Solanum glaucophyllum: Reduces milk fever and improves production

The transition period in dairy cows is a challenging phase. Their metabolism changes overnight from enabling fast embryonic growth during the last phase of gestation to colostrum and milk production immediately after calving.

by Jan Dirk van der Klis, Kathrin Bühler and Sabrina Autzen, Herbonis Animal Health. www.herbonis.com

This change needs a swift adaptation of calcium metabolism. As it takes a few days until the intestinal calcium absorption meets the high demand for calcium excretion in milk, the calcium content in blood drops immediately after calving, which can result in (sub)clinical milk fever.

As this drop is generally bigger in multiparous than in primiparous cows, the former are at a higher risk of developing hypocalcaemia.

Administration of a bolus with 1,25-dihydroxyvitamin D-glycosides (G-1,25(OH)2D3) from Solanum glaucophyllum, less than nine days before calving, is effective to prevent a strong drop in serum calcium until at least 48 hours after calving (Fig. 1) and thus reduces the risk of milk fever.

This effect was demonstrated in trials done at the Ruminant Research Unit of Agroscope, Switzerland.

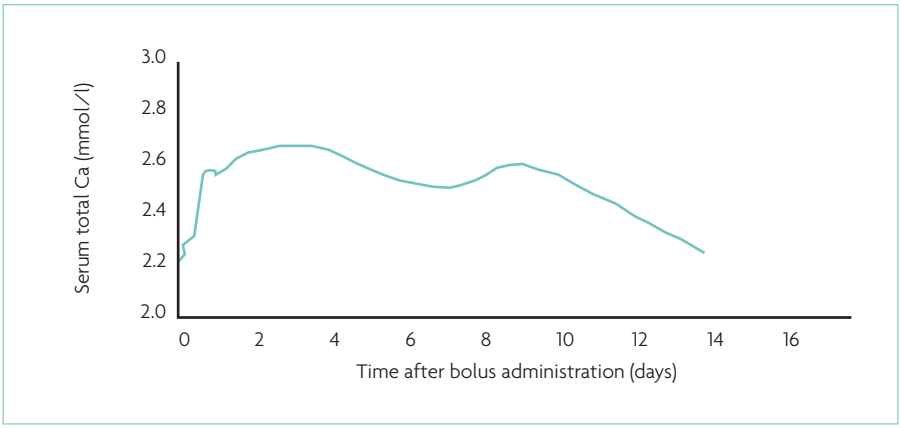


Fig. 1. Change in serum calcium after bolus application to dry Holstein cows. Application was between 220 and 257 days after successful insemination (adapted from Meyer-Binzegger et al, 2022).

Field trial

In a recent trial on a dairy farm in Castelgerundo (Italy) with 350 lactating cows, the effect of the bolus with grinded Solanum glaucophyllum leaves (SG-bolus) was tested under field conditions.

The incidence of (sub)clinical milk fever and the production performance during the first three months of lactation were examined.

Some 60 dry Holstein Friesian cows were selected during the final phase of pregnancy: 15 cows were assigned to the control and 45 to the treatment group.

Groups were balanced for parity (average parity was 2.2). All cows received the same dry and lactating diets. Diets were administered ad libitum as a total mixed ration (TMR) once a day.

The cows received one bolus with either 0 or 500mcg 1,25(OH)2D3 as glycosides from grinded Solanum glaucophyllum leaves when the cows were moved to the individual straw-bedded calving pens, about five days before the expected calving date.

Two days after calving the cows were moved to the lactation barn. Cows were milked twice daily.

Continued on page 12

Fig. 2. The development in serum calcium (Ca) content around calving in cows that received a bolus with Solanum glaucophyllum leaves five days before calving or a control bolus.

