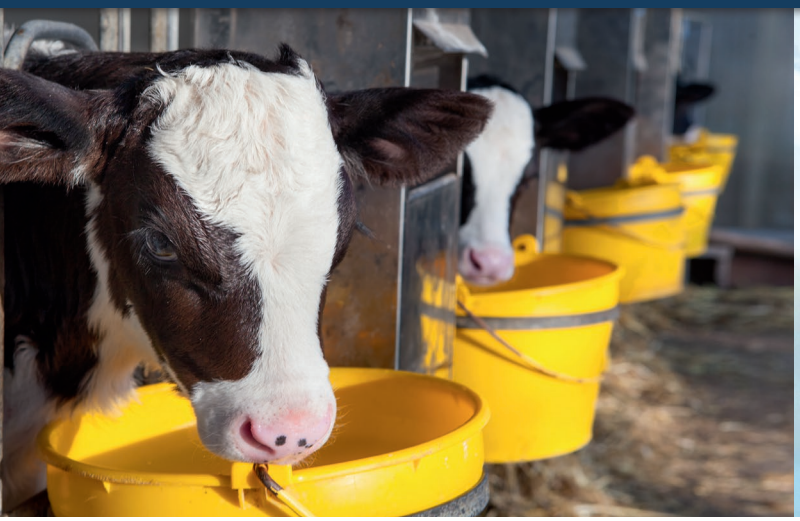
LEIBER® BETA-S



INFLUENCE OF LEIBER® BETA-S ON SELECTED IMMUNE PARAMETERS OF CALVES

The fundament of a successful and economic dairy herd are healthy calves. Calves are born without an own active immune system and are more susceptible to diseases like diarrhea or respiratory diseases during their first few days of life. The endogenous immune system is developed with 6 weeks of life. A "passive" immunity is received by the absorption of colostrum, but decreases already after a few days. With insufficient colostrum intake or bad colostrum quality calves are largely unprotected against pathogens. To support the development of the immune system and to prevent calve diseases, the preventive use of natural immune modulators seems to be favorable.

Leiber® Beta-S consists of highly purified β-1.3-1.6-D-glucan isolated from cell walls of pure brewers' yeast (*Saccharomyces cerevisiae*). β-glucans, which positive effects on the immune system have already been described in the literature, are able to stimulate immunocompetent cells, which increases the immune defense of the body. The trial described below was conducted to determine the effect of a supplementation of **Leiber® Beta-S** on selected immune parameters of calves.

Trial design:

The trial was conducted with 14 Polish Holstein-Friesian calves at the age of one month. These were divided into a trial and a control group. First the calves received colostrum up till the age of 5 days. Afterwards the animals were fed with a standard milk replacer in the amount of 4 liters/animal/day up until the age of 8 weeks. Additionally, the calves had free access to solid feed (corn silage, meadow hay plus a conventional calf starter). In the trial group **Leiber® Beta-S** was supplemented in the amount of 50 mg/kg bodyweight. Blood samples were taken on trial days 0, 15, 30 and 60 and examined in the laboratory.

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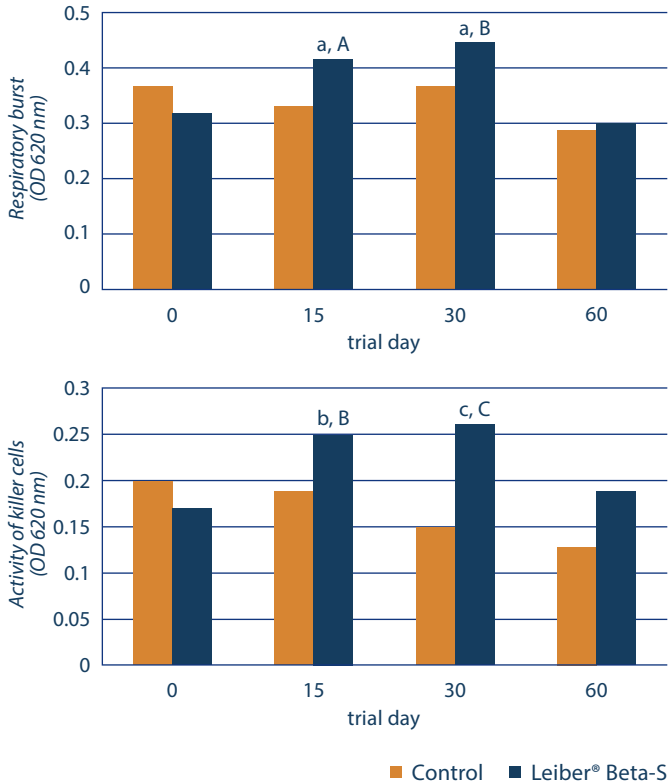
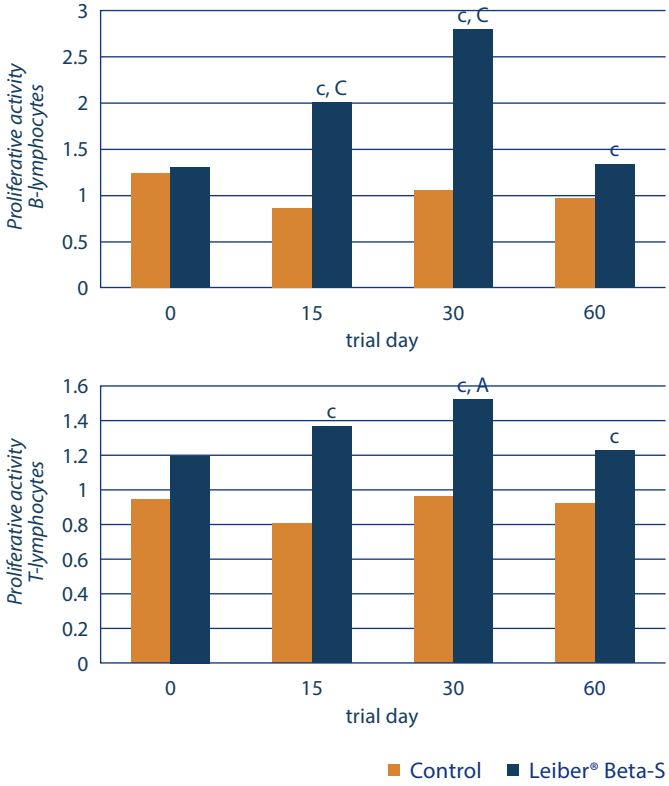
Results:

