

D 3.7 Deliverable. Mussel shells as a combined occupational- and Ca source in floor kept laying hens

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Mussel meal has proven to be an excellent high quality protein source to organic laying hens. In the process of producing mussel meal the mussel shells are being discarded. From an ecological point of view also exploitation of the mussel shells would be to prefer. Feather pecking in laying hens remains a significant issue for the egg industry. The behaviour itself is believed to be a form of misdirected feeding behaviour arising due to lack of occupation. In order to improve the occupation rate in laying hens held in a single tier floor system, mussel shells were given in the litter area. The mussel shells may also serve as a good calcium nutritional source for the hens.

An experiment was conducted with 900 floor reared Dekalb White layers kept in a single tier litter floor system from 16-75 weeks of age. The birds were kept in 18 groups divided into three treatments; **C**= organic diet at *normal* Ca level; **C⁻** = organic diet with a *reduced* Ca content and 700 g crushed mussel shells (10-20 mm) daily distributed in the litter of the pen; **C⁺**= organic diet at *normal* Ca level and mussel shells distributed in the litter. Production, egg shell quality, corticosterone levels, fear reactions (measured by novel object tests), plumage and keel bone condition, pecking wounds, foot and litter condition were recorded throughout the production cycle.

There were no significant differences found between treatments as regards production, novel object reactions, corticosterone levels (feces), plumage condition or pecking wounds. However, the birds given **C⁻** had a higher incidence of keel bone deviations than **C** and **C⁺**, reduced egg shell breaking strength and lower dry matter content of feces and litter.

In conclusion, the fact that the birds fed a limited amount of Ca in the diet (**C⁻**) seemed not to be able to compensate that by consuming enough of the mussel shells implied by the impaired bone strength and egg shell quality. Separate feeding in hoppers of the shells combined with a slightly finer structure may have increased palatability although the possible occupational effect from birds being more active in the litter might have been less. Still, at the larger particle size used this effect did not significantly reduce feather pecking, i.e. plumage condition. The lower dry matter content in feces affecting the litter negatively may be a result from unbalanced nutritional status in the gut.