

Poultry trial feeding result

Introduction

As part of the Baltic Blue Growth project, two studies were carried out to evaluate how substances move in the food chain and to investigate the possibility to use mussels as an ingredient for poultry feed. The aim of the two studies was to show to potential breeders and the chicken industry how mussels from the Baltic proper could be used as a protein source in feeds for poultry. This would reduce the need to import feed from outside the Baltic region and would result in reuse of nutrients in a local nutrient loop. However, in order for this to be appealing to the industry, the raw material needs to be in line with the safety regulations for feed and food products.

The studies were performed in close cooperation with the associated project partner and local feed factory, Swedish Agro, in order to continuously get feedback on the results. Moreover, the mussels as well as the mussel-based feed and chicken tissues (muscles and liver) were analysed with the aim to identify possible unwanted substances according to EU and Swedish national regulations for food safety. Chickens' behaviour and weight were also registered.

Two different processes for mussel meals were tested during the project. The first produced a fine ground feed product and contained above average quantity of sodium and chloride (salt), which made it hygroscopic and thus, it absorbed moisture from the air causing it to become sticky. This could be seen as a possible risk by the poultry industry as the feed could clog feeding pipes and could cause microbial growth. However, the development of industrial mixing processes could address the issue. The second process generated a product which was somewhat flaky and it was similar to fish meal, which worked well in the trial. Both types of mussel meal were tested on chickens and laying hens. Meat, liver and eggs were analysed for the same substances as the mussel meal.

Chicken study 1

The chickens were very eager and curious about the first meal, which also had a distinctive shellfish smell. The chickens' growth or health did not differ from the chickens given ordinary feed with a mean slaughter weight at 2260g (2210g for the control group).

- Number of chickens: 100
- Blend of: oat, wheat, maize, rape seed meal, soy meal and mussel meal (5%)
- 34,5 days
- Sodium (Na) 2,28 %; Chloride (Cl) 3,83 %



Figure 1: Mixing of the feed for Chicken study 1.

Chicken study 2

The flaky meal in the second trial awoke similar interest in the chickens as the blend used in the first study. However, the heterogeneity of the feed made the chickens able to choose what part to eat – pellet or flakes of meal. The chickens' growth or health did not differ from the chickens given ordinary feed. The chickens' slaughter weight was 1970g, which was similar to the control group (1977g). In Sweden there is an ongoing discussion about toxins in organic eggs. The laying hens are given feed that contains Baltic fish meal and the eggs have had a slightly higher content of toxins. The industry wants to make sure that these aspects are straightened out.

- Number of chickens: 100
- Blend of: oat, wheat, maize, rape seed meal, soy meal and mussel meal (10%)

- 33 days
- Sodium (Na) 1 %; Chloride (Cl) 1,7 %



Figure 2: Chicks eating in the second study.

Substance analysis

The mussels used in the two chicken trials were harvested from the archipelago of Västervik on the Swedish southeast coast in late April 2016 and in 2018. They were immediately frozen and stored in a freezing facility. The mussels had grown for about two years on the substrate at the time of harvest. The mussels were analysed and bacteria, algae toxins, metals, dioxins or PAH were either undetectable or under regulation limits.

More information regarding the research as presented in this factsheet can be found in several reports as produced by the BBG project, which can be found on the page 'Publications' at www.balticbluegrowth.eu.

Recommendations for future development of mussel-based feed for poultry

Below is a list of comments and recommendations for the production of meals based on mussels.

- It is an interesting raw material if the unwanted substances (for example salt content) are handled accordingly.
- The raw material needs to be available all year round in large volumes and at a reasonable price in order to maintain a stable feed production.
- Although flaky meal would not clog pipes and it is easier to handle compared to fine hygroscopic meals, it is preferable to produce feed in the form of pellets to suit the industry.
- To start a mussel farm for the production of poultry feed products, it is necessary to notify the authorities and obtain a HACCP (Hazard Analysis and Critical Control Points) to be able to track the ingredients.
- To start a mussel farm for food, a production area needs to be opened. This means the entrepreneur needs to monitor the area for the farm with regards to water quality and unwanted substances and also apply for farm permit.

THE
PROJECT

This factsheet has been elaborated by the Baltic Blue Growth project. The aim of Baltic Blue Growth is to advance mussel farming in the Baltic Sea from experimental to full scale to improve the water quality and to create blue growth in the feed industry. 18 partners from 7 countries are participating, with representatives from regional and national authorities, research institutions, private companies. The project is coordinated by Region Östergötland (Sweden) and has a total budget of € 4.7 million. It is a flagship project under the Policy Area "Nutri" of the European Union Strategy for the Baltic Sea Region (EUSBSR).



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