

THE STUDY OF THE AMINOACIDS IN PROPOLIS COMPOSITION

STUDIUL AMINOACIZILOR ÎN COMPONENTA PROPOLISULUI

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The propolis presents a complex product, but its quality and biologic value depends on the chemical composition and looking at the ecological situation the study of the composition and the amino-acids dynamic in its composition have theoretic and practice importance. The aim of the experiments was the study of the composition and the amino-acids dynamic in the collected propolis in different areas from Republic of Moldova during the active season. There was established the amino-acids composition and their quantity in propolis at the special analysis at Centre of Metrology and Automation of Scientific Researches at the Academy of Science of Moldova. There was established a large amount of amino-acids (6,868 mg/g) in collected propolis from south area of Republic of Moldova. From all determined amino-acids the largest quantity it is the monoaminomonocarbonic group (alanine, valine, glycine, leucine, isoleucine, serine, treonine) – 41.45%. The monoaminodicarbonic group of amino-acids (asparagic acid and glutamic acid), consists – 25.53% from the total, heterociclc (histidine, proline) – 11.39%, diaminomocarbonic (argine, lysine)- 7.47%, cycle-aromatic (fenilanina, tyrosine) – 5.92%, cystine – 6.90%, methionine – 1.19%. In autumn season (August - September), the average of the amino-acids quantity consists 3,426mg/g. The amino-acids quantity in autumn period has decreased to the spring period by 1.74 times. The highest amount had glutamic acid – 16.34% and asparagic acid 11,58% from the whole amount, the lowest quantity had metionine – 0,64% and triptophan – 0.67%. There was determined that the amino-acids quantity in propolis depends on the geographic area as well on the plants species from which it was collected. There happen quantitative changes during the active season in the amino-acids composition of the propolis.

Key words: bees families, propolis, amino-acids.

Introduction

The main bees product is the honey. But at the same time there is an opportunity to receive a large chain of biologic active products between them is the propolis.

Actually the propolis is used more and more in medicine branch, and this is the reason to receive the high quality propolis. But there is not a stable form of these material for its chemical composition till now (Vahonina, T., Duscova, E., 1990).

Derevici, A. (1990) had determined that the total nitrogen of the propolis is 0,400 g/100g of row propolis. The acid hydrolysis allows to show through the chromatography on "Watman" paper, eight amino-acids: serine, glycolic, asparagic acid, glutamic acid, alanine, tryptophan, phenylalanine and leucine. It is necessary to mention that three of these amino-acids are essential.

In 4% solution of propolis there are 16 amino-acids. The large range of amino-acids and biologic active substances in propolis allows it, to be used in the therapy of different diseases (Помойницкий, В., Дудов, И., Хромых, Н., 1988).

Marghitas, L., (2005) had mentioned that there was over 149 substances in the propolis composition. Where the nitrogen substances present 1 – 2% protein equivalent, there are 18 amino-acids in the hydrolysed acid.

There are quantitative changes of amino-acids in the propolis composition during the active season (April - September).

There was established that the collected propolis in the spring time has the higher amount of amino-acids (Eremia, N., Dabija, T., 2004, 2007).

The propolis presents a complex product, but its quality and its value conditions depend on the chemical composition and of the ecological situation, the study of its content and the dynamic of amino-acids in the composition has a great theoretical and practice importance.

The aim of the experiments was the study of the composition and the amino-acids dynamic in the collected propolis in different areas of Republic of Moldova during the active season.

Material and Methods

There were taken the samples to determine the amino-acids content in the propolis composition during the active season from the collected propolis from the bees families in different areas of Republic of Moldova.

There was determined the composition and the quantity of amino-acids in the propolis accordingly the method of Plescov, B., (1976), using the special analysers(AAA-T 339) at the Centre of Metrology and Automation of Scientific Researches at the Academy of Science of Moldova.

The received results have been worked accordingly to Mercurieva, E., (1970), Plohinschii, N., (1971), using the statistical variation by the computer programmes.

Results and Discussions

There are a lot of free amino- acids and combined essential and non-essential in the propolis composition, they depend of the amino-group and on the carbon composition, and they can be monoaminomonocarmonic, sulphate, calcium-aromated, heterocyclic, monoaminodicarbonic, diaminomomonocarmonic, etc.

The experimental results showed, that the amino-acids quantity vary in the collected propolis from different areas in spring time (April-May).

There was established that there is the higher quantity of amino-acids (6,868 mg/g) in the collected propolis from south area of Republic of Moldova. The whole composition of amino-acids in the collected propolis from the Central area there was – 5,761 mg/g, but in the North area it was – 5,225 mg/g, the average in the Republic was – 5,951 mg/g (tab. 1).

