

Influence of Biological Agents Effects on Reduction of Ammonia Concentration in Stables of Intensive Farm Animals Breeding

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Abstract

The living environment distress is connected currently not only with industrial production but also agriculture is biggest producer of toxic gas – ammonia (NH₃). Emissions of that gas originate mainly in the farm animals breeding and generate within storage and handling with farmyard manure, slurry, poultry excrements and litter. Agriculture influences considerably landscape. has impact on basic effect on soil, water and air. In assessing experiment the preparation Biopolym FZT rumen metabolism and N-balance was found positive effects in terms of increased ammonia nitrogen, the number of ciliates and the reduction of N-compounds in feces. Confirmed the impact on the ammonia content in well-ventilated dairy stable. The economic evaluation depends on the exercise price of milk. In the experiments continued.

Keywords: ammonia emissions, cattle, living environment, pigs, poultry, slurry.

1. Introduction

One of such products is Biopolym FTZ - hydrolyzed brown seaweed, *Ascophyllum nodosum*. Its preparation follows the line of plant products from algae that are successfully applied in human and veterinary medicine (in gynecology, dermatology, dentistry). Interesting is the ability of these bioalginates to absorb catabolic gases, particularly NH₃, which is produced during digestion and conversion of nitrogen compounds. Monitoring the content of ammonia and other gases in the barn is significant in terms of reducing toxicity and optimizing the environment for animals.¹

[1] Described the reducing level of protein at the concentrates for pigs and poultry allowed to solve duality of fair conditions at the farm buildings. By the fattening pigs increased on 0,032 kg daily gain weight and decreased on 0,45 kg feed

consumption respectively. The addition of 400 g of Biopolym was reduced. At the broiler chickens by the 2,92 % less of protein decreased a mortality of chickens about 1,8% in experiment group. The others results were the same as in control group of chickens. The levels of ammonia and hydrogen sulphid were lower than maximum data from Czech norms (NH₃ max. 25 ppm and H₂S max. 7-10 ppm) at experiment and control groups.

There are cured respiratory diseases at pigs and Brest swelling at poultry in these bad conditions. Some meat parts must be confiscated at a slaughter house. [6] and [5] describe optimum conditions of environment in pig breeding and poultry breeding.

[3] described the situation at pig and poultry halls after the additions of different biological compounds with the aim reduction of ammonia and other gasses in area and slurry reservoirs.

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2. Materials and methods

The aim of this work was to assess the effects of the preparation Biopolym FZT added to the crude protein content of rumen. The effect of liquid Biopolym FZT on the daily milk yield of dairy cows and on the quality of milk constituents (fat, protein) was studied on selected animals, located near České Budějovice. The original barn, located at an altitude of 440 m above sea level, has undergone a complete modernization, is equipped with three milking robots (Astronaut A2) and operation is now fully automated. The barn has a capacity of 210 pieces of cows of Czech Pied cattle breed.

The experiment conducted in this chosen location involved adding liquid Biopolym FZT (bioalginate seaweed) at a dose of 24 ml / cow / day diluted 1:1 with water in one of the robots (robot number 3). Robot number 3 thus serves the experimental group of cows, while robot number 2 serves a control group, i.e. without product addition. The daily ration in both groups was the same.

The samples of rumen content were collected from cow of Holstein breed, with a live weight of 700 kg, fitted with rumen fistula in anaerobic conditions. The slurry content was sampled twice each week, freeze-dried and analysed with the standard methods.