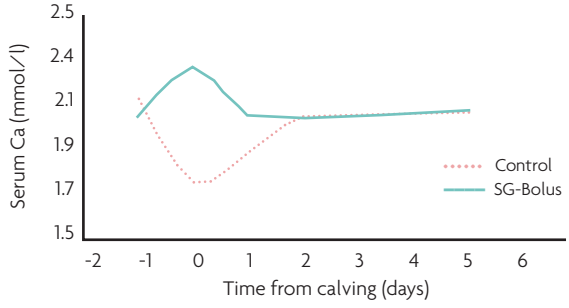
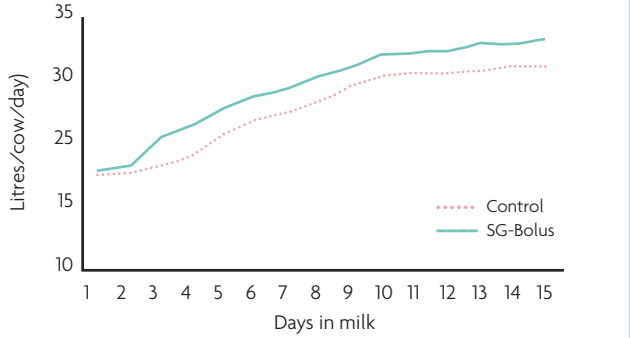


Fig. 3. Development of milk production during the first 15 days in milk.



	Control	SG-Bolus	P-value
Retained placenta (% of total)	20.0	8.9	NS
Clinical milk fever (% of total)	13.3	4.4	NS
Metritis (% of total)	20.0	2.2	<0.05

Table 1. Health status of the cows.

	Control	SG-Bolus	P-value
Milk yield (L/cow/d)	25.7 (±3.48)	27.9 (±2.23)	<0.05
Feed intake (kg DM/cow/d)	18.3 (±2.24)	19.1 (±1.85)	<0.05
Milk/feed intake (L/kg DM)	1.40	1.46	<0.05

Table 2. Milk production during the first 15 days in milk.

Continued from page 11

Blood serum calcium content

Blood samples were taken from each cow at different times up to five days post calving to determine blood mineral contents. Daily feed intake was registered from seven days before calving until 15 days in milk and daily milk production during the first 15 days of lactation.

Milk production recording was continued for three months. The health status of each cow was checked daily as well as reproductive performance.

Blood serum calcium content is given in Fig. 2. It was significantly higher for the SG-bolus group than the control.

About 24% of the former group showed a blood calcium content below 2.0mmol/L (which is generally considered as the critical value to evaluate the risk for subclinical milk fever), and 87% in the latter. Cows that received the SG-bolus showed a lower incidence of retained placenta and clinical milk fever than the control (Table 1).

The incidence of metritis was significantly reduced. Daily feed intake and milk production during the first 15 days in milk were significantly improved when the SG-bolus was supplied (Table 2).

Daily milk production increased faster in the treatment group as of two days after calving (Fig. 3), resulting in a higher daily milk production (2.2L/cow) and higher milk production per kg dry matter (DM) feed intake.

During the first three months of lactation, cows of the SG-bolus group produced on average 35.2L/cow/day and cows of the control 34.3L/cow/day, whereas milk composition was similar. The average body score of the cows of both groups was similar. In the group of cows with retained placenta and metritis, those from the SG-group had a significantly lower number of days to first heat and days to pregnancy than cows from the control, whereas no differences were observed in healthy animals.

This field trial was reported in detail by Grossi et al. (2022). ■

References are available from the authors on request

About Solanum glaucophyllum

S. glaucophyllum is a plant in the nightshade family and is named waxy-leaf nightshade, after the waxy surface of its leaves. In the wild, S. glaucophyllum grows up to 1-2m tall, has a simple stem, and is topped with 9-18cm greenish-grey leaves. The plant is found in different parts of the world, especially in South America, and prefers water-saturated soils like the edges of lakes. Leaves of S. glaucophyllum exert an effect on calcium absorption. Herbonis has cultivated its own variety 'Hervit 153' by cross-breeding and optimised propagation.

This protected variety provides more than five times the concentration of 1,25(OH)$_2$D$_3$ found in wild plants. It is common for plants to store their secondary metabolites as glycosides (G). This means that sugar molecules are bound to the bio-active molecule, forming a protective layer. This layer provides good stability at higher processing temperature or humidity. The dried leaves of 'Hervit 153' are finely ground, micro-encapsulated in a special process to produce Panbovine as a water dispersible bolus ingredient with a defined content of G-1,25(OH)$_2$D$_3$.