



**ENGLISH LANGUAGE ABSTRACTS OF PhD DISSERTATIONS DEFENDED
IN THE DOCTORAL SCHOOLS OF THE FACULTY OF AGRICULTURAL AND
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**Marketing aspects of purchasing and
trading animal products of ecological origin**

CSABA BÓDI

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There is a dynamically growing proportion of ecologically farmed land and the volume of sales of ecologic food stuffs in the whole world. This is due to the better environment consciousness induced by the negative influence of environmental changes, sustainable farming and the rising demand on healthy eating on behalf of the consumer society. During the past years there were considerable changes in the growing market of baby food among ecological products or as it is commonly used bio-products. Besides committed bio-farmers and producers, multinational companies appeared on the market urged by meeting the consumers' demands and capturing a market share. They used distribution and marketing instruments, which enlarged the circle of their consumers.

The basic aim of the thesis was to give an account of the development of ecological growing and processing, their legal background and consumer tendencies with special regard to animal origin products, carrying out target group investigations at the field of baby food, analyzing consumers' preferences and making suggestions that can be turned into practice. In order to reach the set objectives we collected secondary and primary data.

In the frame of secondary research we made an account of the development, progress and legal background of ecological production in Hungary and abroad; the situation of ecological animal husbandry in Hungary, the nutritional values and advantages of ecological products, the development of baby food production and its market share.

We prepared a literature review about the relevant marketing and consumers' behavior with special regard to that of ecological food stuffs.

Primary research covered the following items. Focused on baby food we investigated the consumer tendencies of bio-products. We analyzed in focus group interviews within the consumers' purchasing behavior: the preferences towards home made and fabricated baby food, the factors influencing the frequency of buying and consuming baby food and the possibilities of increasing the consumers' motivations

Further more we analyzed in the field of quality factors, motivations and preferences of baby food: the ingredients of good quality baby food and the awareness of nutritional advantages of raw materials from ecological produce. In the field of product structure and range we analyzed: the possibilities of sale, packing and packaging, the product development policies and the choice of baby food. According to the questionnaire interviews the order of quality factors was: quality,

flavour-combinations, healthy, practical packing and free of preservatives. Investigations proved that customers prefer strictly controlled quality parameters much more than bio-quality. As a summary of own research we elaborated the complex customer model of those who choose the products of Hipp, Kecskemét and Nestlé according to different demographic and marketing specific or non-demographic characteristics.

Economic Analysis of Production Chain Stages of Native Hungarian Grey Cattle

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In the dissertation are subjected the economic parameters and correlations of Hungarian Grey Cattle's total product line. In the course of researching the total product line are phased, the general economics of Hungarian grey cattle are analysed, breeders, processors and salesmen and their relationships are examined in economic ways, eventually problems and deficiencies are shown, and optimal solutions are determined relative to total product line.

New and novel scientific results are the following ones:

1. **Hungarian Grey Cattle** (the native cattle breed of our country) has increased lately, it doesn't have an important role in the economy and its **contribution to the gross domestic product is not important**. By the greater part of the animal stock the main utilization way is not the production of the meat as a raw material, but increasing the size of the breeding stock, gene conservation and environmental protection. The Standard Gross Margin (SGM) and the European Size Unit (ESU) of the Hungarian Grey Cattle keeping farmers were determined. Based on these investigations **the one fifth of the farms are not viable in our country**, even though that they keep other farm animals or serve as a tourism attraction, too.
2. The result of the multiple correlation analysis – what shows, that there is no connection between the realized factors of production – lights upon the fact, **that many keeping technologies are adaptable in case of the Hungarian Grey Cattle keeping**, from the most extensive to the half-intensive. In this study an extensive and a half-intensive keeping technology were analysed in the aspect of income conditions. The investigation shows that there is a **minimal** (could be incidental or caused by a fault) **difference between the two keeping technologies in the aspect of cost efficiency**. The resource expenditure is increasing in vain in course of the production, the output that get into the unit cost won't be higher, so it's the same in case of both technologies.
3. In case of the Hungarian Grey keeping, instead of 1.4 animal unit/ha (maximum allowable in our country) the farmers keep 0.8 animal unit per hectare on the average. This means a very low usage and it is unfavourable in the aspect of economy. It is determined that the higher number of the animals kept in a unit pasture size, effects a higher cost efficiency. In case of a higher value, it could be a decrease in efficiency because of the trampling damage, dominance inside the group, etc. In this dissertation a formula **could be found, that gives a hand to the farmers by determining the optimal size of the livestock**.
4. In course of the Hungarian Grey keeping as a basic activity, because of its multifarious vertical and horizontal diversification possibilities, **five result category could be determined** depending on that the which additional income is taken into the production.

