

IS THE 100-WEEK EGG PRODUCTION CYCLE A SUFFICIENT BREAKTHROUGH OPPORTUNITY ON THE COMMODITY MARKET IN THE LIGHT OF THE ECONOMIC TURNMOILS OF 2021-2022?

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ABSTRACT

In times of accelerated economic changes dominated by technology, the values of scheduled and completed agricultural innovations need to be evaluated in the light of new trends and challenges.

Our data generated in the past years shows great results, but the often-exponential changes may override the meaning of these values. However, new times opens new opportunities: this 100-week egg production technology, designed and developed on firm with excellent economic result provides additional economic and social opportunities fulfilling an important role in an ever-changing environment.

The technology described in the thesis with its particular parameters highlights the importance of long-term, uncompromised, natural pattern based approach. This approach opens positive value innovation and development circles and enables such technological approach that ensures continuous improvement, sustainable operation meeting also the social requirements. The demonstrated results from the presented study are excellent, but in terms of other revenues it is necessary to establish complete systems and to carry out appropriate verification audits before their practical application.

Keywords: biological solution, value innovation, twin products, 100-week egg production, social interests and values

INTRODUCTION

In the years of 2021-2022 the entire agricultural economy has faced with such simultaneous and general restructuring which has been unprecedented in the last 50 years. This affected all elements of fixed and variable costs. Additionally, the inflation and the increased role of automation, robotics, biotechnology, molecular genetics in each process and the rearrangement of markets along with the changes in rules, regulation and customer trends can negatively impact the adaptation or resilience of producers already in short and mid-terms.

Beyond all the trends listed so far, the agricultural and food production in Poland have shown the fastest development in EU with the chance to become the largest exporter after 2025. This puts the Hungarian agrarian sectors under further pressure. (HOLLÓSI, 2018).

In the course of the process of change, the market always finds a new balance with a delay and only with a compensation to the necessary extent. This, however, does not compensate the 6 to 12-month delay neither will provide solution for the similar situations in the future. In general, the literature does not provide satisfactory answers to these challenges, as such disruptive technology from outside of the core industry, which not only provides significant comparative advantages but also has a complex and immediate impact on the industry has not been observed before. In most cases, the industry is not prepared to a boarder perspective in the planning of development, like transforming stock-farming processes according to current customer demands, such as food-quality or protection and

improvement of ecological and social values. If it were prepared, our market indicators would be much more competitive.

The changes happen quickly and often exponentially. This requires that the R&D activities and innovations need to be evaluated based on excellent responses to the already visible trends, hence the planned application is timely adequate and serves the based for further process developments.

The true question to be asked: is it possible to find a technologically and economically viable solution from an independent source outside of the industry, that complies with strict Hungarian regulations, and which provides significant advantages from pure economic perspective, but ignoring social and moral parameters?

The great advantage of purely biological development and value innovation processes is that they have a positive effect on all important physiological processes together with generating positive impact on multiple economic indicators. What additional market opportunities can be turned on, which can build up additional benefits even in a traditional production process.

This study explores the economic impact of a biological and holistic supplementary feed consisting of all natural substances on the production of intense laying hens showing measurable and significant direct effects and positive side effects on widespread ecological and social value creation, and through them demonstrating also positive economic results in the production process.

MATERIALS AND METHODS

Hens were tested by adding Esstence supplementary feed to their drinking water. The dosage was carried out by the automatic dispensing system in a similar way to the dosage of drugs, antibiotics, mandatory vaccines, other vitamins and organic mineral supplement feeds.

During this testing with adding Esstence, we provoked all non-compulsory medication in the flock, but we did not replace any of the vitamins and organic supplements.

Daily physical and economic parameters of the production process have been measured and recorded from each barn in the past five years, where the data collection is partially automated and partially done by manual data upload.

The site complies with the provisions prescribed by the self-monitoring HACCP requirements defined by NEBIH from all aspect, moreover additional set of important economic (both quantitative and qualitative) indicators and records have been constantly registered.

This source provided the opportunity to set up authentic and justified control measures and to perform temporal and spatial analysis.

The most important natural and economic parameters used in our analysis are the following:

- Rate of Lay % (numbers of eggs were divided by the duration in days; or productivity)
- Egg Mass
- H.H. Eggs Numbers (eggs per hens placed)
- Egg Weight in grams
- Mortality rate in %
- Feed Intake (grams per hens)

There are 180.000 Lohmann Brown-Classic laying hens producing eggs in six stables on the site at the same time.

The test was carried out at the installation of 3 x 2 barns, all together at the same time. All plantings were carried out at the same time, with the same hybrid, on the same feed, under the same conditions.

The installation took place in the fall of 2019, after the penultimate period of bird-flue, as a resumption of the production process.

