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DIAGNOSIS AND ORGANIZATION OF MEASURES TO COMBAT NEKROBAKTERIOZA CATTLE MANAGEMENT LLP «BAYSERKE AGRO»

***Annotation***

The article presents the data of the results of research on the diagnosis and the organization of measures to combat fusobacterium cattle farm LLP «Bayserke-AGRO». It was found that young fusobacterium acutely ill, and in the adult population, the disease is in the chronic form.

***Keywords:*** basteroides, fusobacterium, necrosis, abscess, microscopy.

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INFLUENCE OF METHODS OF REDUCING THE CONTENT OF COUMARIN ON YIELD AND QUALITY OF MELILOT FORAGE IN NORTH KAZAKHSTAN

**Abstract**

The results of laboratory and field experiments to study the effect of different methods reducing the content of coumarin in melilot are given in the article. The purpose of the research is to develop a safe for animal melilot hay-making method in relation to the content of cormophyte coumarin glucoside. In compliance with the set tasks the field work was carried out on the experimental plot of North-Kazakhstan Institute of Agriculture in 2015-2016. The content of coumarin in melilot herbage was 1,14%, in hay dried at temperature 20° it was 0,65% and at 60° - 0,48%.

***Key words:*** melilot, feed quality, coumarin.

**Introduction**

There are various ways of economic use of melilot, the main ones are using it for green fodder, hay and haylage. It has up-sufficient good taste and cattle, sheep and horses readily eat it. Melilot also gives high yields of hay and its feed production costs are not high. If one keeps to the harvesting technology, melilot hay is very valuable and is comparable to alfalfa hay.

However, such negative biological feature of melilot as the content of cormophyte coumarin glucoside is not considered. If the feed made of melilot has the processes of decay, it is less edible because of its bitter taste caused by the fact that the plant tissue contains coumarin which turns into dicoumarin. Animals when eating melilot have hoove, but it is manifested to a lesser degree compared to alfalfa and clover eating. Animal hoove when eating melilot can be avoided by converting herbage into dry feed, or in addition to melilot provide sufficient amount of water and salt. Due to the risk of bleeding in cattle by eating melilot the herbage should be dried up to 13-14% of moisture [1-2].

Melilot contains coumarin which in case of plant damage and decay turns into dicoumarin. Dicoumarin is an anticoagulant that causes bleeding in cattle and can result in death. The animals will have difficulty with blood clotting and may die from blood loss because of small external or internal injury. Sheep and horses are less prone to this disease because these animals are more selective when eating feed [3]. Dicoumarol (dicoumarin) refers to a group of blood anticoagulants that has specific smell of lemon and can cause poisoning and death of animals [4].

The analysis of peer-reviewed scientific literature and patent search revealed that there hasn't been any purposeful work on melilot feed hay-making in relation with the content of coumarin. There are only various methods for determining the amount of coumarin and selection of melilot forms free of coumarin.

Therefore, we were tasked to develop a safe way of melilot hay-making.

The purpose of the research is to develop a safe for animal melilot hay-making method in relation to the content of cormophyte coumarin glucoside.

The following tasks were set:

- Determination of the content of coumarin in herbage and hay, dried in different modes;
- Comparative assessment of different ways of feed-making from melilot (coumarin content, feed quality and herbage yield).

**Materials and methods**

The studies were conducted in the years 2015-2016 on the experimental plot of LLP "North-Kazakhstan Agricultural Research Institute" (Chaglinka village). The predecessor was clean fallow; the tillage was carried out according to the zone technology. The seeding was done openly early in spring (in the first decade of May). The accounting plot area was 25 $m^2$ with replication of 3 times. The allocation of variants was random. Melilot-Kokshetau-14 perspective grade -was used in the studies.

The observations and surveys were conducted according to the methods of the All-Russian Research Institute of feed [5]. The experimental data were processed by the analysis of variance [6].

The qualitative and quantitative rapid method by M.I. Smirnova and R.B. Gelchinskaya was used to determine the content of coumarin in melilot [7]. The conversion to the feed units was carried out according to the digestibility coefficients of M.F.Tommee [8]. The evaluation of economic efficiency was made by the method proposed by U.M Sagalbekov [9].

