

## UTILIZATION POSSIBILITIES OF PREBIOTICS AND PROBIOTICS IN PREVENTION AND HEALTH CARE OF CALVES

— short communication —

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**Abstract:** the aim of our study was to evaluate influence of probiotic agents (Lactovita) and seaweed extracts (Biopolym) with antidiarrheal effects on the prevention of diarrhoea in calves. In the experiment 22 experimental and 22 control calves were observed. The results of the observed incidence of diarrhoea in the control and experimental groups showed a positive effect of probiotic Lactovita and seaweed extracts Biopolymer. 32% of calves in the experimental group and 45% of calves in the control group became sick. Unfortunately, we could not demonstrate the statistical significance of these differences. The weight gains found in the 4th week after birth were by 37.6% higher in the group with Lactovita and Biopolym than in the control group.

**Keywords:** calf rumen, dietary supplements, diarrhoea

### INTRODUCTION

Growth of calves during their first few weeks of life is one of the most important factors affecting their performance during subsequent rearing, and

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it can be modified by disease, especially gastrointestinal infections. Use of lactic acid bacteria (LAB) is a tool which may maintain the intestinal microbial balance, prevent diarrhea and improve growth (Frizzo et al., 2012). Healthy calves are fundamental for successful breeding. Successful breeding results in high milk and meat production. The precondition for a healthy herd is timely prevention and quick identification of illnesses. After the birth, calves are more prone to various diseases, including diarrhoea that is the most serious and common cause of calves' weakening, as their immune system is not fully developed. Calves grow slower, lose weight, their immune system weakens and there is overall damage to the body due to illnesses. Colostrum is the first natural food of new-born calves. Chemical composition of the colostrum is very complex because it is rich in nutrients and bioactive components. The most important bioactive components of the colostrum are immunoglobulin and growth factors. If the wall of small intestine absorbs it of a sufficient amount, immunoglobulin protects calves against infection from the surrounding environment (Pirman et al., 2009). Colostrum is the most important in nutrition and plays a key role in health and post-natal development of new-born calves (Blum, 2006). Colostrum is not only a source of antibodies and nutrients but it also contains a great number of biologically active substances such as insulin, insulin-like growth factors (IGF s), growth hormone, prolactin, thyroid hormones, cortisol and some other substances (Sanei et al., 2012). Both conventional and nonconventional treatment is significantly risky in terms of adverse effects as well as the "placebo effect" and suggestive aspects (Niggemman, 2006). Probiotics were defined as live microbial supplements beneficially affecting the microbial balance of the host. Their administration stimulates growth of other microorganisms, mucosal and system immunity, and it improves alimental and microbial balance of the intestinal tract (Oelschlaeger, 2010). Most of the probiotic bacteria belong to lactobacillus and bifidobacterium family. The other probiotic microbes that are an essential part are yeasts (*Saccharomyces boulardii*) and some non-pathogenic strains of *Escherichia coli* and *Bacillus spp* that are usually in the gastrointestinal tract (Vrese et al., 2008). Lactic acid bacteria (LAB) are widely used as probiotics in humans and animals to restore the ecological balance of different mucosa. They help in the physiological functions of newborn calves that are susceptible to a variety of syndromes (Maldonado et al., 2012). During the treatment with antibiotics, Lactovita maintain biological balance of intestinal microflora through lactose-fermenting bacteria producing favourable

conditions for its growth. It compensates for the low supply of B vitamins during a digestion disorder, disorders of the overall health condition, during the period of quick growth, increased metabolic activity, if exhausted after physical exertion, during infectious illnesses especially those with fever and diarrhoea (Habrová, 2012). It is generally known that microflora of the large intestine significantly affects health. Nowadays, there is a great interest in using prebiotic oligosaccharides as a functional component of nutrition with the aim to improve the individual's health. Prebiotic oligosaccharides stimulate growth and colonization of probiotic bacteria beneficial to health (Rastall et al., 2002).

The aim of the study is to evaluate the effect of selected supportive preparations and their effect on gains in weight of calves under operation conditions at the early stages after weaning to milk nutrition.

## **MATERIALS AND METHODS**

Hypothesis: Dietary supplements will affect the gains in weight of calves and their overall health condition at the stage of milk nutrition after weaning from mother's milk positively.

