

Study of Efficiency: Two Preparation Forms of Repellent Alezan

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Abstract.

The article introduces the data on the testing of two forms of the Alezan repellent, recommended for the protection of horses from the attacks of horseflies: the Alezan spray and the Alezan gel. The Alezan spray for horses with repellent action contains repellent, natural extracts of burdock, bidens, plantain, essential oil of lavender, water with a high degree of clearing enriched with silver ions and also excipients. The Alezan gel with a repellent effect intended for horses with sensitive skin contains repellent, Aloe Vera, plantain and dandelion extracts, allantoin and water with a high degree of clearing enriched with silver ions. The repellent effectiveness of the preparations was studied by a simultaneous counting of the number of attacking horseflies and mosquitoes before and after their treatment with these preparations in different doses. It was followed by calculation of the repelling effectiveness expressed as a percentage and the duration of persistence of the repellent action of different constant efficiency expressed in hours. The Alezan spray exhibits more pronounced repellent properties. A sustainable repellent effect of the Alezan spray against the horseflies for 4 and 6 hours with an efficiency of not less than 84% at the end of this period can be obtained after treatment of horses at doses of 200 and 250 ml, representing 40 g and 50 g of active substance. If a longer protection is required, the dose of the preparation can be increased to 400 ml (80 g of active substance). Due to the dose increase the repellent efficiency will last more than 8 hours. A further increase in the dose of the preparation is not cost-effective, since it is not accompanied by a proportional increase in the periods of effective repellent action. Both tested drugs have a pleasant smell, do not cause skin irritation, which fully meets the aesthetic qualities.

Keywords: coefficient of repellent efficiency, gel, horse, horse flies, mosquitoes, rational dose, repellent, spray.

INTRODUCTION

Horse breeding is an important branch of animal husbandry. Although the use of horses in the national economy as draft power is now almost outdated, they are increasingly used in equestrian sport, horseback riding and hippotherapy which helps to treat and prevent certain diseases. In order to preserve calmness of the horses used for these purposes it is required to protect them from flying blood-sucking dipterous insects, mainly from the hocks, which are the largest species of blood-sucking insects. The attack of the horseflies results in considerable anxiety of the horses, and even their buzzing causes suspicion when approaching. The injections of the horseflies are very painful, which is connected with the input of toxic saliva into the wound, often causing hyperemia and edema formation.

The use of repellents has become firmly established in a combination of activities to protect animals from horseflies. Such drugs as benzimine (hexamide), carboxide, diethyltoluamide, oxamate, technical sulfones of oil, terpenoid repellent, veterinary repellent, oxarep, UMORep and others have been widely tested and have received the greatest application in veterinary medicine [1, 2, 3, 4, 5, 6]. However, all these preparations have a specific unpleasant smell and are not suitable for treating horses used by people to rest for aesthetic reasons. For these purposes a repellent preparation "Alezan", produced as a spray and a gel is suggested by OOO "Scientific and Innovation Center Agrovetzashchita". Both forms of repellent are applied to clean and dry skin and hair coat.

The Alezan spray for horses with repellent action contains repellent, natural extracts of burdock, bidens, plantain, essential oil of lavender, water with a high degree of clearing enriched with silver ions and also excipients. Besides the repellent action, it contributes to the rapid recovery of horses from the consequences of insect bites. It possesses bacteriostatic, antipruritic, anti-inflammatory and wound-healing properties which soothe skin irritation.

The Alezan gel with a repellent effect intended for horses with sensitive skin contains repellent, Aloe Vera, plantain and dandelion extracts, allantoin and water with a high degree of clearing enriched with silver ions. The gel also contributes to the

rapid recovery of horses from insect bites. Aloe Vera nourishes the skin and hair coat, heals the skin, plantain and dandelion extracts possess bacteriostatic, antipruritic, anti-inflammatory and wound-healing properties, allantoin activates metabolic processes in the skin, restores epidermis protective functions, eliminates dryness and peeling. According to the "Instruction for the application of the Alezan gel", approved by CEO of OOO "Scientific and Innovation Center Agrovetzashchita" on August 4, 2008, a one-time use provides protection from the horseflies up to 3 hours. The gel is applied with a sponge on the face and genitals with a thin layer, without rubbing.

