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Analysis of Amino Acid Composition of the Grass Brassica Oleracea var. Italica Plenck

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Abstract Broccoli herb is a rich source of biologically active substances. The objects of our study were the dried grass Brassica Oleracea var. Italica Plenck (supplier of agricultural enterprise "YAKKA-BURGUT", Samarkand region, Jambay district), assembled in November 2022. For the first time, the amino acid composition and definitely the quantitative content in broccoli grass were studied using high-performance liquid chromatography. The presence of 20 amino acids has been established, 9 of which are essential. The results indicate the prospects of using the vegetative and generative parts of the plant.

Keywords Grass Brassica Oleracea var. Italica Plenck, Amino acids, High performance liquid chromatography

1. Introduction

According to experimental data, it is known that broccoli has a high protein content, which includes the anti-sclerotic substances choline and methionine, as well as essential amino acids such as lysine, methionine, valine, isoleucine, leucine, threonine, phenylalanine; replaceable - tyrosine, histidine, alanine, arginine, aspartic acid, glycine, glutamic acid, proline, serine. In terms of the amount of protein, broccoli is superior to sweet potatoes, potatoes, sweet corn, asparagus, and spinach [1,2,3,4,5].

The content of total protein in broccoli was qualitatively and quantitatively determined. A qualitative reaction (biuret reaction) with an alkaline solution of copper (II) salts with the formation of a violet color confirmed the presence of protein in the raw material. For a quantitative protein study, a protein isolate from broccoli was prepared [8,9,10,14].

Quantitative determination of protein in raw materials was carried out using the Bradford method with the Kumasi reagent and 6.09 g of protein per 100 g of dry raw materials was found. To quantify protein in raw materials, the microbiuret method with Benedict's reagent was used and 18.6 g of protein per 100 g of dry raw material was found. The protein content in broccoli is not inferior to protein of animal origin, for example, a chicken egg contains 13 g of protein per 100 g of product [6,7,11,12,13].

Purpose of the study. Analysis of the amino acid composition of the grass Brassica Oleracea var. Italica Plenck to determine the possibility of using broccoli herb growing in the territory of the Republic of Uzbekistan in medical practice.

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2. Materials and Methods

The objects of our study were the grass Brassica Oleracea var. Italica Plenck (supplier of the farm "YAKKA-BURGUT", Samarkand region, Jambay district), assembled in November 2022.

The raw materials were dried at room temperature in a well-ventilated area for ten days [15,16] and stored in paper bags.

Precipitation of proteins and peptides from the aqueous extract of the samples was carried out in centrifuge beakers. To do this, 1 ml (exact volume) of 20% TCA was added to 1 ml of the test sample. After 10 minutes, the precipitate was separated by centrifugation at 8000 rpm for 15 minutes. 0.1 ml of the supernatant was separated and freeze-dried. The hydrolyzate was evaporated, the dry residue was dissolved in a mixture of triethylamine-acetonitrile-water (1:7:1) and dried. This operation was repeated twice to neutralize the acid. By reaction with phenylthioisocyanate, phenylthiocarbamyl derivatives (PTC) of amino acids were obtained according to the method of Steven A., Cohen Daviel [17]. Identification of amino acid derivatives was carried out by HPLC. HPLC conditions: Agilent Technologies 1200 chromatograph with DAD detector, 75x4.6 mm Discovery HS C18 column. Solution A: 0.14 M CH3COONa + 0.05% TEA pH 6.4, B: CH3CN. Flow rate 1.2 ml/min, absorption 269 nm. Gradient %B/min: 1-6%/0-2.5min; 6-30%/2.51-40min; 30-60%/40.1-45min; 60-60%/45.1-50min; 60-0%/50,1-55 min.

3. Results and Discussions

The results of the determination of the amino acid composition of the broccoli herb (Brassica Oleracea var. Italica Plenck) are presented in Table 1 and in Figures 1, 2.

The quantitative content of amino acids in broccoli grass (Brassica Oleracea var. Italica Plenck). The presence of 20 amino acids has been established, 9 of which are essential. Quantitatively, the raw materials are dominated by interchangeable amino acids. Among the essential amino acids in the dried broccoli herb, threonine, valine, histidine, tryptophan prevail, and in the dry aqueous extract methionine, leucine, phenylalanine. Amino acids take part in the processes of nervous regulation of various body functions and have a pronounced effect on vascular tone.