The test started with the most vulnerable population, then after the first spectacular results, it became the subject of the test in stages, in each test pair of stables, so that we can also clear out the effects of the stables at the time of certification.

With the exception of Esstence technology, all other parameters were identical during the investigation period.

Since, contrary to the usual intermittent nature of the installation the production had to be resumed at the same time, the production of one stock had to be pulled apart during the cycle, i.e. one stock was cut down sooner, while the other was kept in further production by shedding in order to re-establish an economically sustainable order.

As a production site, in addition to the production value per feed and square meter, the most important parameter is that economical production is only possible at a level of persistence above 80%.

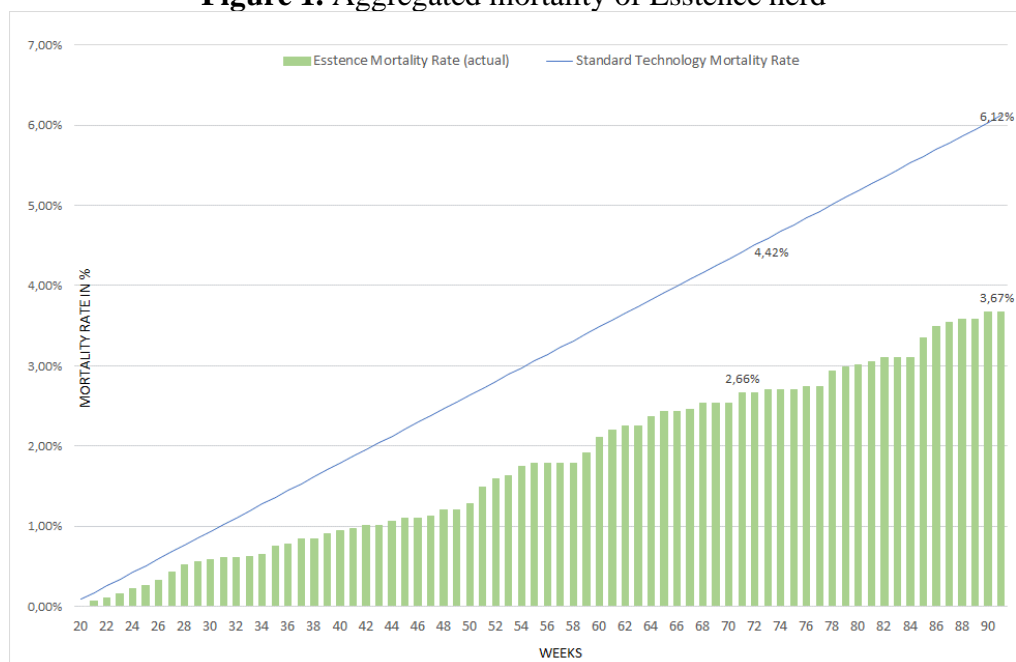
Hence, the unusual situation, that the length of the cycle had to be extended in some sheds, it was also possible to analyse the effect of the technology even in such conditions with a longer production cycle.

The experiment ended 9 weeks earlier than the planned (and both technically and economically preferred) test period of 100 weeks due to the newest wave of avian flu in early 2022.

RESULTS

The improvement in the stamina of the flock can be best detected in the radical decrease in the mortality rate. To the persistence point (W71) the aggregated mortality rate almost halved and dropped from 4.2% to 2.7%.

Figure 1. Aggregated mortality of Esstence herd



The average number of eggs laid on the daily basis increased by ca. 10% from 5.7 to 6.3 eggs / hen with maintaining the feed volume at the same level as before.

