# METHODOLOGICAL ASPECTS REGARDING THE CALCULATION OF PRODUCTION COST IN BEEKEEPING

# ASPECTE METODOLOGICE PRIVIND CALCULAREA COSTULUI DE PRODUCȚIE ÎN APICULTURĂ

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***Abstract:*** *Beekeeping is a source of income for the sustainable development of rural space in Romania. This sector is still confronted with many problems related to the marketing, the quality and the diversification of bee products. The economical analysis of beekeeping involves the calculation of production cost, both for honey and other products of the hive: pollen, propolis, royal jelly, venom and apilarnil. The use of the most efficient methods for calculating the cost of production permits to establish, in measurable size, the direct and indirect factors that influence the economic efficiency of this activity.*

***Key words:*** *cost, production, beekeeping, methods, analyse.*

## INTRODUCTION

The production cost analysis in beekeeping starts from different assumptions. Some international studies reveal the fact that there is a significant difference between the components of production cost, depending on the type of beekeeping farm - modern or traditional. According to some researchers (A.S. Tsafak Matrop, 2008), the most significant differences arise in terms of fixed costs, and less in terms of variable costs. Other studies (Barlovic N&collab., 2009) starts from the hypothesis that the number of bee families is the most important factor in terms of productivity and profitability of beekeeping activity. This hypothesis is not confirmed by the analysis performed, the most significant factor of influence being the honey production/hive and the honey price. Studies conducted in Turkey show that the unit cost of production in the case of bee products depends on the size of apiary and on region of origin.

As apiary size increases, the unit cost of production decreases (Gamze S. & collab., 2004).

Based on these results, the present study aims to analyse the methods for calculating the unit cost of production in beekeeping, starting to the following hypothesis: the beekeeping production is characterized by obtaining the honey bee, the main product, as well as other secondary products, such as: pollen, propolis, royal jelly, wax, venom and apilarnil. The choice of using an appropriate method for calculating the unit cost depends on the criteria used to share the production cost on all products.

## MATERIALS AND METHODS

The methods for calculate the unit cost are the remaining value method and the coefficients' method for distributing costs. The difference between these two methods is represented by the criteria used for sharing costs on products. In the case of the method of remaining value, the cost of production is calculated for one main product, the others products being assimilated as secondary products:

$$Cp_1 = \frac{Cht - (\sum_{i=1}^{n} Q_i * p_i + Vs)}{Q_1}$$

Where:

$Cp_1$ – the production cost of the main product;

Cht – the total cost of production;

$Q_i$ – the quantity of the main product "i" without the calculation of unit cost;

$p_i$ – the unit price of the product "i";

$Q_1$ –the quantity of the main product "i" for which the cost of production is calculated;

Vs – the value of secondary products;

n – the number of products without the calculation of unit cost;

$Vs = p_i * q_i$

$q_i$ – the quantity of secondary product

In beekeeping the main product for which it is calculated the unit cost is honey, the others products (honey, pollen, propolis, royal jelly, venom, wax, apilarnil) are considerate as principal products without calculation of unit cost; this is the case of the sapling too.

In the case of the coefficients method for distributing costs, after the subtraction of the value of secondary products from the total cost of production, the costs afferent to the main products are shared on products by using coefficients of distribution ($k_i$), that reflect the weight of the product in the total value of the main products, calculated in medium selling prices.

$$Cp_i = \frac{(Cht - Vs) * k_i}{Q_i}$$

Where:
$Cp_i$ – the cost of production of the main product "i";
Cht – the total costs of production;
Vs – the value of secondary products;
Qi – the total production obtained from the product "i".

The coefficients for sharing costs on products are calculated as follows:

$$K_i = \frac{Q_i * \overline{p_i}}{\sum_{i=1}^{n} Q_i * \overline{p_i}}$$

Where:
n – the number of the main products.

The advantages of using this method are the following: it allows the determination of the cost for each main product; profitability, identically at the level of products and at the level of bee family; it allows to determine the influence of the quality of bee products by their selling prices; the method is in concordance with the main tendencies of evolution in the apicultural sector: maintaining the interest for honey and increasing the

needs for other bee products, due to the growth of the demand for diversified products as source of food and active components for human health.

## RESULTS AND DISCUTIONS

Analysing the production cost contributes to the determination of the degree of efficiency of the costs related to the level of production. In the beekeeping farms, analyse of the unit cost permits to establish, in measurable size, the direct and indirect factors that contribute to the deviation from the level of reference. In the case of using the coefficients method of distributing costs, the direct factors that determine the modification of unit costs are the quantity of the product and its afferent cost:

$$Cp_i = \frac{(Cht - Vs) * k_i}{Q_i} = \frac{C_i}{Q_i}$$

Where:
$k_i$ – the weight of the product "i" in the total value of the main products;
$C_i$ – the costs of the product "i";

In the beekeeping farms the number of products is different from one farm to another (pollen, propolis, royal jelly, venom, wax, apilarnil). The utilisation of the coefficients method permits to calculate the unit cost and analyse each of these products. Therefore, in a beekeeping farm that produces honey, pollen and wax, n = 3, the relations used in analyse are:

i = 1 → honey,
i = 2 → propolis,
i = 3 → wax.

The deviation of the unit cost of product „i" is:

$\Delta Cpi = Cpi_1 - Cpi_0$

$$\Delta Cp_i = \frac{C_{i1}}{Q_{i1}} - \frac{C_{i0}}{Q_{i0}}$$

Due to the influence of the volume of product ”i”, as quantitative factor :

$$\Delta Cp_{iQ} = \frac{C_{i0}}{Q_{i1}} - \frac{C_{i0}}{Q_{i0}} = \frac{C_{i0}}{Q_{i1}} - Cp_{i0}$$

Due to the influence of the costs of product “i”:

$$\Delta Cp_{iC} = \frac{C_{i1}}{Q_{i1}} - \frac{C_{i0}}{Q_{i1}} = Cp_{i1} - \frac{C_{i0}}{Q_{i1}}$$

As indirect factors, the volume and the price of all products (and their quality) operate by the coefficient of sharing the costs. The verification of the influence of direct factors is:

$\Delta CpiQ + \Delta CpiC = \Delta Cpi$

## CONCLUSIONS

In the present and also in the future, the main interest for the intensification and the diversification of production concerns the growth of the number of bee families and their biologically and productive performances and also on the insurance of the quality of production. The growth of the competitiveness will determine an acceleration of the concentration of activities in beekeeping and acceleration in the production of bee products. The coefficient method for distributing costs is in accordance with the main tendencies of evolution in the apicultural sector.

**ACKNOWLEDGEMENTS**

This work was a part of a research project supported by a grant from CNCSIS, PN II. Romania. The title of the research project is "A technical and economic analysis of the beekeeping in the North West Region of Romania in order to ensure the sustainable development of the beekeeping chain", Contract no. 149/2010.

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