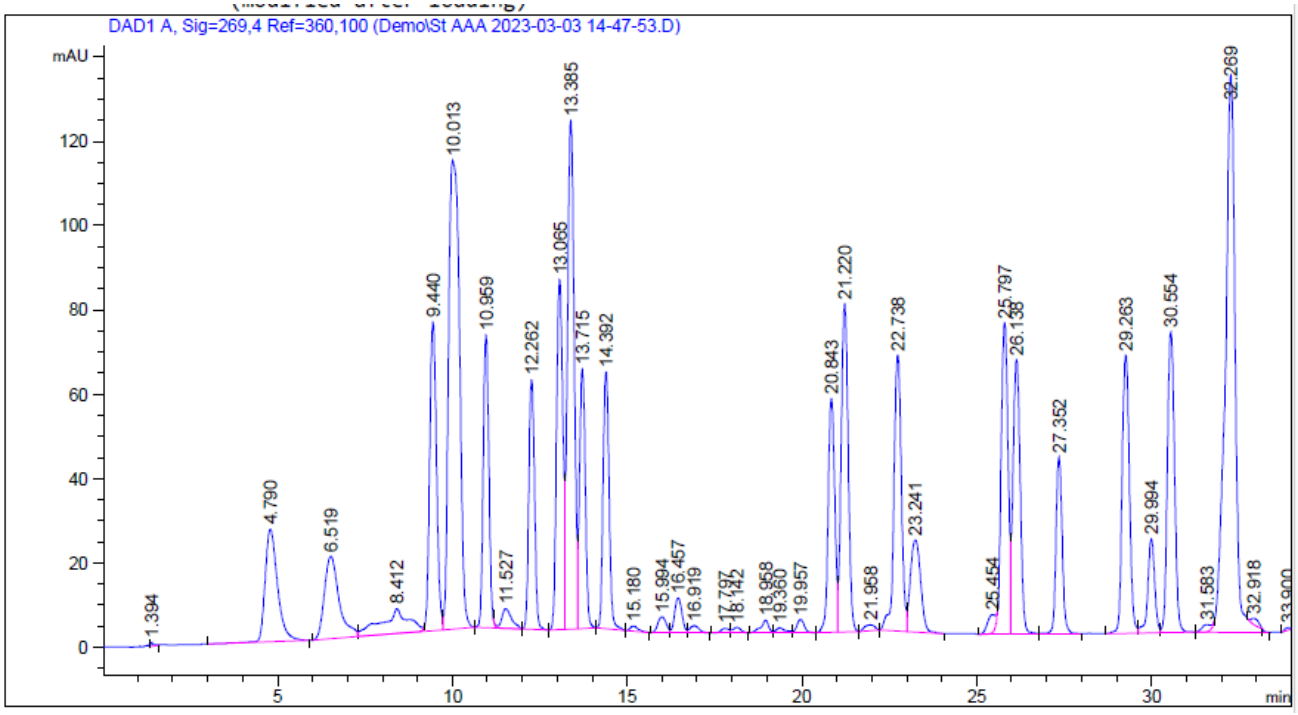

Figure 1. Chromatograms. Amino Acid Standards

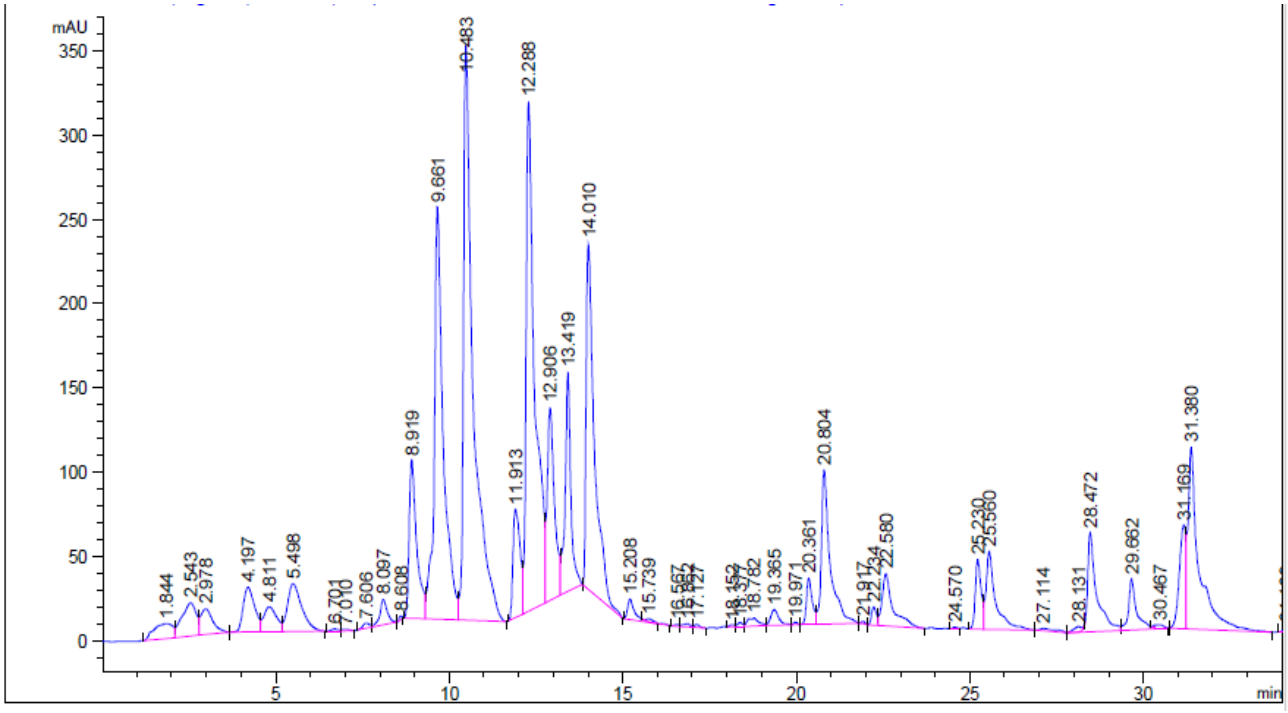

Figure 2. Chromatogram of amin o acids of the grass Brassica Oleracea var. Italica Plenck

Table 1. Amino acid composition of broccoli herb

The name of amino acids	Broccoli Herb
	Concentration mg/g
Aspartic acid	1,930386
Glutamic acid	2,596154
Serin	2,254145
Glycine	1,144923
Asparagine	4,617609
Glutamine	22,31574
Cysteine	9,704918
Threonine	17,15314
Arginine	5,057082
Alanin	2,337739
Proline	15,18005
Tyrosine	1,341391
Valin	4,911219
Methionine	0,310642
Histidine	4,135068
Isoleucine	1,231303
Leucine	2,857189
Tryptophan	3,258863
Phenylalanine	0,969458
Lysine	1,601002
Total	**104,908**

4. Conclusions

For the first time, the amino acid composition and definitely quantitative content of broccoli grass (Brassica Oleracea var. Italica Plenck) grown on the territory of the Republic of Uzbekistan. The results indicate the prospects of using the vegetative and generative parts of the plant.

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