5. This research has revealed the distribution channels of the Hungarian Grey Cattle as a raw meat and meat product in Hungary. The marketing channels of the Hungarian Grey are immature and not worked out enough, there is a minimal coordination and business connection between the vertical performers of the market. In course of the investigation the *different marketing possibilities were compared to each other*. The result is, that the most effective and the most favourable solution would be the vertical integration for this sector. Furthermore it could be determined – based on the analysis of the prices that evolved on the vertical level – that while the price scissors between the processor and consumer prices is opening significantly because of the lack of integration (a strong exponential connection exists), till then a co-integrated market exists in case of integration (by a strong linear connection).

Economic analysis of production factors and weed management methods in organic farming

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Conservation of natural values, protections of environmental values has become a dominant part of the socio-economic life by now. At the back of it there is on one hand the increasing use and depletion of natural resources, and on the other hand the increasing quantity of pollutants released to the environment as an effect of different activities.

The legitimacy of organic farming is not only confirmed with its benefits at quality issues and environmental protection, but also with its yield stability at unfavourable weather conditions.

In contrast with the reduction of average sales prices the constant increase of inputs (material, ancillary and labour costs) is observed. A solution would be if the private organic farms would unionize into a vertical integration, and the added value of organic products would be increased with the establishment and expansion of processing capacities.

Direct weed control is achieved firstly mechanically – manual and by machines. Due to lack of capital the most common methods in organic farming systems can be observed in the conventional farming systems, too. The applied weed control method is not determined by its cost in the farm, the more expensive methods not always prove to be the most efficient ones.

It is difficult to obtain reliable data regarding the time consumption and cost of weed control, because the majority of farmers does not lead a separate record despite these factors affect their profitability notably. Changes made in the structure of the existing registration system could provide information not only for the farmers, but also for various professional and scientific circles to enable rational decision making.

The following new scientific results can be stated based on the surveys:

1. The paper found that there are not any significant differences between the productions systems of conventional and organic farming systems considering labour demand and land use based on the data of FADN of the Research Institute of Agricultural Economics. The comparison of conventional and organic farming showed the indicators of labour force per 100 hectare varied between 7–27%, there were significant changes in case of land use per year.
2. The analysis of secondary data proved that the surplus use-value of organic products recognized by the consumers has a decreasing tendency. 10–20% higher prices could be obtained on the average concerning cereals and row crops in organic farms compared to conventional ones in the years 2004–2007.
3. The farmers' response survey results were classified in factor classes on the basis of data variability. The constraints of effective weed control can be classified into three clusters; the cluster of the most important influencing factors is formed of the environmental and economic-financial conditions. Subsidiary and education system

can also be highlighted regarding the efficiency. The causes of weed damage can be divided into three clusters based on the survey. Above-average effect is attributed to yield reduction, while the crop contamination – control is difficult to solve – acts as a vector factor class is considered mediocre.

4. The dissertation made evident that the labour force characteristics (low-cost labour, high unemployment rate) establish the application of manual weed control also economically.
5. A simulation model has been developed, which enables to investigate the optimal structure of organic farms considering both ecological and economic factors, which should be recognized in the direction of diversification. This model results in the profit maximalization of production activity, and provides a basis to the farmer in the development of a crop rotation.

The use of glycerol generated during the biodiesel production for feeding pig

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The biodiesel, which it is possible to manufacture from different materials, belongs to the renewable energy sources. The use of the huge amount of glycerine arising as the by-product of biodiesel production turned into an important task worldwide. The glycerol has been used for decades with good results for dairy cows to improve the energy supply of the animals. The 2 groups were placed in 4–4 boxes in a concrete grid floor stable. For feeding dry-food self feeders, for watering tipped (Nipple) self watering devices were used. Animals received until 70–75 kg of live weight a growing diet, and then till to the end of the experiment a finishing diet.

