The advantages of waxy-leaf nightshade for poultry performance

Covering the increasing demands for eggs and poultry meat, coupled with increasing expectations from the customers for sustainability, animal welfare and health, poses a great challenge for all poultry farmers around the world. Management and nutrition are two of the key factors for good animal performance and they are often interlinked.

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In recent years many substances besides the 'classical' nutrients have been introduced into feed to support the animal. Examples of such feed components are pre- and probiotics, organic acids and herbal mixtures.

Of special interest are feed materials that have the potential to quickly cover an increased demand of the animal's metabolism under challenging conditions (heat stress, feed imbalances) which may occur even under very good management.

The plant waxy-leaf nightshade (Solanum glaucophyllum) provides such an opportunity. This plant naturally contains 1,25-dihydroxycholecalciferol-glycosides (1,25(OH)$_2$D$_3$-gly).

The leaves are standardised with wheat middlings to a novel product now available for the feed industry: Panbonis.

This mixture is added as complementary feed on top of the usual vitamin D supplementation to support the functions of vitamin D.

Whereas the usual vitamin D forms used in animal nutrition cover the animal's basic needs, 1,25(OH)$_2$D$_3$-gly are suitable for meeting suddenly increased requirements, thus giving the feed an extra benefit.

Quick time to action

The quick time to action of 1,25(OH)$_2$D$_3$-gly is based on three reasons.

First, the glycosides are cleaved in the intestines by the digestive enzymes. The free 1,25(OH)$_2$D$_3$ is then easily absorbed by the gut wall where it is a necessary agent for mineral uptake.

Secondly, unlike other forms of vitamin D, 1,25(OH)$_2$D$_3$ is already metabolically active and does not need to be converted in the liver and kidney and is thus quickly available in situations of higher need.

Third, it provides an additional source of 1,25(OH)$_2$D$_3$ where the conversion of preliminary, metabolic inactive forms of vitamin D is hampered, for example due to reduced liver or kidney function.

These points are an advantage especially in older laying hens which may suffer from impaired liver function and decreased calcium absorption. In a trial with 70-week-old laying hens, the animals were fed 100g (Pan100) or 500g (Pan500) Panbonis 10 per ton of feed on top of the usual vitamin D supplementation.

This experimental period followed after a four week adaptation period with standard feed. The experimental period lasted 21 weeks (final hen age: 95 weeks).

In week 21 of the experimental period, egg shell breaking strength was significantly higher in the eggs from animals fed Panbonis compared to the control group (Fig. 1).

The decline in performance parameters, such as laying rate, was slower in the animals fed Panbonis than in the animals fed a standard control diet for older layers (Fig. 2), despite the large variation observed.

Similar to the effects in laying hens the addition of Panbonis is also suitable for broilers. There it supports the bone formation which is a challenge in today's fast growing breeds. A healthy and strong skeleton is important for animal welfare and optimal performance.

The strength of Panbonis in broiler diets is that it may reduce the effects of imbalanced diets. Such imbalances may occur on farms for different reasons and may be detrimental to optimal performance of the animals.

In a trial, male Cobb500 broilers were fed one of four diets from day 0 to day 42: a

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Fig. 1. Influence of the addition of 100g and 500g Panbonis 10/t to a commercial diet for older laying hens on egg breaking strength. The x-axis shows the week of experimental treatment. At experimental week 0, the hens were 74 weeks old.

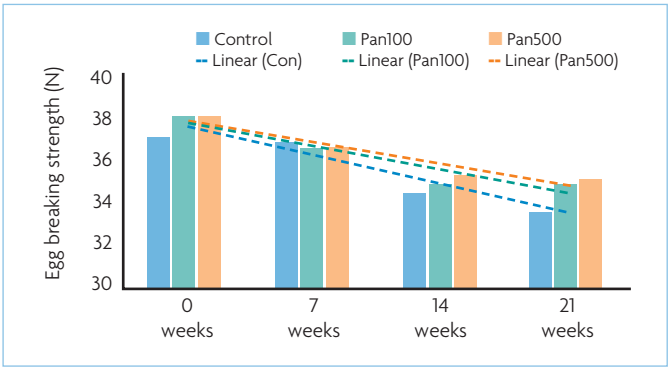
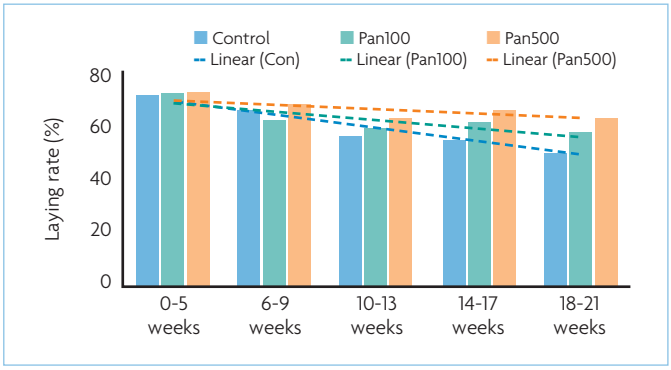


Fig. 2. Influence of the addition of 100g and 500g Panbonis 10/t to a commercial diet for older laying hens on laying rate. The x-axis shows the week of experimental treatment. At experimental week 0, the hens were 74 weeks old.



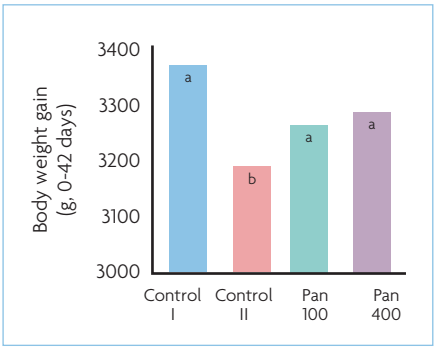


Fig. 3. Influence of the addition of 100g and 400g Panbonis 10/t (Pan100, Pan400) to a diet with an altered Ca:P ratio (Control II) compared to a commercial diet (Control I) for broilers on overall weight gain. Different letters show statistically significant differences among treatments.

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control diet according to recommendation (Control I), a diet with a slightly altered Ca:P ratio to simulate a nutritional imbalance (Control II), Control II plus 100g Panbonis 10/t (Pan100) and Control II plus 400g Panbonis 10/t (Pan400).

All parameters assessed showed that the addition of Panbonis significantly improved performance compared to the unsupplemented Control II.

In some cases there was even no difference among Control I and Pan100 and Pan400, respectively (Figs. 3 and 4).

The results described above demonstrate that adding Panbonis to the normal feed provides an additional line of defence for optimal performance and that Panbonis may compensate to a certain point for challenging conditions.

Furthermore, several studies also showed that amounts of up to 10 times as high as the recommended dosage are well tolerated in different species. One reason for this high safety margin is the water solubility of 1,25(OH)$_2$D$_3$-gly which has a low potential for tissue accumulation. ■

References are available from the author on request

Fig. 4. Influence of the addition of 100g and 400g Panbonis 10/t (Pan100, Pan400) to a diet with an altered Ca:P ratio (Control II) compared to a commercial diet (Control I) for broilers on the European Broiler Index (calculated as: (average grams gained/day x % survival rate)/feed conversion x 10). Different letters show statistically significant differences among treatments.