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Original Contribution

ABAMECTIN AND CLOSANTEL RESIDUES IN MILK FROM SHEEP TREATED WITH ABANTEL-B

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ABSTRACT

The studies were carried out on sheep's milk, Cigay breed sheep, treated with the anthelmintic product *Abantel-b* (Biovet, Peshtera). The samples were taken on the 7th, 14th and 21st day after treatment. HPLC method was used for determination of the residues of Closantel (CLS) and Abamectin (ABM). Fluorescence detection without derivatisation for CLS and with derivatisation for ABM was used. It was established that the quantity of CLS, excreted with milk was from 225±19 µg/l (on 7th day) to 172.5±26.29 µg/l (on 21st day), and the quantity of ABM was from 3.5±1 µg/l to 0.62±0.25 µg/l. It was determined that sheep's milk was safe for human consumption 7 days after treatment. The proposed withdrawal period for milk from sheep treated with *Abantel-b* is 7 days.

Key words: sheep's milk, anthelmintic drugs, residues

INTRODUCTION

Many authors have studied residues of veterinary medicines in food products of animal origin The anthelmintic medicines are of particular interest due to their long withdrawal period. The medical product – Abantel-bolus (Biovet-Peshtera) contains the endectocides Abamectin (ABM) and Closantel-sodium (CLS) in one bi-conventional bolus intended for oral application for small ruminants.

Closantel is a salicylanide (5'-Chloro-4'-(4-chloro-α-cyanobenzyl)-3,5-di-iodosalicyl-*o*-toluidide) with wide anthelmintic spectrum effect, used successfully against helminth invasions at different stages of their reproduction cycle (trematodes, some nematodes and arthropods). Its anti-trematode efficiency is pointed against *Fasciola hepatica*, adult and young forms (after 4-6 weeks of their development). According to Courtney and Roberson [2] and Roberson and Courtney [3] the anti-nematode and anti-arthropod activity is against those parasites which feed on blood and plasma from the treated animals.

Abamectin is an antibiotic from the avermectines group, which is produced by the *Streptomyces avermitilis* [1]. A characteristic of this group is that the antibiotics are active against both nematodes and arthropods (endectocides). Abamectin, which is a natural product, and ivermectin, which is a semi-artificial product, are the avermectines used in practice.

Keeping in mind the data from the literature review we set our aim to study the abamectin and closantel residues in sheep milk, treated with Abantel-b, with a view to its veterinary-sanitary expertise.

MATERIALS AND METHODS

Research was carried out with milk from 4 lactating sheep of the Cigay breed, 32-43 kg body weight, in good clinical condition (without endo- and ecto-parasites). All animals were single treated (after a 12 hour starvation) with Abantel-bolus "Biovet", throught a bolus provider in dose 1 bolus per 25 kg b.m. The four sheep were milked in the morning and in the evening before and after the experiment. The milk samples were stored at ≤-20ºC until the chemical analyses.

Determination of closantel was done using a liquid-chromatography technique with fluorescence detection (without derivatisation), applying a method developed by us (4). Abamectin was determined applying a liquid-chromatography method with derivatisation of the molecule of ABM for acquiring a chemical structure with

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expressive fluorescence. The method for quantitative determination of ivermectin in biochemical substrate (tissues and blood) was modified according to our methodology [4].

RESULTS AND DISCUSSION

The residues of closantel and abamectin in sheep milk treated orally with Abantel-b are presented on **Table 1**. It is seen that the levels are minimal at the 8th hour (40.00 μg/l for CLS and 4.00 μg/l for ABM respectively). Their quantities in milk gradually increase and reach the highest values; for closantel the maximum value is at the 60th hour – 557.5±38.62 μg/l and for abamectin at the 24th hour – 7.00±2.45 μg/l. The quantities gradually decrease and for closantel the values are 225±19 μg/l on the 7th day and 172.5±26.29 μg/l on the 21st day. For abamectin the respective values are 3.5±1.0 μg/l on the 7th day and 0.62±0.25 μg/l on the 21st day.

