



# Can mussels replace fish meal in feeds for organic poultry?

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## Aim

To evaluate if mussel meal could be a potential new protein source in feed for organic poultry

## Background

Poultry has higher requirements of sulphur amino acids than any other food producing animals. Most feedstuffs used in poultry feed have low contents of sulphur amino acids in relation to the birds requirement and in organic animal production it is not allowed to supplement the feed with pure (synthetic) amino acids. This means that it is very important with alternative protein sources, especially sources rich in methionine and cysteine. The shortage of good quality protein source may jeopardize animal health. Today we can see, for example mussel meat, as a potential protein source in poultry feeds.

## Discussion

In case mussels will be able to be processed and used as mussel meal and/or silage to a reasonable price it may be a safe and high quality protein source in organic diets for poultry. However, more research is necessary before mussels can be satisfactory evaluated as a substitute to fish meal in feeds.



## Material and methods

The study included 96 laying hens (Lohman Selected Leghorn). At 16 weeks of age the birds were transferred to furnished experimental cages with 8 hens in each cage. After week 18 until slaughter (week 29) four different trial feeds were used. The feeds have different content of mussel meal (0, 3, 6 or 9%) and fishmeal respectively.

## Why mussels?

The negative effects of over supply of nitrogen and phosphorus of our seas are today a well known problem and the nutrient leakage from agriculture is for that most responsible. Mussel cultivation have a positive effect on the environment and should make it possible to remove about 300 ton nitrogen every year on the Swedish west coast.



Foto: Lars-Ove Loo

## Results

• Different content of mussel meal (0, 3, 6 or 9%) had no significant effect on production or egg quality characteristics except for yolk pigmentation which increased with increasing concentration of mussel meal in the feed.



0 %



3 %



6 %



9 %

Yolk pigmentation with increasing levels of mussel meal in the feed.



# Mussel meal as a high quality protein source in broiler diets

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Mussel meal as a dietary protein source in broiler diets was evaluated. Mussel meal is produced from shelled, dried mussels (*Mytilus edulis*) and has an amino acid profile similar to fish meal. At times, mussels may contain toxins, derived from certain phytoplankton, causing varying types of poisoning in humans. However, preliminary studies have shown that poultry seem to tolerate moderate levels of these toxins without detrimental effects on health and with no residues in meat and eggs.



## Experimental design

The experiment included 288 unsexed Ross 308 broilers, divided into 36 floorpens. The chickens had free access to a standard commercial diet with either 0, 3, 6, 9 or 12 % mussel meal, or equivalent inclusion levels of fish meal, thus in total 9 experimental diets with 4 replicates each. The different diets were optimized for equivalent nutrient contents.

## Conclusion

Mussel meal may be used as a high quality protein source in broiler diets, and may be included at similar levels as fish meal.



## Results

There were no significant differences in live weight, FCR, mortality or caecal numbers of *C. perfringens* between protein sources or inclusion levels.

**Over-all effects of protein source on live weight, FCR and caecal colonisation of *C. perfringens*.**

|  | d  | protein source |      | p-values |
|--|----|----------------|------|----------|
|  |    | mussel         | fish |          |
| Live weight, g                                   | 7  | 187            | 189  | 0.68     |
|  | 21 | 988            | 991  | 0.87     |
|  | 36 | 2231           | 2214 | 0.67     |
| FCR  | 7  | 0.84           | 0.83 | 0.73     |
|  | 21 | 1.36           | 1.35 | 0.91     |
|  | 36 | 1.87           | 1.80 | 0.14     |
| <i>C. perfringens</i> ,<br>log <sub>10</sub> CFU | 22 | 6.7            | 5.2  | 0.60     |
|  | 29 | 6.0            | 6.4  | 0.28     |
|  | 36 | 6.4            | 5.5  | 0.07     |