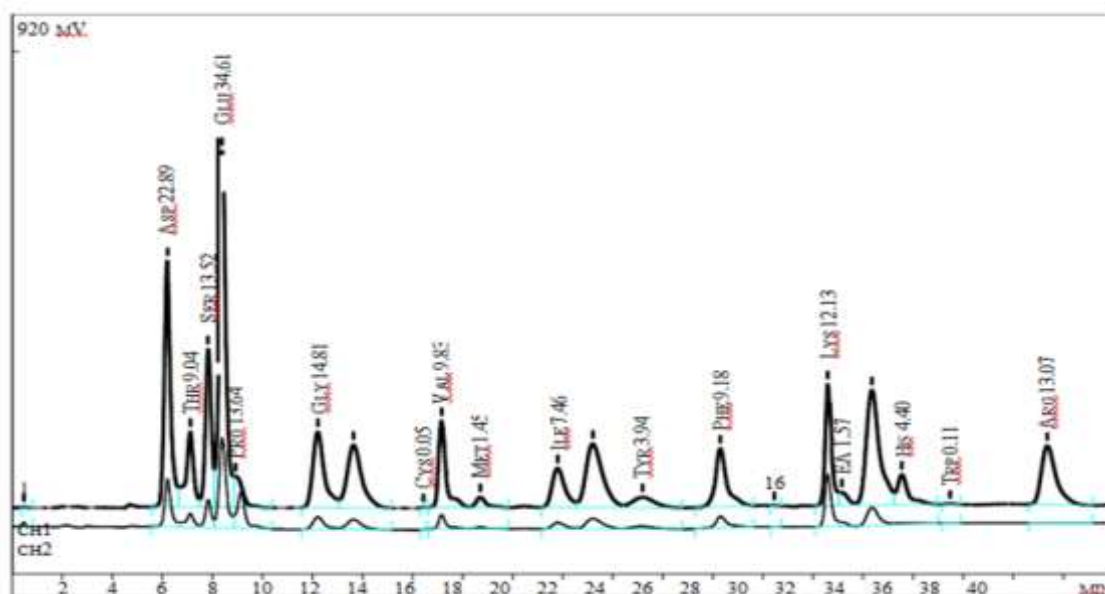


Figure.1. Chromatogram of the amino acid composition

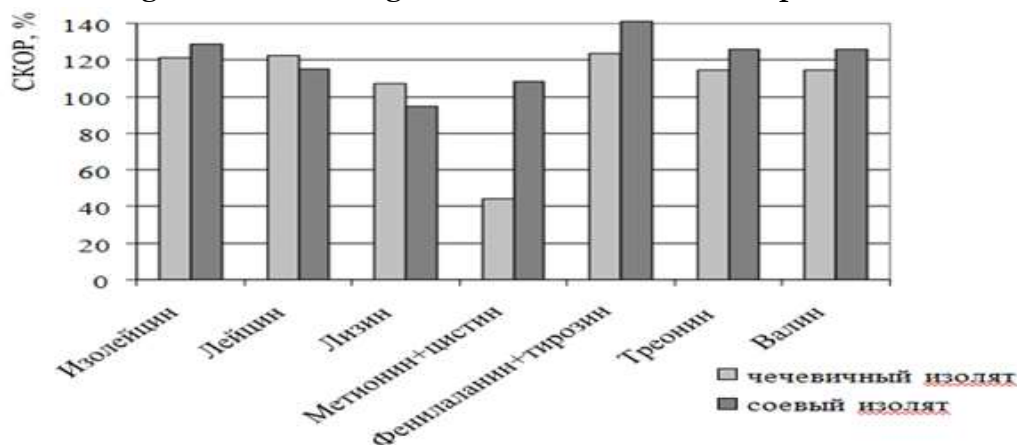


Figure.2. Amino acid composition of protein isolates from lentil and soy grains, %