The study was carried out in the Agricultural Cooperation in Staré Hobzí (hereinafter referred to as the "ZD"). Heifers are intended to renew the own herd of milk cows, young bulls are fed until their weight is around 600 kg and then they are slaughtered. Calves are loosely housed in the individual beds with bedding. There are only calves born in this Centre in the breeding. They are weaned from mothers not until the third day after birth. Calves were fed three times a day and they received about  $2.5 \text{ l.pcs}^{-1}$  per feeding. Calves were fed with the colostrum from plastic buckets with teats poured by the employees of the ZD manually into them. Milk nutrition was finished not until the second month of the age and it was changed into plant nutrition. Calves had access to clean water and starter food all the time (starter + shredded oat + coarse meal). 22 experimental calves and 10 control calves were included in the experiment. The experiment was conducted in a conventional breeding under unchanged operational conditions at the ZH in Staré Hobzí. After birth, calves were divided into two groups. Both groups of calves were weighted within two hours after birth. Except for the colostrum, the experimental group of calves was orally administrated with one pill of probiotics and 5 ml of hydrolysate of brown seaweeds once a day during the second feeding. Both preparations were administrated to the experimental

group on the first seven days after birth. The control group was fed with an unchanged feeding ration. Both the control and experimental group was monitored until the age of the fourth week and weighted regularly once a week. Gains in grams were recorded into a table.

## RESULTS AND DISCUSSIONS

Tables 1 and 2 suggest the following: These tables and figures clearly suggest that the experimental group shows significantly higher gains in weight especially in the 1<sup>st</sup> and 4<sup>th</sup> week after birth. In the 4<sup>th</sup> week after birth, gains in weight in the experimental group are higher by 37.6 % than in the control group. According to these tables, the average gain in weight in 28 days from birth is 13.57 kg in the experimental group and 9.43 kg in the control group during the same period of time.

Table 1. Weight gain first - 4<sup>th</sup> week

	Ø gain first week (g)	Ø gain second week (g)	Ø gain 3 <sup>rd</sup> week (g)	Ø gain 4 <sup>th</sup> week (g)
<b>Experime-ntal group</b>	3568.18	2500	3204.55	4295.45
<b>Control group</b>	2477.27	1454.55	2818.18	2681.82

Table 1. Ø daily gain first - 4<sup>th</sup> week after birth

	Ø daily gain first week (g)	Ø daily gain second week (g)	Ø daily gain 3 <sup>rd</sup> week (g)	Ø daily gain 4 <sup>th</sup> week (g)
<b>Experime-ntal group</b>	509.740	357.14	457.79	613.64
<b>Control group</b>	353.90	207.79	402.60	383.12

Statistics to Tables 1 and 2: P - one-sided value = 0.077260. This value can be considered the threshold between the control and experimental group. These values suggest that use of Lactovita and Biopolym positively stimulates the digestive system of the experimental group and subsequently

higher increase in weight. Timmerman et al. (2005) and Frizzo et al. (2010) have come to the conclusions following their results that probiotic substances support increase in body weight of calves fed with milk especially in the first week of calves' life. Further, the authors say that probiotics may contribute to improvement of effectiveness of food especially of food with high content of dry matter in form of grains having positive effect on rumen development. Improvement of growth at this stage significantly affects performance in the following breeding. Such improvement of performance thanks to probiotics could contribute to improvement of production and economic indicators of agricultural businesses. Morrell et al. (2008) states in his study that increased use of some of laboratory strains of probiotics may improve the health condition of calves and that they can be used as prevention of diarrhoea which leads to high mortality rate and morbidity of new-borns. Some of the strains of *Enterococcus* are assessed as probiotics, which opens new possibilities especially in the area of production of bacteriocins as inhibitive substances in veterinary medicine (Veir et al., 2007). Gaggia et al. (2010) says that experiments done with both healthy and stressed animals showed positive effects of probiotics and prebiotics mainly on ruminants, pigs and poultry. The number of useful bacteria was increased and the potential burden of pathogens was reduced. It is necessary to say that the effects of probiotics and prebiotics on the growth ability of farm animals were significant only in some of the studies in terms of statistics.

## CONCLUSIONS

The results of monitoring of the gains in weight and occurrence of diarrhoea in the control and experimental group showed positive affect of use of probiotic preparation Lactovita and seaweed extract Biopolym. It was ascertained that thanks to the effect of Lactovita and Biopolym, the gains in weight in the 4<sup>th</sup> week after birth were higher by 37.6 % in the experimental group than in the control group. To conclude, preventive use of natural substances positively simulated the digestive system of the calves and it had an overall positive effect on their physiological condition.

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