**Results and discussion**

Coumarin is a negative disadvantage which melilot has. In order to reduce or eliminate the content of this substance, first, it is necessary to examine the methods for determining the content of coumarin in cormophyte. There are many methods for determining coumarin such as microchemical, calorimetric, fluorometric, gas chromatography, and others. In our studies, we used the method of M.I. Smirnova and R.B. Gelchinskaya. The essence of this method is that the prepared melilot samples were immersed for 1-2 minutes in a solution of iodine in potassium iodide. The samples containing coumarin in concentration greater than 1% had crimson color, 0,9-0,5% - pink, less than 0.1% - did not change its color.

The studies done by E.Andreyeva revealed the fact that coumarin content upon melilot drying is reduced in comparison to its content in herbage [10]. It is known that when melilot is dried in the shade, also as a result of a more complete hydrolysis of glucoside, the coumarin content is reduced to 52-78% of its initial amount. The facts of coumarin content reduction were observed in studies of P. Berke and B. Dornerri [11]. Later, the same pattern was noticed in the experiments of E. Stuczynski, W. Mangalska, and E.V. Deyneko [12-13].

Our experiments defined that when the content of coumarin upon melilot drying is reduced compared to its content in herbage (Table 1).

Table 1 - Content of coumarin in melilot cormophyte of feed species (2015-2016.).

| Feed | Content of coumarin,% | | |
|---|---|---|---|
| | 2015 | 2016 | average for the year 2015-2016 |
| Herbage | 1,17 | 1,11 | 1,14 |
| Hay, dried at 20 ° C | 0,69 | 0,62 | 0,65 |
| Hay, dried at 60ºC | 0,55 | 0,41 | 0,48 |

The reason of the reduction of coumarin on melilot drying is the hydrolysis of coumarin glucosides. The evaporation causes the release of coumarin from mown dry plants and contributes to its reduction in hay.

The proposed method of melilot hay-making is based on these experimental data.

Its essence lies in the fact that melilot with coumarin content in its vegetative mass shouldn't be fed in the green form, and the haymaking must be carried out by active ventilation - when coumarin content decreases by more than 2 times.

According to the preliminary data it is known that the most effective and safest content of coumarin had the hay dried by ventilation at temperature of 60 ° C (Table 2).

When the hay was made by active ventilation at temperature of 60 ° C, compared to the conventional technology, the coumarin content reduced from 0,65% to 0,48% and the protein content increased from 13,2% to 15,1% mainly due to better preservation of leaves and foliage.

Table 2 - The effectiveness of different ways of melilot hay-making.

| Feed | Content in 1 kg of dry matter, % | | | | | Foliage,% | | Yield of hay, c/ha |
|---|---|---|---|---|---|---|---|---|
| | coumarin | Protein | | feed units | | | | |
| | | 2015 | 2016 | 2015 | 2016 | 2015 | 2016 | |
| Hay (conventional technology) | 0,65 | 12,8 | 13,6 | 0,37 | 0,41 | 36,4 | 37,3 | 27,6 |
| Hay (active ventilation) | 0,48 | 14,7 | 15,5 | 0,46 | 0,48 | 49,8 | 51,6 | 30,3 |
| $LSD_{05}$ (least significant difference) | | | | | | | | 2,1 |

Besides the qualitative indicators, hay-making by active ventilation at temperature of 60 ° C increased from 27,6 c/ha (conventional technology) to 30,3 c/ha by reducing feed losses during the stationary making than under the field conditions.

In addition to the main task of reducing the coumarin content in feed, the analysis of the economic efficiency showed that only the yield data of the recommended way to make hay of melilot by active ventilation, provides the economic benefit of 3250 KZT per 1 ha (Table 3).