The experimental group's diets contained 5% glycerine, with which a part of the corn proportion was replaced. The small decrease in crude protein deriving from the smaller proportion of corn in the diet was compensated by a corn gluten supplement. The animals were individually weighed at the beginning of the experiment, then when changing the feed mixture (on the 57th day of the experiment, 70–75 kg live weight) and at the end of the trial (105–110 kg live weight).

For the consumers, such as restaurants, canteens and households, it is an important question, what the cooking and sensory properties of pork derived from animals fed glycerol. The parameters listed, were determined in part (dripping loss, baking loss, shearing strength, colour and sensory properties) by the experts of the National Meat Industry Research Institute, using by groups 5–5 pork chop samples, which we cut from the 11. rib section. Another part of the laboratory tests (freezing, defrosting and cooking loss) was performed by the laboratory of Department of Animal Nutrition.

However, it is still not widespread in practice in the case of monogastric animal.

The new scientific findings are as follows:

1. 14.01 MJ/kg was the apparent digestible energy content and 13.48 MJ/kg was the apparent metabolizable energy content of the 86.76% feed grade glycerol tested, what amounts to 91.5% and 88.0%, respectively of the tested glycerine's gross energy content. This is counted to 100% glycerine equal to a content of 16.43 MJ/kg apparent DE and 15.54 MJ/kg apparent ME, respectively.
2. The weight of the animals between 25–85 kg and the application rate of the glycerine between 5–10% did not effect the utilization of glycerine.
3. Dose of 5 or 10% glycerol supplement in the diet does not affect the digestibility of feed nutrients either N-retention of pigs.
4. Feeding of 5% glycerine does not affect the results of fattening (weight gain, feed-, energy- and protein utilization), ie. glycerol can replace the corn in pigs' feed, based on its apparent digestible energy value.
5. 5% glycerol has only a small effect on the "de novo" fatty acid synthesis, resulting in a small change in the fatty acid composition of loins, thighs, back-fat and lard.
6. The glycerol feeding reduces the dripping loss of the meat, stored at a temperature between –12 and –20 °C degrees, after thawing.

Effect of UV radiation on the growth, pigment and hormone content of microalgae

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Stratospheric ozone depletion discovered during the 1970s has caused an increase in the intensity of solar UV radiation reaching the Earth's surface, which generated extensive research on its effects on living organisms. Algae, as the most ancient photosynthetic organisms, are considered particularly unique in this respect for several reasons. This dissertation focused on the effect of UV radiation on microalgal strains under laboratory conditions after preliminary *in situ* experiments.

New scientific findings:

1. The author was the first to detect UV-effects on phytoplankton photosynthesis in an Hungarian lake (Lake Balaton). As shown by the results, an average of 75% of surface UV photoinhibition was caused by UV-A radiation (320–400 nm). As for areal primary production, the effect of UV radiation resulted in a considerably lower inhibition of 8–14%.
2. UV-induced growth inhibition, changes in photosynthetic pigment content and morphological changes of the green alga *Desmodesmus armatus* have not been studied before. In the presence of UV-A radiation the relative abundance of 4- and 8-celled coenobia decreased, while that of the 2-celled and teratological forms showed an increase over the controls.
3. Results of the experiments on microalgal cultures (Mosonmagyaróvár Algal Culture Collection) suggest that growth inhibition and the decline in chlorophyll-a content showed similar trends between the green algae studied. On the other hand, there was considerable variability among the cyanobacterial strains. As opposed to the green algae with higher UV resistance, cyanobacteria showed high sensitivity in respect of growth in response to the applied UV-A and UV-B radiation.
4. The author successfully detected a UV-absorbing mycosporine-like amino acid (palythine) in the green alga *Klebsormidium* sp. (strain MACC-426). Accumulation of the compound was induced by UV radiation, with UV-B radiation (280–320 nm) having a greater effect.
5. This is the first report studying the effect of UV radiation on the hormone content of a microalgal culture. The applied UV-A intensity slightly inhibited the cellular growth of the green algal species (MACC-458 *Chlorella*), and caused a significant decrease in the dry-matter-related levels of isopentenil-ribozide, indole-3-acetic acid and abscisic acid.

