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## USE OF PHYTONCIDS CONTAINING PLANTS AS PRESERVATIVES TO SILAGE FODDER

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Bulky fodder of low quality is one of the main reasons of low efficiency of animal production. Its nutritive value depends on the level of energy and digestible protein in dry matter. Diets deficient in protein inevitably cause high expenditures of feed. Therefore, energy content of grass silage must be no less than 0,80 F.U./kg D.M. and 100 g of digestible protein /F.U. Making silage of high quality similar to that of green fodder by its nutritive value and at the same time bringing losses to minimum values is thus of prime importance.

Chemical preservatives have been widely applied in order to improve the silage quality. The level of nutrients in the silage treated with these chemicals reached 95-98% (including sugar which is almost completely lost at spontaneous fermentation). However, chemical preservatives have some grave disadvantages. They are toxic to man and animals and are very dangerous when applied at high doses as they can provoke dysfunction of digestive tract and cardiovascular system resulting in serious diseases (acidosis, hypomagnesaemia, tympany, etc.) and spoil the quality of animal products. Thus, there is a drop of useful microflora in the milk of cows which have been fed on the silage treated with benzoic acid. Besides, many chemical preservatives of high corrosive effect are very expensive. It is evident therefore, that new preservatives which would be characterized by high ecological safety and economic efficiency having no corrosive effect and other negative properties are of the barest necessity.

Some phytoncids containing plants meet these requirements. Their preservative effect is due to such compounds as glycosides, terpenoids, tanning and ethereal matters which were found in 1146 species of plants from 137 families including 54 species of fodder plants.

Investigations have been recently carried out to study the efficiency of rape, warmot, mustard, bird cherry (*Prunus padus*), burdock, tarragon,

plantain, camomile coltsfoot, horse-raddish, dandelion, hogweed Sosnovsky, needles of cedar, pine, fir and larch as silage preservatives and rape, dandelion, burdock and bird cherry were found to be the most effective.

The use of phytoncids containing plants as preservatives is a new trend in silage making and we have to widely examine their influence on the nutritive value of silage and its productive efficiency.

Our investigations were aimed to study the preservative effect of such ether containing plants as tarragon, catmint and tansy balsamic on the silage quality.

Tarragon and catmint can be considered as plants rich in protein (21.0 and 19.6%, respectively) with a low content of fiber (12.1 and 13.1%). Tansy balsamic and catmint have rather high levels of carbohydrates (7.2 and 8.7) and fat (3.5 and 4.6% in dry matter).

In series of trials the fresh clove-timothy mixture (75:25) and new varieties of blue and yellow lupine (*L. angusifolius*, *L. luteus*) bred in Belarus were treated with tarragon (10, 20 and 25%) and catmint (10 and 20%) in order to determine optimal doses of preservatives.

The biochemical analysis of the silage showed that the clover-timothy mixture (the clover at a budding phase) treated with 10% of tarragon had a better ratio of organic acids and optimal active acidity when compared to the untreated silage (the control sample and treated with 20 and 25% of tarragon): the level of lactic acid was 76% with no traces of butyric acid, optimal active acidity reached 4.3. The control untreated samples and experimental silage treated with high doses of tarragon (20 and 25%) contained 64-73% of lactic acid, 1-2% of butyric acid and had the pH value of 4.5. Active acidity was low (3.78) in the untreated silage of new varieties of yellow and blue lupines, while it approached to the optimal value (4.10) in the silage treated with 10% of tarragon and 10% of tansy. Besides, the ratio of free and bind acids was better in that silage which is beneficial to their aerobic resistance. However, 20% of catmint added to the clover-timothy mixture alkalized the silage (pH 4.39) in which traces of butyric acid were found.

Results of biochemical analysis of the silage treated with low doses of tarragon correlated with the data of its chemical composition. Losses of nu-

rients including sugar and crude protein were significantly lower. The level of sugar was twice higher and those of crude protein and dry matter were 2.75 and 1.1-2.3% higher when compared to the control samples (untreated silage).

Our data showed that these vegetable preservatives were similar to formic acid and biopreservatives Sillactim by its efficiency. Active acidity of the silage treated with chemical and biological preservatives was optimal (pH 4.0-4.13) as in cases of tarragon and tansy treatment. However, formic acid inhibited the growth of lactic bacteria in the silage. The level of lactic acid was 51% of total acids vs. 83% in the silage treated with biopreservatives and that of sugar was 2-3 times higher in comparison with the untreated silage. Other quality parameters, crude protein in particular, were similar to those in the silage with formic acid, Sillactim and tarragon treatment: 17.25, 17.44 and 17.06% in dry matter, respectively.

Hence, high quality the clover-timothy and lupine silage can be effectively preserved by tarragon and tansy balsamic which ensure minimum losses of nutrients including sugar, protein and dry matter.

The dose of 10% of tarragon and tansy balsamic applied to green grass can be considered as optimal.