The metabolic activity of phagocytes (seen in the respiratory burst activity and potential phagocytic activity) rose already in the first 15 days of trial with the supplementation of **Leiber® Beta-S** (figure 1). This positive trend has continued until the 30th day of trial. Reactive oxygen species (respiratory burst) are set free through phagocytosis by neutrophil granulocytes and macrophages. These are used for the intracellular digestion of phagocytized foreign matter, like pathogens. Consequently, the supplementation of **Leiber® Beta-S** increased the phagocytic activity of leucocytes right from the beginning, which form the first defense mechanism against entering pathogens. The supplementation of **Leiber® Beta-S** supports therefore actively the immune system by promoting the effective elimination and degradation of pathogens.

Figure 1: Influence of **Leiber® Beta-S** on selected parameters of cellular immunity in the blood serum of calves





Different letters mark significant differences between trial group and control of $^{a}p<0.05$, $^{b}p<0.01$, $^{c}p<0.001$ and $^{A}p<0.05$, $^{B}p<0.01$, $^{C}p<0.001$ in comparison to trial day 0; OD: optical density

Also, the supplementation of **Leiber® Beta-S** increased the proliferation of B- and T-lymphocytes over the whole trial period after exposure to antigens (figure 1). Lymphocytes are part of the specific immune response and are activated as soon as pathogens are recognized by antibodies. At primary infection with a pathogen, the production of a sufficient number of antibodies by lymphocytes takes several weeks. The results suggest that the supplementation of **Leiber® Beta-S** sets the immune system in an excited state and therefore a faster immune reaction occurs when pathogens are entering the body.

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Table 1: Influence of **Leiber® Beta-S** on selected parameters of humoral immunity in blood serum of calves

Parameter	Group	Trial day			
		0	15	30	60
Lysozyme activity (mg/l)	Control	0.51 ± 0.17	0.33 ± 0.09	0.38 ± 0.12	0.41 ± 0.09
	Leiber® Beta-S	0.48 ± 0.12	0.57 ± 0.11^{c}	0.70 ± 0.16^{b,A}	0.50 ± 0.08
Ceruloplasmin activity (mg/l)	Control	48.43 ± 4.30	45.20 ± 2.45	53.03 ± 8.44	49.31 ± 2.86
	Leiber® Beta-S	49.07 ± 2.60	52.74 ± 1.99^{c,A}	52.36 ± 1.98	49.87 ± 2.15
γ-globulin content (g/l)	Control	8.17 ± 0.51	9.09 ± 1.65	9.07 ± 0.63	10.34 ± 0.73
	Leiber® Beta-S	7.63 ± 0.97	10.53 ± 1.26^{C}	11.81 ± 0.72^{c,C}	12.92 ± 0.66^{c,C}
Total protein content (g/l)	Control	48.29 ± 2.81	49.66 ± 4.09	50.27 ± 3.98	55.89 ± 6.2
	Leiber® Beta-S	46.96 ± 2.23	51.57 ± 3.59	52.76 ± 6.40	56.76 ± 2.77^{B}

Different letters mark significant differences between trial group and control of $^{a}p<0.05$, $^{b}p<0.01$, $^{c}p<0.001$ and $^{A}p<0.05$, $^{B}p<0.01$, $^{C}p<0.001$ in comparison to trial day 0

The activity of lysozyme and ceruloplasmin as well as the γ-globulin content increased also with the 15th day of trial in the blood serum of the trial group. Also, the total protein content was increased over the whole trial period (table 1). Lysozyme can be found in different body secretions and attacks the cell walls of bacteria. γ-globulin is a certain antibody, which inhibits pathogens and initiates other defense mechanisms. Ceruloplasmin belongs to the acute-phase proteins of the unspecific immune response. These results of the humoral immunity lead also to the conclusion that the supplementation of **Leiber® Beta-S** stimulates the neonatal immune system of calves and let it evolve better. The immune status of calves is therefore improved and they are more resistant towards pathogens.

The results of the current study show that the supplementation of **Leiber® Beta-S** increases the reaction and activity of the unspecific as well as the specific immune response of calves right from the beginning. Therefore, with the supplementation of **Leiber® Beta-S** the immune system is supported positively and it results in an improved immune status of the animals. This is especially important during the first week of life of calves, as here animals often suffer from diarrhea or respiratory diseases. Healthy calves are the fundament of a future productive, healthy and economic dairy herd.

Conclusion Leiber® Beta-S:

- positive influence on the development of the immune system
- increased immune response
- improved immune status of animals

Reference : ROMAN WÒJCIK – Institute for Veterinary Medicine – University of Warmia and Mazury

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