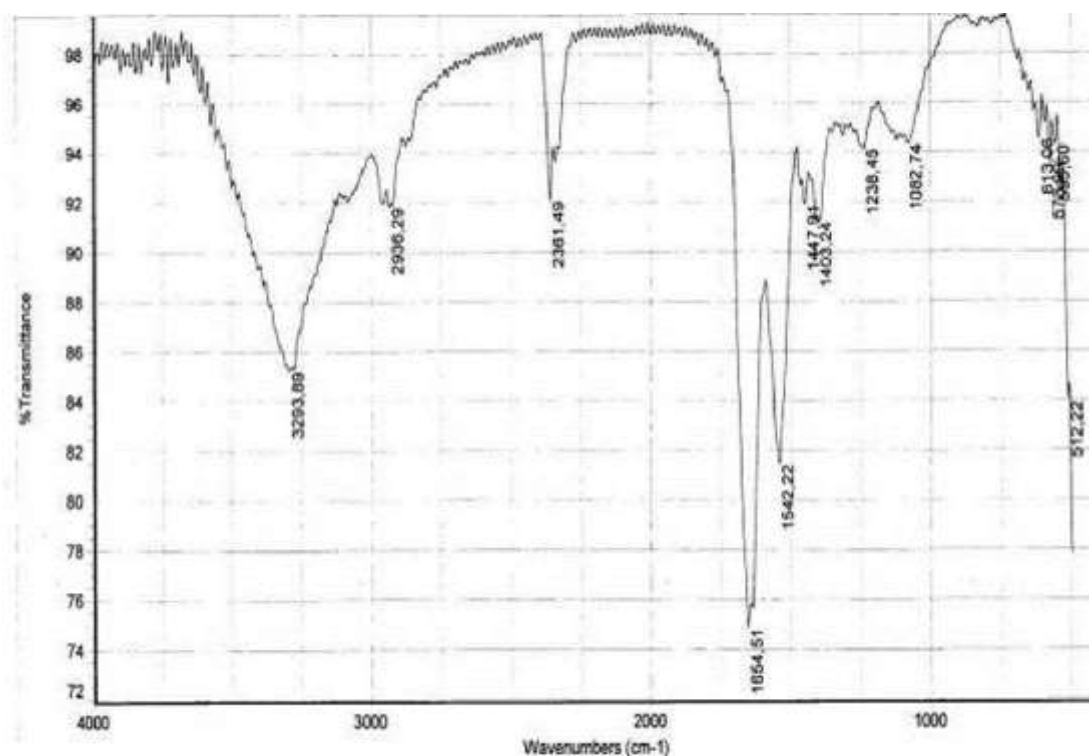


Figure.3. - IR spectrum of protein isolate from lentil grain

References

- 1.Аникеева Н.В. Дезодорированная мука из чечевицы / Н.В. Аникеева // Хлебопечение России. – 2003. – №2. – С. 32.
- 2.Аникеева Н.В. Перспективы применения белковых продуктов из семян чечевицы
- 3.Антипова Л.В. Исследование фракционного состава белков чечевицы в аспекте получения белкового изолята / Л.В. Антипова, Н.В. Аникеева // Фундаментальные исследования. – 2006. – №5. – С. 13-14.
- 4.Асатуллоев И.А. Белковые ингибиторы эндогенных протеаз в прорастающих семенах чечевицы / И.А. Асатуллоев, Г.П. Карпиленко, И.С. Витол: Сб. материалов V Юбилейной школы-конференции с междунар. Участием «Высокоэффективные пищевые технологии, методы и средства их реализации». Москва, МГУПП, 2007. – С. 8-9.
- 5.Zaynobiddinov D. K. Prevention of Diseases and Strengthening Through Physical Education Classes and Sport //Berlin Studies Transnational Journal of Science and Humanities. – 2021. – Т. 1. – №. 1.5 Pedagogical sciences.

6. Adilhodzhaev A. et al. Assessment of the potential of composite gypsum binder bricks as an alternative to traditional wall materials in Uzbekistan //European Journal of Molecular & Clinical Medicine. – 2020. – Т. 7. – №. 2. – С. 1884-1889.
7. Kodirova D. T. et al. Solubility in the system sodium chlorate-rhodanide ammonium-water //Проблемы современной науки и образования. – 2019. – №. 3. – С. 26-30.
8. Tulanovna K. D., Saydakhral T. Solubility in the system sodium chlorate-rhodanide sodium-water //Проблемы современной науки и образования. – 2019. – №. 6 (139). – С. 17-19.
9. Tulanovna K. D., Kizi A. S. D. Physicochemical studies of the production of defoliant based on magnesium chlorate and ammonium thiocyanate //Asian Journal of Multidimensional Research. – 2021. – Т. 9. – №. 4. – С. 95-100.