METHODS AND RESULTS

The Alezan spray and the Alezan gel preparations in polymer bottles, respectively, with hand pressure sprayers and devices for batch squeezing of pasty substance containing 20% and 10% of active substance were studied as repellents. The preparations are presented by the company OOO "Agrovetzashchita" for studying with the purpose of protection horses used in equestrian sport from the horseflies. The research was conducted on the cattle pasture in the Nizhnetavdinsky district (southern taiga) of the Tyumen region. The experiments were made on horses used by shepherds for grazing.

According to the methodical recommendations [7], the repellent effectiveness of the preparations was studied by a simultaneous counting of the number of attacking horseflies and mosquitoes before and after their treatment with these preparations in different doses. It was followed by calculation of the repelling effectiveness expressed as a percentage and the duration of persistence of the repellent action of different constant efficiency expressed in hours. Due to the strong anxiety of horses during spraying, the Alezan spray treatment and the Alezan gel treatment were carried out the same way: by wiping with the help of a sponge of the entire surface of the body.

Both preparations were tested on a human being beforehand. The left hand of the researcher exposed to the elbow was treated with the Alezan gel preparation, and the left leg, bare to the knee joint, was treated with the Alezan spray preparation

until pronounced signs of moistening. The right arm and leg were not treated as a mean of control.

As a result of the account taken within 25 minutes after 3.5 hours after treatment, there was an attack of only one horsefly on the hand treated with the Alezan gel, and there were 13 horseflies on the other arm, which means that the repellent effectiveness of the preparation against the horseflies by that time was 92.3%. As a result of the same account at the same time, there were no attacks of the flies on the left leg, treated with the preparation Alezan spray, and there were 20 attacks on the right leg during this time, which means that the repellent efficiency was 100%.

As a result of an account taken within 15 minutes 4.2 hours after treatment, there were 5 mosquitoes on the left hand, treated with the Alezan gel, and there were 82 mosquitoes on the right hand, which means that the repellent effectiveness of the preparation against mosquitoes by this time was 93.9%. With similar account at the same time there were no mosquitoes on the left leg, treated with the preparation Alezan spray, and there were 114 mosquitoes on the right leg during this time, which means that, as well as and against the horseflies, the repellent effectiveness of the drug was 100%. It should be noted that both drugs have a pleasant smell, do not irritate the skin, which fully meets the aesthetic qualities.

Preliminary accounts showed the high number of horseflies on horses. So there were up to 32 horseflies on the horse at one point. The blood shedding of the horsefly - *Tabanus bovinus* is shown in Figure 1, and a massive attack of horseflies - *p. Hybomitra* on the udder of a horse is shown in Figure 2. In the last picture trickles of blood flowing from the wounds on the surface of the udder are visible.



Figure 1. Female horsefly *Tabanus bovinus* L. sucking the blood of a horse.

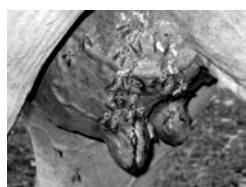


Figure 2. Horseflies sucking the blood of the horse's udder.

The direct results of the study of the repellent effectiveness of the Alezan spray and the Alezan gel preparations against horseflies in the treatment of horses, presented in Table 1, show their insufficiently high and stable effectiveness against these insects, which is explained by the relatively low doses of the preparations, which were used during the experiment. Unfortunately, before the study of the effectiveness of these preparations, the researchers had no information about the relative content of the active substance in them.

