



## RESEARCH ARTICLE

### Comparative efficacies of two different commercial products containing nitroxylnil against fascioliasis in cattle

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#### Özet

**Chowdhury MR, Huq MA, Howlader MMR, Islam MS, Akanda MR, Akhand RN.** Sığırlarda fascioliasise karşı nitroksinil içeren iki farklı ticari ürünün etkinliğini karşılaştırılmalı olarak değerlendirilmesi.

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**Amaç:** Bu araştırma nitroksinil içeren iki farklı ticari ürünün 18 sığırdaki karaciğer keleşine karşı karşılaştırılmalı etkinliğini belirlemek amacıyla yapıldı.

**Gereç ve Yöntem:** Onsekiz sığır, her birinde 6 adet olan 3 gruba (A, B ve C) ayrıldı. Grup C hiçbir uygulama yapılmaksızın hastalığın kontrol grubu olarak değerlendirilirken, grup A ve B'ye sırası ile ticari ürünler deri altı yolla uygulandı.

**Bulgular:** A ve B gruplarında 3, 7, 14 ve 28. günlerde her gramdaki yumurta sayısında (EPG) önemli oranda ( $P<0.01$ ) düşme görüldü. Kontrol grubunda 7. günde EPG değerinde önemli artış ( $P<0.01$ ) belirlendi. Grup A ve B'de 3, 7, 14 ve 28. günlerde ortalama EPG düzeyi sırası ile %83.9-%80.8, %81.7-%80.7, %78.1-%77.0 ve %73.7-%61.2 olarak belirlenirken, kontrol grubunda sırası ile %6.7, %9.2, %21.4 ve %30.9 olarak belirlendi. İlaç uygulanan grup A ve B hayvanlarında canlı ağırlıkta artış ( $P<0.01$ ) belirlenirken, kontrol grubunda değişiklik belirlenmedi.

**Öneri:** Araştırma sonucu nitroksinil içeren iki farklı ticari ürünün sığırlarda fascioliasise karşı benzer etkinliğe sahip olduğu ifade edilebilir.

**Anahtar kelimeler:** Nitroksinil, etkinlik, fascioliasis, sığır

#### Abstract

**Chowdhury MR, Huq MA, Howlader MMR, Islam MS, Akanda MR, Akhand RN.** Comparative efficacies of two different commercial products containing nitroxylnil against fascioliasis in cattle.

**Aim:** This study was conducted to evaluate the comparative efficacies of two different commercial products containing nitroxylnil against liver fluke infestation for a period of 28 days by using 18 cattle.

**Materials and Methods:** Eighteen cattle were divided into 3 groups (A, B and C) where each group consisted of six cattle. Product A and Product B were injected subcutaneously to the cattle in group A and B, respectively. Cattle in group C were kept as infected control group without giving any treatment.

**Results:** A significant ( $P<0.01$ ) reduction of egg per gram (EPG) count was found on 3rd, 7th, 14th and 28th days of treated cattle of group A and B, respectively. The EPG count of control group were significantly ( $P<0.01$ ) increased 7 day onwards up to experimental period. Reduction of mean EPG on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28th day after treatment in group A and B were 83.9%-80.8%, 81.7%-80.7, 78.1%-77.0% and 73.7%-61.2%, respectively, whereas in control group the mean EPG were 6.7%, 9.2%, 21.4% and 30.9%, respectively. The body weight was increased significantly ( $P<0.01$ ) after treatments in group A and B, respectively except untreated control group C.

**Conclusions:** This result may indicate that two commercial products contain nitroxylnil have similar efficacies against fascioliasis in cattle.

**Keywords:** Nitroxylnil, efficacy, fascioliasis, cattle





## Introduction

Livestock feed and parasitism are the important limiting factors of livestock development in Bangladesh. As a result, about 50 % apparently healthy cattle population has been recognized to be affected with two or more different species of parasites (Garrels 1975). Among the various parasitic infections fascioliasis (*Fasciola sp.*) is to be considered a major disease of ruminants in this country (Qadir 1981). Fascioliasis, caused by *Fasciola hepatica* and *F. gigantica*, is one of the most prevalent helminthes infections of ruminants in different parts of the world inducing significant morbidity and mortality (WHO 1995, Okewole et al 2000) as well as lower production of ruminants (Okoli 2001). This group of liver fluke (*Fasciola sp.*) is also associated with anaemia (Soulsby 1986) resulting loss of body weight, stunted growth, diarrhea etc. that greatly hamper the normal growth and production of cattle.