There was determined that from all studied amino-acids the largest quantity had the group of monoaminomonocarboxylic (alanine, valine, glycine, leucine, isoleucine, serine and tyrosine) – 41,45%. The quantity of some amino-acids from this group vary between 0,21 mg/g (isoleucine) and 0,478 mg/g (serine).

The group of monoaminodicarboxylic amino-acids (asparagic acid and glutamic acid) had – 25,53% from the total, heterocyclic (histidine, proline) – 11,39%, diamino-monocarboxylic (arginine, lysine) – 7,47%, cycle-aromated (phenylalanine, tyrosine) – 5,92%, cystine – 6,90% and methionine – 1,19%.

Table 1. The amino-acids dynamic in the collected propolis from different areas in spring time (April-May), mg/g

| The amino-acids group | Amino-acids | $\bar{X} \pm S_x$ | % from the total quantity |
|--|----------------|-------------------|---------------------------|
| Monoaminomonocarboxylic | Alanine | 0.434±0.032 | 7.29 |
| | Valine | 0.332±0.022 | 5.57 |
| | Glycine | 0.366±0.080 | 6.15 |
| | Leucine | 0.363±0.117 | 6.09 |
| | Isoleucine | 0.21±0.031 | 3.52 |
| | Serine | 0.478±0.026 | 8.03 |
| | Treonine | 0.286±0.062 | 4.80 |
| Sulphuric | Methionine | 0.071±0.009 | 1.19 |
| Cycle – aromated | Phenylalanine | 0.196±0.027 | 3.29 |
| | Tyrosine | 0.157±0.016 | 2.63 |
| Hetero-cycle | Histidine | 0.084±0.007 | 1.41 |
| | Proline | 0.594±0.177 | 9.98 |
| Monoaminodicarboxylic | Asparagic acid | 0.585±0.059 | 9.83 |
| | Glutamic acid | 0.939±0.110 | 15.7 |
| Diamino-monocarboxylic | Arginine | 0.226±0.20 | 3.79 |
| | Lysine | 0.219±0.012 | 3.68 |
| | Cystine | 0.411±0.031 | 6.90 |
| | Tryptophan | - | - |
| The total quantity of amino-acids | - | 5.951 | 100 |

During autumn time (August-September) the average of amino-acids quantity is 3,426 mg/g (tab. 2), and it varies in the North area 1,934 mg/g and 4,920 mg/g in the Central area.

The quantity of amino-acid in autumn time has decreased comparative with the spring time by 1,74 times.

The largest part had glutamic acid being 16,34% and asparagic acid – 11,58% in whole quantity, and the smallest- methionine – 0,64% and tryptophan – 0,67%.

There was established, that the collected propolis early in the spring has the highest quantity of amino-acids.

Table 2. The dynamic of amino-acids found in the collected propolis from different areas in autumn time (August-September), mg/g

| The amino-acids group | Amino-acids | $\bar{X} \pm Sx$ | % from the total quantity |
|--|-----------------|------------------|---------------------------|
| Monoaminomonocarmonic | Alanine | 0.274±0.108 | 7.99 |
| | Valine | 0.167±0.108 | 4.87 |
| | Glycine | 0.232±0.06 | 6.77 |
| | Leucine | 0.249±0.142 | 7.26 |
| | Izoleucine | 0.106±0.065 | 3.09 |
| | Serine | 0.284±0.121 | 8.28 |
| | Treonine | 0.153±0.073 | 4.46 |
| Sulphuric | Metionine | 0.022±0.015 | 0.642 |
| Cicle – aromated | Phenylalanine | 0.142±0.098 | 4.14 |
| | Tyrozine | 0.081±0.043 | 2.36 |
| Hethero-cycle | Histidine | 0.045±0.020 | 1.31 |
| | Proline | 0.307±0.131 | 8.96 |
| Monoaminodicarmonic | Asparagic acid | 0.397±0.176 | 11.58 |
| | Glutaminic acid | 0.560±0.268 | 16.34 |
| Diaminomonocarmonic | Arginine | 0.119±0.044 | 3.47 |
| | Lysine | 0.099±0.046 | 2.88 |
| | Cystine | 0.166±0.036 | 4.84 |
| | Tryptophan | 0.023±0.007 | 0.67 |
| The total quantity of amino-acids | | 3.426 | 100 |

The quantity of amino-acids in propolis depends directly on the geographic area and plants species where it has been collected.

Conclusions

1. There was established that the amino-acids quantity depends on the geographic area as well on the plants species where it has been collected.

2. During the active season there are quantitative changes of amino-acids in propolis composition. Collected propolis during early spring time has the higher amount of amino-acids.

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