Nevertheless more encouraging results were obtained when testing the preparation Alezan spray. The performed calculations of the constant efficiency at different levels, presented in Table 2, show that increase in the dose of this preparation for processing a horse to 200-250 ml or 40-50 g of active substance will allow obtaining a stable repellent efficiency for 4-6 hours not less than 84% by the end of these periods. Spray treatment provides repelling not only horseflies, but also zoophilic

flies, which are clearly visible on the face of a horse, one side of which is treated with repellent (Figure 3).

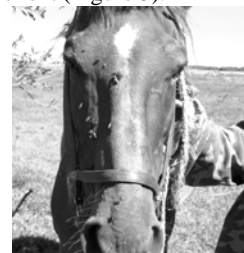


Figure 3. Flies and horseflies attacking the part of the head, which is not treated with the Alezan spray and their absence on the part of the head, which is treated with the Alezan spray.

Table 1. The direct repellent effectiveness of the Alezan spray and the Alezan gel preparations against horseflies after treatment of horses with different doses.

Date and time of treatment	Doses of preparations, ml	The number of insects before treatment	The time that has passed since treatment, hours/efficiency, percents
The preparation Alezan spray			
16.07. 15 ⁵⁵	100	32	0.3/90; 0.5/75; 0.7/70
23.07. 11 ⁰⁰	150	11	0.1/100; 0.25/75; 1/75; 2/80; 4.5/69
23.07. 11 ⁰⁵	150	14	0.1/100; 0.25/75; 2/63; 4.5/50
The preparation Alezan gel			
23.07. 10 ²⁵	100	12	0.25/100; 2/45; 5/0
24.07. 11 ⁰⁰	150	28	0.2/0; 0.3/0; 1/0; 4/0

At the same time it should be noted that the most rational dose for this preparation should be 400 ml (80 gr. Of active substance), since the increase in volume from 200 ml to this level, that is by 2 times, leads to a directly proportional increase in the duration of the repellent actions at a level of not less than 84%, that is also by 2 times from 4 to 8 hours (Table 2).

There was no way to calculate the repellent effectiveness of the Alezan gel preparation with the increase in the applied doses (not possible), since the results of the studies of this drug were obtained in contradictory ways: very low and even negative. Such results are explained by the fact that this drug was tested at twice lower doses of active substance than the Alezan spray. According to the calculations given in Table 2, the Alezan spray in doses of 50 and 75 ml, equated to the doses in which the Alezan gel was tested, also proved to be ineffective.

Table 2. The expected effectiveness of the repellent Alezan spray against horseflies when processing horses by wiping the hair covering with a sponge.

Doses of preparation, ml	CRE, percents				
	100	84	50	16	0
Duration, hours					
50	-	-	-	-	0.95
75	-	-	-	2.08	3.56
100	-	-	1.60	3.94	5.41
150	0.41	2.27	4.22	6.56	8.03
200	2.25	4.12	6.06	8.40	9.88
250	3.74	5.60	7.55	9.89	11.36
300	4.88	6.75	8.69	11.04	12.51
400	6.74	8.61	10.55	12.90	14.37

CONCLUSIONS

A stable repellent effect of the Alezan spray against the horseflies for 4 and 6 hours with an efficiency of not less than 84% at the end of this period can be obtained after treatment of horses at doses of 200 and 250 ml, respectively, which is 40 and 50 g. of active substance.

If a longer protection is required, the dose of the drug can be increased to 400 ml (80 g of active substance), from which the repellent efficiency will last more than 8 hours. A further increase in the dose of the preparation is not cost-effective, since it is not accompanied by a proportional increase in the periods of effective repellent action.

The treatment of horses by spraying is more suitable in comparison with wiping, but can be carried out only after preliminary training of animals to such a procedure.

The constant effective doses of the Alezan gel and the duration of their repellent action can be calculated from the results of studies after treatment of horses with the drug in much higher dosages or with a drug with a higher concentration of active substance.

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