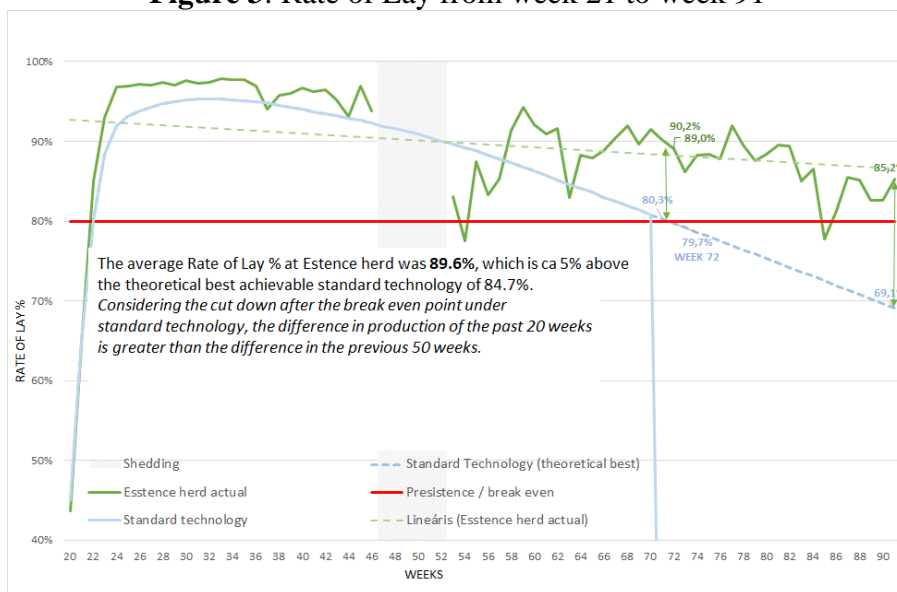
This also resulted in exceeding all expectations in egg weight produced. The cumulative production showed a yet unknown heights and it confirmed an average production weight by hen of 27.2 kg vs. the technological standards and expectation of 20.1 kg per hen until the standard week (week 71.) of the cut down. In other words, the production measured in egg-weight overtook technological expectation by 35.3%, within the framework of an extremely economical and simple production technology.

Figure 2. Daily eggs laid H.H.



It was an unexpected result that the persistence arc flattens so wonderfully, that the flock is able to meet the economic requirements for up to 100 production weeks. (The rate of lay was recorded still at 85% in week 91, when the test got interrupted due to avian flu.)

Figure 3: Rate of Lay from week 21 to week 91



This is extremely important, since with the longer production period the one in three stock-rearing can be skipped over, which in this case means additional variable cost avoidance (or cost decrease) of ca. HUF 300 M at corporate / site level. This can be also translated as a cost decrease of over HUF 16 M per stable in each production cycle. This is and remarkable result considering the HUF 130 M expected revenue cycle per stable.

Similar goals have only started to be published in the very recent years by the R&D teams of international companies that define the sector (MCDUGAL, 2018).

Figure 4. Estimated Quarterly Revenue and Margin Growth (in M HUF)

