ABSTRACT

of the PhD paper entitled:

„Researches regarding the conversion period and the quality of organic certified products obtained in different areas of Romania”

Developed by PhD. ing. Daniela BĂDESCU under the scientific supervision of
Prof. Univ. Dr Dumitru DRĂGOTOIU

Key-words: organic agriculture, organic honey, organic milk, quality of organic products

The PhD paper is structured in two parts, respectively a biographical study and own researches, containing a table of contents, an abstract of the paper, preface, introduction, seven chapters that contain 180 tables and 55 figures and a list of bibliographical references with 145 titles.

PART I, BIBLIOGRAPHICAL STUDY, contains three chapters, thus structured:

CHAPTER I The importance of using organic certified products in human nutrition, where we have described the differences between organic products and conventional products, from the point of view of chemical composition, but also of organoleptic features. At the same time, we have presented in this chapter the impact the organic products or conventional products consumption has on human health.

CHAPTER II The situation of organic agriculture and of organic products on nationally and globally, where we have presented the legal frame regarding organic agriculture both at European level, as well as the level of tertiary countries, but also statistic data about the evolution in time of organic agriculture at world, European, as well as national levels.

CHAPTER III Conditions to be complied for organic certification of agrifood products, where we have described the conditions which farmers must respect in order to organic certify products of vegetal origin, products of animal origin, but also in the case of growing the bees in an organic system.

PART II OWN RESEARCHES is composed of four chapters that highlight the purpose of the PhD paper, materials and analysis methods used for reaching the set objectives, the results and discussions that follow the researches made, the general conclusions regarding the quality of organic products.

CHAPTER IV The purpose and the importance of the paper: in this paper we have wanted to bring into first plan the importance of using in human nourishment some products of superior quality obtained by traditional methods, combined with the modern ones, in order not to degrade the quality of the final product. We have also highlighted the process a farm or exploitation has to go through, in order to pass from conventional agriculture to organic agriculture, the duration of the process according to the field of activity, but also the quality of the food products obtained, in comparison with the conventional ones.

CHAPTER V Materials and methods, in which we have described the biological material and the physical-chemical and microbiological methods of analysis, in order to highlight the quality of organic products, but also the analysis methods used in the statistic interpretation of the results.

CHAPTER VI Results and discussions, where we have presented the results of the four studies performed in this PhD paper:

- A study regarding the conversion period for obtaining organic certified milk as raw material aimed at following the conversion period of five farms from Suceava county and five farms from Hunedoara county in 2012-2013;
- A study regarding the duration of conversion period for obtaining organic certified honey followed the evolution of registered beekeepers in organic agriculture from the Association of Beekeepers, Hunedoara and Bacău branches;
- Particularities regarding the quality of organic certified milk as raw material in the studied geographical areas, containing the analysis during the three years of 300 samples of milk as raw material, regarding the fat content, total protein content, casein content, total dry matter content, urea content, total number of germs, cryoscopy point, pH and medicine residues content;
- Particularities regarding the quality of organic certified honey in the studied geographical areas, highlighting the analysis, for the period of 2012-2014, of 54 samples of organic honey, regarding the moisture content, HMF content, colorimetric index, reducing sugar content, fructose content, glucose content, dyastasic index, acidity and medicine residues content.

CHAPTER VII GENERAL CONCLUSIONS

Analyzing on the whole results regarding the conversion period and the quality of the raw milk and the organic honey, the following conclusions can be emphasised:

- For the simultaneous conversion of the plant production and livestock production, the length of the conversion period is two years, applicable to the ten farms that were included in the research

- The spontaneous flora found in the two areas ensuring animal nutrition during summer through the green mass obtained on the fields owned by the farmers, and partially during the cold season with the hay obtained by preserving the green mass, supplemented with bran from organic wheat
- Also, the relief in the area where the ten farms are located allows free access to grazing, to water sources and to the free manifestation of animal behaviour, conditions essential in the case of breeding organically
- The average values obtained for the total dry matter content in the raw milk analysed varies between 12,319% and 12,936%, the minimal value being recorded for SF1 farm in 2014 and the maximal for HF5 in 2014. The statistical analysis of the results intra-yearly per region, inter-annual per region and inter-regional, underlined significant differences between:
  - ✓ Farm SF1 (12,319%) and SF5 (12,735%) in 2104
  - ✓ SF5 (12,735%) in 2014 and SF3 (12,349%) in 2013
  - ✓ HF2 (12,571%) in 2012 and HF5 (12,936%) in 2014
  - ✓ In 2012, SF1 (12,388%) and HF4 (12,784%)
  - ✓ In 2013, the average recorded for SF1 (12,349%), SF4 (12,367%) and SF1 (12,398%) compared with the average in all the farms in Hunedoara County; the average of SF5 (12,436%) compared with HF4 (12,795%) and HF2 (12,781%)
  - ✓ In 2014, the value from SF1 (12, 319%) compared with the one from all the farms in Hunedoara County, SF2 (12,387%) and HF5 (12,936%), HF1 (12,911%), HF2 (12,863%) and HF3 (12,872%), the average from farms SF4 (12,507%) and SF3 (12,514%) by comparison with HF5 (12,936%)
- The statistical recording and handling of the data regarding the fat content of the raw milk emphasised the existence of significant differences among the results obtained in the following cases:
  - ✓ Intra-annual, in Moldova, between the values at farm SF1 (3,648%) compared with SF5 (3,889%) in 2014, and in Transylvania, between HF2 (4,026%) by comparison with HF3 (3,810%)
  - ✓ Inter-annual, in Moldova, the farm SF3 (3,644%) in 2013 compared with SF5 (3,889%) in 2014, and in Transylvania, between HF3 (3,810%) in 2013 compared with HF1 (4,023%) and HF5 (4,0223%) in 2014
  - ✓ Inter-regional, in 2012, farm HF4 (3,985%) compared with SF1 (3,741%) and SF2 (3,752%); in 2013, between HF2 (4,026%) and HF1 (3,674%) compared with SF3 (3,664%), SF4 (3,674%) and SF2 (3,756%); between HF4 (3,905%) and SF3

