

# ANIMALS' GROWTH STIMULATORS ON THE BASIS OF BACILLUS MUCILAGINOSUS PRODUCING MICROORGANISM

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**SUMMARY:** Animals' growth stimulators on the basis of saprophyte producing microorganisms *Bacillus mucilaginosus* have been developed. There are given data on physiological valuability of biomaterial and those determining the efficiency of protein-enzyme feed additive in broiler and calves rations. Bacilli biomaterial is represented by valuable protein containing all essential aminoacids, enzymes and vitamins A, E, B<sub>1</sub>-B<sub>12</sub>. Large scale testing of protein-enzyme feed additive for animals and birds showed that it increases their productivity and maintain amount. Biomaterial positively influences lactation process, significantly improves milk quality due to protein and fat content increase. It is found that biomaterial may be used for silage production.

**INTRODUCTION:** It is well known that proteins, fats and carbohydrates are the basis of man's and animal's nutrition. However, ration deficiency in some biologically active compounds leads to animals' low productivity and organism exhaustion. Enzyme occupies a specific position among them: due to them organism digests all nutritional compounds. Even such highly protein plants as soya, wheat, corn, etc. can't be digested without enzymes. As more variable they are in feed additives than greater is their influence upon animals' productivity.

In practice, abroad and here, feed additives on the basis of yeasts - paprin, eprin, etc. - are used for these purposes. Besides, new, more efficient and absolutely harmless producing organisms are being searched for.

**MATERIALS AND METHODS:** The work is concerned the results of a study into saprophyte type of *Bacillus mucilaginosus*. Bacilli biomaterial is represented by a valuable protein containing all essential aminoacids, enzymes and vitamins A, E, B<sub>1</sub>-B<sub>12</sub>. Culture liquid accumulates products of biosynthesis: axopolysacharides, exoenzymes, fatty acids, microelements etc. All these determine valuability of protein-enzyme feed additive (PEFA) from *Bac. mucilaginosus*.

Culturing takes place on wastes of food industry. Biosynthesis itself is a practically wastless and ecologically pure process.

**RESULTS:** Large scale tests of PEFA in agricultural animals and birds ration showed that it provides their productivity increase and amount maintenance (Khokhrin et al., 1984) Khokhrin, Vinogradov et al., 1984).

Addition of PEFA into laying hens ration instead of combi-feed in the amount of 5% promotes egg laying capacity increase by 1.2-2.3% and feed costs decrease by 5.9-7.5% per 10 eggs. Besides, feed protein digestability increases by 2.0-5.1% and nitrogen, calcium and phosphorus utilization improves. As for eggs relative weight of protein, yolk index, How units, carotene and riboflavin content increase and shell quality improves.

PEFA addition to broilers' ration modifies meat quality, increases slaughter weight by 3.5-4.2% and semi-eviscerated carcass weight by 67-90g. Protein content in broilers' meat rises by 1.8-2.6%. Ratio of essential aminoacids in white meat, by tryptophan and threonin formula, agrees with the optimum proposed by WHO/FAO. PEFA does not affect flavour characteristics of meat and broth (Voronkov et al., 1984).

PEFA positively influences calves' growth (Table 1). Its addition significantly increases gross weight gain, decreases feeds cost by 13% per 1 center of weight gain.

PEFA favourably effects lactation, milk quality: protein and fat content increase.

While studying the mechanism of PEFA influence on animal's organism it was found that it stimulated immunoprotective properties: increase of bactericidal, phagocital, lyzocimal activity, protein content in blood (Table 2).

Tests on animals showed that PEFA improves enzyme developing function of stomach cells by 35-40%, increases total amount of proteolytic enzymes in stomach juice by 20-22% and pancreatic juice separation. So. PEFA addition creates favourable conditions in gastro-intestinal tract for better food digestion.

**CONCLUSION:** New non-traditional stimulators in the contrast to the well-known possess some properties that should be paid attention to. Their antogonistic characteristics in relation to many patogenic microorganisms significantly simplify biotechnological processes and the way of use. Besides, information on PEFA possible effect upon nitrites and nitrates is of a particular interest and gives new possibilities for feed quality evaluation (Chetverkin V.A. and Vinogradov E.Ya., 1972).

PEFA can be used in various forms: liquid(culture media), adsorbed on a carrier or complex feed and dry.

PEFA can be used in feed production for silage preparation. We have developed a procedure for juicy feeeds production that enables to increase crude and digested protein content in silage by 22.2-33.3%, to decrease crude fiber level by 7.8-11.0%, to get extra milk(up to 37 tons), calculated per tona of fermented silage, and to provide an increase of nutritional value of 1 ton feed by 40 feed units (Patent A.C.N°1068092(USSR)).

Economic efficiency of PEFA, harmfulness of producing micro-



organism for animal's and man's organism testify to the perspective of a new feed additive.

Table 1. PEFA influence upon calve's growth

Parameters	Feeding ration	
	control	PEFA added
Calve live weight, kg		
at birth	36.7	36.6
10 days	42.5	43.8
3 months	93.5	111.6
Average daily gain, g		
colostrum period	580	720
milk period	645	850

Note: PEFA is added in the amount of 20-50g per head per day (test group)

Table 2. Increase of calves' resistency

Animal group	Total blood protein, %	Lysozyme activity, %	-lysine activity, %
Colostrum period			
Control	5.76	2.90	23.18
Test	6.13	3.28	42.42
Milk period			
Control	6.58	1.52	16.64
Test	7.37	1.52	24.89

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