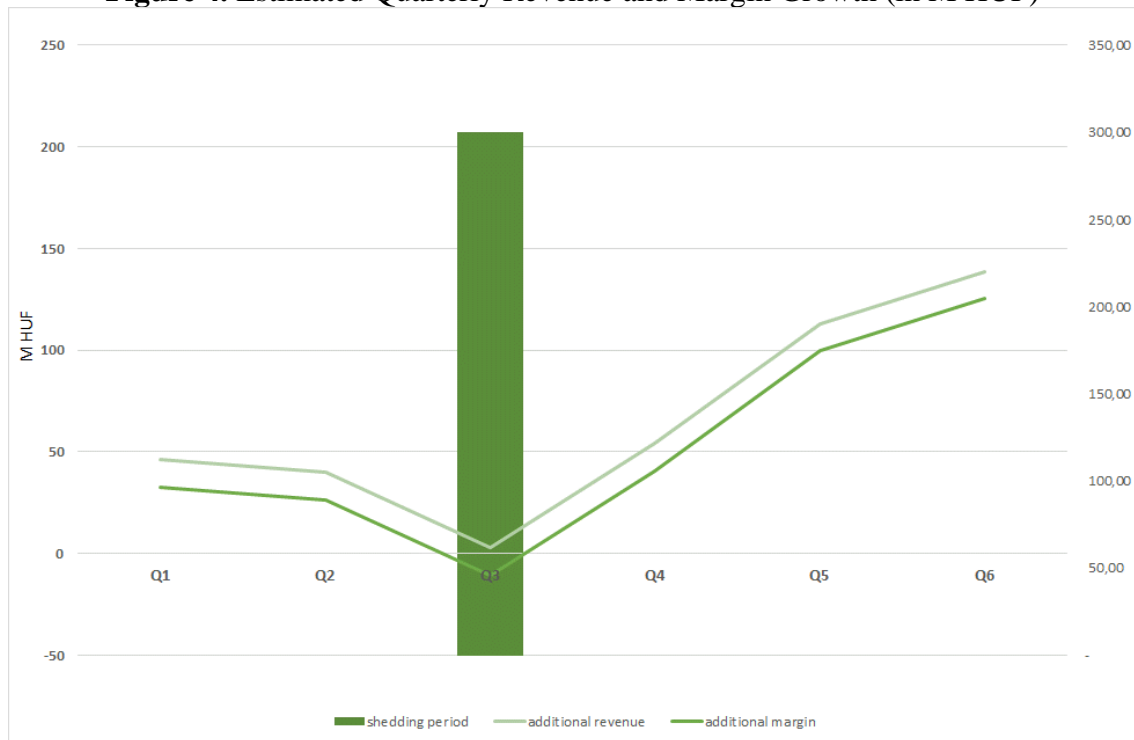


Table 1. Economic calculation results

period	base revenue	excess revenue		Esistence cost		excess margin	M HUF
Q1	889.4	72.9	12%	(13.7)	17%	59.1	11%
Q2	1,036.1	63.5	10%	(13.7)	17%	49.9	9%
Q3	1,003.9	4.9	1%	(13.6)	17%	(8.7)	-2%
Q4	926.4	85.6	14%	(13.5)	17%	72.1	13%
Q5	836.3	178.5	29%	(13.4)	17%	165.1	30%
Q6	742.4	218.7	35%	(13.3)	16%	205.4	38%
Összesen	5,434.5	624.2	100%	(81.3)	100%	542.9	100%
		11%		-1%			

Source: own research [_____](#) calculation based on egg price at 1200 HUF/kg

In the process of design and development we applied Blue Ocean strategy in order to identify new business opportunities: achieving higher yields without significant additional investment and cost; further to satisfy social and consumer needs for high quality food products (STE Quality, SQ) and to support sustainable economy, through reduction of

GHG emission in production and trading with CO₂ quota (KIM AND MAUBORGNE, 2008). They are considered synergistic complements to each other in the changing markets. The composition and substance of the product are always confirmed by laboratory testing, further it can be distinguished from other products by sensory examination and in gastronomic processes, allowing for positioning between the organic (bio) foods and the conventional food products (KERTÉSZ AND TÖRÖK (2021), GERGELY ET AL. (2014)).

This is an extremely important business aspect as it represents an additional 20-30% pricing and turnover opportunity.

Studying the CO₂ settlement process we applied the FAO-approved GLEAM system and the Cool farm method, which is extremely wide-ranging and supported by major market players. Although both systems have extremely shallow agrotechnical depths, similar and significant CO₂ quotas can be achieved when using Esstence technology. This can provide a surplus revenue of 30-50% above the operating revenue of the base activity. The CO₂ quota's exchange rates may be highly volatile, the EU is a major buyer market, which market is regulated at Community level (FAO, 2022, COOL FARM ALLIANCE, 2022, SANDBAG, 2022).

DISCUSSION

The significant natural surplus, the operating cost reduction and the resulting hedging surplus in continuous production would be perfectly sufficient in "peace time" to underpin a successful operation and management and to provide competitive advantage.

Similar result in such significant increase in persistence has so far been achieved for one commercial stock in the world, although there are a lot of ongoing attempts, all only on free-range stocks.

Taking into accounts the specific benefits described above this is a professional world leading technology, which with additional biological procedures (germ feeding or other supplementary natural feeds) can be significantly developed further. These additional steps mean further improvement in food quality and in CO₂ quota utilization, without compromising the professional ethics of the development directions.

All developments, which have been designed and conducted by other creators try to achieve their goals through genetic selection and biotechnological procedures.

Leaving this behind, we have opened an essential, vital, and primary physiological path.

Esstence contains exclusively natural substances and the basis of its function, and its effect are measured by the fact that via robust increase in endurance, fewer animals weaken and die, so more birds continue to produce, and the measured other specific values underpin a more efficient production.

However, most of these results were measured and recorded before the critical turning point in spring 2022.

With sustained increases in feed prices, energy prices by orders of magnitude and a steady increase in labour costs, in contrast to several months of delays in market recognition and the ongoing pandemic threat and inflation, any production activity represents a significant risk, both from a contingency, return and further investment decision perspective.

Repositioning a product based on food quality is an excellent opportunity to generate additional revenue in the usual markets, which is in significant demand from consumers according to surveys.

The possibility of clearing the CO₂ quota became a real opportunity in 2021, when significant and sustained demand emerged in the markets under sectoral regulations, causing exponential increase in quota prices.

The value of quota accounting in such production processes is increased by the fact that

- a) it does not require additional activities or investment, except for the documentation necessary for settlement, and
- b) that it generates surplus revenue from dynamically growing markets utterly independent of the core business

The combination of proven results of excellence in food production, preservation of natural resources and values, and increased animal welfare in one single system will create significant synergies on all markets being it on the base product market (with controlled and repositioned base product) or on the markets of CO₂ quotas.

The increased sales revenue and margin together with the above supplementary revenues are already and excellent financial assurance for business contingency and an enabler for new developments.

The demonstrated results from the presented study are excellent, but in terms of other revenues it is necessary to establish complete systems and to carry out appropriate verification audits before their practical application.

The technology of the basic process of the study can be utilized, but further technological results can only be achieved through the continuous development of the technological ensemble.

This technological ensemble with appropriately verified implementation can already represent significant and global competitive advantages in the international ecosphere.

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