Economic investigation of copper micro-element treatment in winter wheat

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Winter wheat is one of the most important cultivated plants in Hungary. In the market-oriented agricultural circumstances decreasing yields and fluctuating quality cause considerable problems to the producers. The objective of the research was to increase and stabilise yields with suitable fertilisation, and as a result to improve profitability.

During the research the effect of copper micro element fertilisers was in the focus, due to the fact that in the past years and decades some essential elements like copper were not supplied sufficiently. In case the soil is deficient in micro elements, one should expect the decrease of yields and decline in content values. Winter wheat fertilisation investigations have been carried out for three years with using copper-amine complex, copper-carbohydrate complex and copper ion-exchanged synthesised zeolite with the objective of defining the best yield-increasing copper micro element fertiliser, the optimal application time. The effect of copper complex fertilisers on yields was also put in numerical form.

In market economic circumstances production should not only focus on excellent quality and high yields; farmers should also produce a reasonable profit with the production. For that reason revenues and expenditures were nominalised and profit level was also defined. It is hard to give exact numbers for the profit originating from higher quality – especially in case of basically good quality winter wheat –, therefore in order to illustrate the usefulness of micro element supply in winter wheat, economic analysis concentrated on the definition of profit increase originating from yield increase.

Investigation results prove the favourable effects of copper micro element fertilisation, based on both natural and value indicators; the following new scientific findings:

1. The yield increasing effect could be proved for all copper micro element fertilisers and for both phenological phases, applied in winter wheat. Applying the suitable doses yields increased considerably in all cases; however, significant differences – compared to the control plots – could not be proved in all cases.
2. Investigation results proved that concerning the three copper micro element fertilisers, applied during both phenological phases, the copper-amine ion-exchanged synthesised zeolite had the most effective yield increasing effect.

The more favourable time of application was also defined. Concerning the phenological phases, treatments at flowering turned out to be the most effective, reaching higher yields with less copper amount, in an input material saving way.

3. It was demonstrated that the copper microelement fertiliser applied as a supplement to the regular plant nutrition has a profit increasing effect. As a result of the suitable dose of all three copper microelement fertilisers in all research years, profit increased considerably by 25–60%.

The most useful copper leaf fertiliser was defined, based on economic viewpoints:

economic calculations indicate that copper-amine ion-exchanged synthesised zeolite was the most favourable treatment from all three copper micro-element fertilisers, applied both at tillering and flowering.

4. Concerning the most favourable copper-amine ion-exchanged synthesised zeolite, applications performed at different phenological phases were compared from economic viewpoints. Based on the economic calculations, research results do not indicate significant differences concerning treatments applied at different phenological phases. Analysing the average of the three years, profit increased by more than one and a half times. Profit was the highest with 1.56 kg/ha copper dose applied at tillering, and with 1.35 kg/ha copper dose applied at flowering.

Increasing of conjugated linoleic acid content of broiler meat and egg by feeding

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Nowadays some of the researches which aim to alter the fatty acid content, are primarily investigating the opportunities of increasing the conjugated linoleic acid (CLA) content in fat. This tendency largely depends of the fact that linoleic acid plays a wide parallels range of different roles in the organism. If it comes to these roles, the c9,t11 and t10,c12 CLA isomers are the most important ones. In considerable amount, the human organism initiates its CLA intake by consuming food products, made of ruminants (milk, meat), or by the consumption of different food supplements. In Hungary, beef and lamb consumption per head is insignificant, the yearly milk intake per head also fails to exceed 200 liters, which is, compared to the EU average, is rather low. That is why it would be advisable to increase the CLA content of such food materials – originally low at CLA – which are widely consumed in large amount. Broiler meat and egg could be such materials; of which CLA increase via feeding manipulation got to become the aim of our study. Apart from the investigation of increasing CLA content, we also dealt with the question whether the blissful effect of CLA on the oxidation stability of the meat samples could be boosted by the vitamin E supplementation added to the feed.