(3,644%); in 2014, the values recorded at SF1 (3.638%), SF2 (3,691%) and SF4 (3,731%) compared with the values recorded in all the farms in Transylvania.

- Analyzing the urea content in the raw milk, it can be concluded that the average values vary from 15,140mg/dl of milk to 37,420mg/dl, the minimal value being recorded at HF2 in 2014 and the maximal one at HF1 in 2012. Moreover, the statistical handling of data showed the existence of significant differences between the values obtained in 2012 compared with the other two years included in the research, both intra-regional and inter-regional.
- For the total number of germs, the readings underlined a variation from 22,100x1000ml of milk and 494,100x1000 of milk, the minimal value being at SF1 in 2014 and the maximal at SF2 in 2012. On the whole, the higher values recorded in 2012 differed significantly from the ones in 2013 and 2014.
- The analysis performed to determine medicine residues in the raw milk came out negative for all the samples, pointing out that the milk comes from healthy animals which weren't administered treatments with substances dangerous for the health of the consumer.
- The number of beekeepers registered in the organic agricultural system in the two geographical area studied evolved during the three years as follows:
  - ✓ In Moldova, in 2012, there were registered 64 beekeepers in the organic agriculture at the Agricultural County Association in 2013, 9% more in 2013, and the number reached 78 in 2014
  - ✓ In Transylvania, in 2012, 58 beekeepers were registered, but in 2013 the number decreased to 53 and in the final year the number came down to 45
- The honey production in Moldova, during the study, was of 62.500 kilos of acacia honey, 50.500 kilos of linden honey and 65.500 kilos of polifloral honey, while the production in Transylvania was of 30.000 kilos of acacia honey, 14.000 kilos of linden honey and 50.000 kilos of polifloral honey, quantities much bigger in Moldova, fact determined by the honey-related flora present in each of the two regions studied
- Concerning the price per kilo for organic honey, growth can be noticed from one year to another, for all the sorts, meaning for acacia honey from 23,5 to 30 at Apicola Bacău and from 15 to 24 RON at Apicola Deva, for linden honey from 15 to 18 RON at Apicola Bacău and from 8,5 to 14 RON at Apicola Deva and for polifloral honey from 13,5 to 16 RON at Apicola Bacău and from 9,5 to 14 RON at Apicola Deva. In the same time, it can be observed that organic honey sold by Apicola Bacău had a bigger price than the one sold by Apicola Deva

- As a result of the statistical handling of the results regarding the moisture content of the honey, significant differences were identified in the following situations:
  - ✓ For Apicola Deva, between acacia honey (17,5%) and linden honey (18,333%) or polifloral honey (18%) in 2012, linden honey (18,733%) and acacia honey (17,833%) or polifloral honey (18%) in 2014
- The statistical handling of the values obtained for the hydroxymethylfurfural content, no significant differences were identified between the results taken from the three honey sorts analysed during the three-year study.
- After the comparative analysis of the results for the colorimetric index, there were noticed significant differences as it follows:
  - ✓ In Moldova, for acacia honey, in 2012 (12,33 mm on Pfund scale) and in 2014 (5,333 mm), between the average for polifloral honey in 2014 (51 mm) compared with the average in 2013 (35,333 mm) and in 2012 (38,667 mm), between linden honey (34 mm) compared with polifloral honey (51 mm) in 2014.
  - ✓ Between Moldova and Transylvania, for the results obtained in the case of polifloral honey in 2014 (51 mm) compared with 2013 (35,667 mm)
- The results regarding the content of total reducing sugar comprised values from 69,4% (a sample of polifloral honey from Apicola Deva) to 76% (a sample of acacia honey from 2012 from Apicola Bacău). The results were not statistically ensured.
- The fructose content, in the case of the acacia honey, ranged from 43,133% and 44,050%; for linden honey from 38,683% and 39,333%, and for polifloral honey from 39,650% to 41,167%.
- Also, it could be noticed that the results concerning the average content of glucose varied for acacia honey between 30,567% and 31,500%, for linden honey from 33,617% to 33,717%, and for polifloral honey between 32,800% and 33,133%.
- The lack of tetracycline, streptomycine, sulphonamide and chloramphenicol waste as a result of analysing the 54 samples pointed out a high quality honey.