3. Results and discussion

On the farm the barn was open and the wall was with the plastic net covered. It was any differences between experimental and control milk robots group find in ammonia and other gas products. In the table 1 the content of crude protein in liquid and content in slurry is present. The reduction of crude protein content in experimental group is significant. This results are in [2] present. In the farm the technological water are coming to liquid slurry, we continued with the experimental cows and sampled the original slurry from rumen cannulated cows with the individual dosage of Biopolym. The results before experiment are in figure 1 present. The results of the experimental period are in figure 2. and in table 2 present. This results are not in statistical differences. In opposite by the fattened pigs are the results from [6] and broilers chicken [5] and [1], [4] with the pigs and broilers slurry important reduction of ammonia gas [3]. In assessing experiment the preparation Biopolym FZT rumen metabolism and N-balance was found positive effects in terms of increased ammonia nitrogen, the number of ciliates and the reduction of N-compounds in feces. It was not confirmed the impact on the ammonia content in well-ventilated dairy stable. The economic evaluation depends on the exercise price of milk. In the experiments continued.

Table 1. Content of nitrogen compounds in slurry at fresh and 100% dry matter.

I. - Slurry before experiment				II. Slurry in the experiment			
	Orig. dry matter	N L%	% NL		Orig. dry matter	NL %	% NL
liquid content	2.56	2.49	97.27	liquid content	1.68	1.52	90.48
	20.35	3.08	15.14		18.95	1.69	8.92

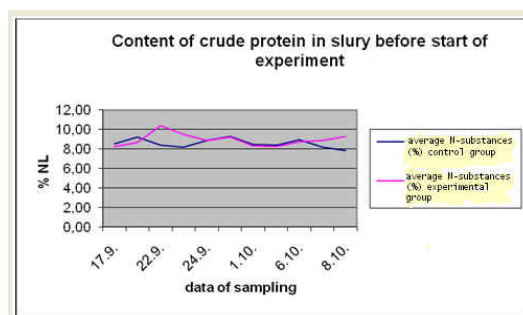


Figure 1. Content of crude protein in slurry before start of experiment

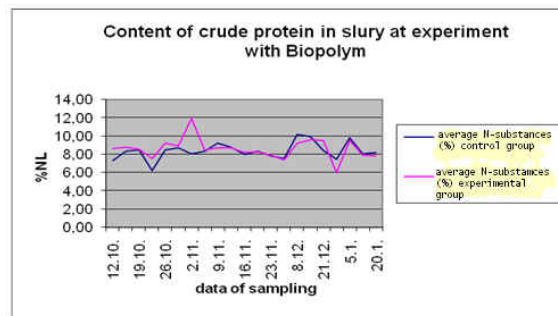


Figure 2. Content of crude protein in slurry at experiment with Biopolym

Table 2. Average content of N substances in % before and in experimental period

Period	Data of sampling	Average N-substances (%) control group	Average N-substances (%) experimental group
before	17.9.	8.55	8.31
	21.9.	9.25	8.70
	22.9.	8.42	10.41
	23.9.	8.17	9.49
	24.9.	8.90	8.89
	30.9.	9.33	9.27
	1.10.	8.47	8.34
	5.10.	8.43	8.28
	6.10.	9.00	8.75
	7.10.	8.20	8.92
	8.10.	7.83	9.33
	12.10.	7.36	8.58
	15.10.	8.34	8.74
	19.10.	8.49	8.55
experimental	22.10.	6.24	7.53
	26.10.	8.49	9.16
	27.10.	8.71	8.91
	2.11.	8.04	11.91
	5.11.	8.33	8.46
	9.11.	9.18	8.71
	12.11.	8.74	8.70
	16.11.	7.97	8.16
	19.11.	8.32	8.26
	23.11.	7.85	7.85
	30.11.	7.56	7.39
	8.12.	10.15	9.23
	15.12.	9.94	9.58
	21.12.	8.41	9.46
	28.12.	7.44	5.97
	5.1.	9.79	9.48
	12.1.	8.07	7.88
20.1.	8.19	7.78	

4. Conclusions

In accessing the dose of liquid Biopolym FZT on rumen metabolism and N-balance was found positive effects in terms of increased ammonia nitrogen, the number of ciliates and the reduction of N-compounds in feces. It was not confirmed the impact on the ammonia content in well-ventilated dairy barns. The economic evaluation depends on the exercise price of milk. In the experiments continued.

Acknowledgements

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