Table 3 - Cost-effectiveness of different melilot hay-making technologies.

| Indicator | Hay by conventional technology | Hay made by active ventilation |
|---|---|---|
| Productivity, c/ha | 27,6 | 30,3 |
| Harvest of fodder units, c/ha | 10,2 | 16,9 |
| Expenditure per ha of KZT | 14400 | 15200 |
| Cost of 1 c, KZT | 783 | 685 |
| Selling price / c, KZT | 1500 | 1500 |
| Cost for the entire production per 1 ha, KZT | 41400 | 45450 |
| Income per 1 ha, KZT | 27000 | 30250 |
| Economic effect per 1 ha, KZT | - | 3250 |

**Conclusion**

The safe for animal melilot hay-making method in relation to the content of cormophyte coumarin glucoside was developed. The content of coumarin in herbage and hay dried in different modes was defined. The method of active ventilation at 60 ° C reduced the content of coumarin from 0,65% to 0,48% and the protein content increased from 13,2% to 15,1%. The economic effect was 3250 KZT per 1 ha.

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## СОЛТҮСТІК ҚАЗАҚСТАН ЖАҒДАЙЫНДА ТҮЙЕЖОҢЫШҚАНЫҢ МАЛ АЗЫҚТЫҚ ӨНІМІНІҢ ШЫҒЫМДЫЛЫҒЫ МЕН САПАСЫНА КУМАРИН ШАМАСЫН ТӨМЕНДЕТУ ӘДІСТЕРІНІҢ ӘСЕРІ

***Аңдатпа***

Мақалада түйежоңышқа құрамындағы кумаринді төмендету тәсілдерінің әсерін зерттеудің лабораториялық және танаптық тәжірибелердің нәтижелері келтірілген. Зерттеу мақсаты – түйежоңышқа жапырағы мен сабақтарының құрамында глюкозид кумарин бар болуына байланысты малдарға қауіпсіз шөпті дайындау тәсілін әзірлеу. Қойылған мақсаттарды жүзеге асыру үшін 2015-2016 жж. Солтүстік Қазақстан ауыл шаруашылық ғылыми-зерттеу институтында зерртеу жұмыстары жүргізілген. Жасыл

балаусада кумарин шамасы 1,14 %, 20° температурада кептірілген шөпте – 0,65 %, 60° температурада белсенді желдету кезінде 0,48% құрады.

***Кілт сөздер:*** Түйежоңышқа, мал азығының сапасы, кумарин.

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ВЛИЯНИЕ ПРИЕМОВ СНИЖЕНИЯ СОДЕРЖАНИЯ КУМАРИНА НА УРОЖАЙНОСТЬ И КАЧЕСТВО КОРМОВОЙ МАССЫ ДОННИКА В УСЛОВИЯХ СЕВЕРНОГО КАЗАХСТАНА

***Аннотация***

В статье приведены результаты лабораторных и полевых опытов по изучению влияния различных приемов снижения содержания кумарина в доннике. Цель исследований – разработать безопасный для животных способ заготовки сена из донника в связи с содержанием в листостебельной массе глюкозида кумарин. Во исполнение решения поставленных задач проведены полевые работы на опытном участке Северо-Казахстанского НИИ сельского хозяйства в 2015-2016 гг. Содержание кумарина в зеленой массе донника составляло 1,14%, в сене высушенном при температуре 20° - 0,65% и при температуре 60° - 0,48%.

***Ключевые слова:*** Донник, качество корма, кумарин.

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MEDIUM OPTIMIZATION FOR PRODUCTION ANSAMITOCIN P-3 BY *ACTINOSYNNEMA PRETIOSUM*

**Abstract**

Ansamitocins belong to the group of ansamycin macrolactam antibiotics, which are produced by Actynosynnema spp. In the present studies, inexpensive carbon sources in an attempt to increase ansamitocin P-3 production were investigated. Dry powder of Jerusalem artichoke was the best carbon sources for production of ansamitocin P-3. In the medium, which contains Jerusalem artichoke powder combining with glycerol and additionally adding isobutanol, the AP-3 was reached about 60 mg/l.

***Key words:*** Actinosynnema pretiosum，ansamitocin P-3, fermentation, carbon sources.

**Introduction**

Ansamitocins are potent antitumor agents produced by Actinosynnema pretiosum.[1]

Actinosynnema pretiosum is a commercially important organism due to its ability to produce ansamitocin P-3. The cytotoxicity of ansamitocin has prompted its use as a toxic "warhead" in immuno-toxin conjugates. Several of these conjugates are currently in late-phase clinical trials as therapeutic agents against solid tumors [2]