Table 1. Residues of closantel and abamectin in milk from orally treated sheep with Abantel-b

Time (hours)	***Medical form***	
	Closantel (μg/l)	***Abamectin (μg/l)***
	Average value± standard deviation	*Average value± standard deviation*
8	40,00 ± 8,16	4,00 ± 2,45
24	245,00 ± 26,96	7,00 ± 2,45
60	557,50 ± 38,62	5,00 ± 2,00
72	350,00 ± 21,60	5,00 ± 1,41
108	257,50 ± 26,30	4,00 ± 0,82
120	240,00 ± 14,14	3,75 ± 8,16
144	217,50 ± 12,58	3,25 ± 0,50
168	225,00 ± 19,15	3,50 ± 1,00
312	242,50 ± 17,08	1,50 ± 0,58
336	210,00 ± 14,14	1,75 ± 0,50
492	177,50 ± 17,08	0,75 ± 0,29
504	172,50 ± 26,29	0,62 ± 0,25
660	175,00 ± 23,80	0,50 ± 0
672	167,50 ± 12,60	0,50 ± 0

Table 2. *Closantel and Abamectin residues in tissues and milk from sheep on the 7th, 14th and 21st day after treatment with Abantel-bolus in dose 1 bolus/25kg b.m.*

Medical form	***Animal products used for food***	***Maximum residues, which can be taken from one person per day (μg/day)***			***ADI = acceptable daily intake for people (μg/person/ day)***
		7 days after treatment	*14 days after treatment*	*21 days after treatment*	
Closantel	Tissues Milk Total residue quantity in tissues + milk, (μg)	38.78 394.95 433.73	38.78 357.42 396.20	38.78 337.62 376.4	1800
Abamectin	Tissues Milk Total residue quantity in tissues + milk, (μg)	0.93 8.25 9.18	0.93 4.12 5.05	0.93 1.68 2.61	15

The residues of CLS and ABM in milk on the 7th day after treatment together with the residual quantities of CLS and ABM in tissues (meat, liver, kidneys, fat) on the 21st day, taking into consideration human's daily consumption of milk and tissues, give the total quantity which a person can take per day. For closantel this quantity is 433.73 μg/person/day and the determined acceptable daily intake (ADI) is 1800 μg/person/day. For abamectin the respective values are 9.18

μg/person/day and the ADI value is 15 μg/person/day (**Table 2**).

Taking into consideration the presented data we propose the withdrawal period for milk from sheep treated with "Abantel-bolus", Biovet, to be 7 days.

These results show that even if a person consumes meat and offals from animals treated with Abantel-b and together with that consumes milk again from sheep treated with Abantel-b, and mindful of the withdrawal periods there is no risk to exceed the ADI for closantel and abamectin.

REFERENCES

1. Burg, R., Miller, B., Baker, E., Birnbaum, J., Currie, S., Hartman, R., L.ong, Y., Monaghan, R., Olson, L., Putter, I., Tunac, J., Wallick, H., Stapley, E., Oiwa, R.and Omura, S. Avermectins, new family of potent anthelmintic agents: producing organism and fermentation, *Antimicrobial Agents and Chemotherapy*, 15, 3, 361-367, 1979.
2. Courtney, Ch. and Roberson, E. Chemotherapy of Parasitic Diseases. In: Adams, H. R. (ed.) "Veterinary Pharmacology and Therapeutics", 7th Ed., Iowa State University Press, Ames, Iowa, 50014, USA, p. 916, 1995.
3. Roberson, E. and Courtney, Ch. Anticestodal and Antitrematodal Drugs. In: Adams, H. R. (ed.) "Veterinary Pharmacology and Therapeutics", 7th Ed., Iowa State University Press, Ames, Iowa, 50014, USA, pp. 933-954, 1995.
4. Stoev, G, Dakova, T, Michailova, A. Quantitative determination of Closantel residues in milk by high-performance liquid chromatography with fluorescence detection. *J. Chromatogr A,*. Jun 18; 846 (1-2):383-6, 1999.