On the basis of the outcomes of the experiments on broiler chicken and laying hens the following new scientific achievements could be stated:

1. 1 or 2% CLA product – containing 53.5% CLA, made by alkaline isomerisation of sunflower oil – of the feed significantly increases the daily weight gain of the broilers. 4% CLA product, however, hinders the weight gain.
2. The CLA supplementation of broiler feed does not affect considerably the digestibility of the nutrition, or N-retention. CLA supplementation furthermore does not change the crude protein or crude fat of breast and leg meat significantly.
3. The CLA supplementation of broiler and laying hen feed increases the CLA proportion of the broiler meats (leg, breast) and egg lipids. Regardless of the fact that c9,t11 and t10c12 isomers were present in the CLA product in an equal amount, the proportion of the c9,t11 variation in meats is 1.5; in eggs 4 times higher than of the t10,c12 isomer.
4. As a result of CLA feeding, the amount of saturated fatty acids in breast meat increases, the proportion of mono and poly unsaturated fatty acids decreases. In the lipids of egg yolk, besides the increase of the proportion of saturated fatty acids, the proportion of mono unsaturated fatty acids decreases. The direction of changes in the proportion of the main fatty acid groups, triggered by the linoleic oil, fed simultaneously with the CLA product, cannot be modified.
5. Our results proved that substituting the sunflower oil content of the feed with CLA product aids the oxidation stability of broiler meat. This favorable effect could be strengthened by the combination of CLA supplementation with vitamin E.

Revenue relationships of the actors of poultry (broiler) and swine product planes

SZABOLCS TROJÁN

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Making consequences we have made several references on positive or negative effects of Hungary's EU accession, but the present state of matters cannot be solely explained by the effects of accession.

The subject of our research was the thorough analysis of the pork and poultry more nearly broiler chicken product planes which are the backbone of domestic meat industry. The choice of topic was motivated by the fact, that both sectors fall within the so called soft regulation of the Common Agricultural Policy, the regulation of the production of both sectors being managed – through animal fodder consumption – by regulation of COPF plants. The accessible data of the past 5 years (2004–2008) has enabled us to perform analyses and based on these to draw conclusions regarding agricultural production within that broiler chicken and pork production and the sector of food industry (meat production).

Our basic aim was the examination of the fodder consuming sectors (poultry and pork) more and more in crisis, with the aim of getting a complex picture of the situation of actors of the two planes regarding income and competitiveness. It was among our goals to discover the factors which can chiefly influence the competitiveness of both examined sectors both on national and regional levels. The aim of this work to present and examine in the network of interrelations the levels of the poultry (broiler) and pork meat product planes according.

The following new and novel results were stated based on our research:

1. With examinations performed based on financial indicators of stages of the broiler and swine product plane a novel approach was used to uncover the economic processes. After performing the calculations, a clearer view can be formed of the financial and revenue status of all actors of the product plane.
2. The revenue and competition situation of both meat product planes falling under the same regulation of Common Agricultural Policy have derogated after the years following EU accession, but the extent of worsening of the situation is not the same in the two product planes. This instance shows, that the basically cost (and price) related revenue – from the side of input – is strongly influenced by the prices of fodder, but these changes can not be solely explained by changes in the prices of fodder. Other factors beside the price of fodder (for example, capital and product concentration) also play an important role in the formation of results. These factors are in the relation of both product planes had negative effects especially on the revenue and competition situation of the processing sector.
3. All indicators of revenue production have improved on national level, and the previous indicators showing deficit have turned into positive regarding the chicken meat (broiler) sector in the examined period of five years (2004–2008). Contrary to this several revenue indicators of broiler producers in the Western Transdanubian Region worsened

or turned to deficit levels. The values of these indicators show that in this sector the assets value- and capital rate have strong influences on the results or production.

4. The revenue situation of swine stall feeding was under the level of broiler production on both national and regional level, and receded significantly after the years of the EU accession. In this sector not only the revenue indicators have deteriorated, but other economic indicators (liquidity rate, debt indicator) have continuously deteriorated. This is especially true for invested capital in the single product plane stages related to the revenue. This can also explain the large amount of dissolution among swine farms with low capital level and low level of concentration that has continued after 2008 as well.
5. Meat processing companies in spite of still having a far larger processing capacity than necessary arrived in a more and more vulnerable situation of the retail chains after the EU accession. Due to the low level of capital concentration represented by them they were forced into a price accepting position, and often are unable to realize their costs in their prices. The profitability of the majority of meat processing companies is even lower than the producers of slaughter raw materials, and this position has become worse in the period of the research and also ever since then.