The agro-ecological and geo-climatic condition of Bangladesh is highly favorable for the growth and multiplication of parasites. The heavy rainfall in the summer and autumn, deep fog in the winter and also low lying region might be the causes of higher prevalence of the disease in Bangladesh (Mamun et al 2011). Prevalence of fascioliasis is higher during the rainy season in slaughtered goats (Hossain et al 2011). Tahir (2002) and Dipeolu et al (2000) reported that the reason for the more prevalence of *Fasciola sp.* after summer season may be due to conducive factors like presence of marshy places with grass at the canal banks and presence of snails in the area. Yuling and Zang (1997) reported that outbreaks of fascioliasis occurred after flooding. Especially

rainfall climate conditions were often associated with prevalence of the fasciola infection because this was suitable for intermediate host like snails to reproduce and to survive longer under humid conditions (Ahmed et al 2007).

In developed countries, the principle of controlling parasitic diseases are based on pasture and barn management (Rodistis et al 2000) and protective therapy, but in Bangladesh where animals are generally maintained in mixed farming system with no pasture land for grazing, these applications can cause limitation to control parasites. Control of parasitic diseases is mainly based on regular anthelmintic treatment in Bangladesh. Now various groups of anthelmintics with narrow and broad spectrum activities have been discovered. Nitroxylin is one of the latest broad spectrum anthelmintics.

Therefore, nitroxylin was selected and the present research work was designed to undertake the comparative efficacies of two different commercial products against fascioliasis in cattle.

## Materials and Methods

This study was conducted for a period of 28 days at Sylhet Govt. dairy farm, Bangladesh. The study protocol was approved by the ethical committee of the Sylhet Govt. dairy farm, Bangladesh. About 18 multiparous indigenous cows weighing between 190 to 210 kg were selected on the basis of their age, sex and breed. The animals were maintained in intensive husbandry condition and supplied 12 kg green grass; 4 kg straw, 2 kg mixed concentrate with *ad lib* water per day per cow. Eighteen cattle were divided 3 groups. Two

Table 1. Comparative efficacies of two different commercial products containing nitroxylin against liver fluke in cattle.

Groups	Treatments	Pre-treatment			Post-treatment					
		0 day	3 <sup>rd</sup> day		7 <sup>rd</sup> day		14 <sup>rd</sup> day		28 <sup>rd</sup> day	
		EPG	EPG	EPG (%)	EPG	EPG (%)	EPG	EPG (%)	EPG	EPG (%)
A	Product A	176±3.5	28.3±0.8*	83.9(↓)	32.3±0.1*	81.7(↓)	38.5±0.0*	78.1(↓)	46.3±0.8*	73.7(↓)
B	Product B	168±2.2	32.4±3.5*	80.8(↓)	32.4±0.2*	80.7(↓)	38.7±0.2*	77.0(↓)	65.4±0.5*	61.2(↓)
C	Control	159±1.1	170±0.8*	6.7(↑)	175±1.0*	9.20(↑)	202±2.0*	21.4(↑)	230±0.8*	30.9(↑)

The above values represent the mean ± standard deviation of 6 cattle. \*:P<0.01.

Table 2 Effects of two different commercial products on body weight (kg) in cattle.

Groups	Treatments	Pre-treatment		Post-treatment		
		0 day	3 <sup>rd</sup> day	7 <sup>rd</sup> day	14 <sup>rd</sup> day	28 <sup>rd</sup> day
A	Product A	195±0.8	196±0.9*	201±1.5*	203±1.9*	220±1.3*
B	Product B	190±1.0	192±1.2*	196±1.6*	201±1.6*	206±1.3*
C	Control	210±1.3	207±1.0*	204±0.4*	197±2.6*	196±1.7*

The above values represent the mean ± standard deviation of 6 cattle. \*:P<0.01.





injectable nitroxylin preparations (Dovenix<sup>®</sup>, Merial, France and Oxynil<sup>®</sup>, Techno Drugs Limited, Bangladesh) were used (10 mg/kg, SC) for positive control against liver fluke (*Fasciola* spp.) as Group A and B. Cattle of group C was kept as control without giving any treatment. Before trials (day 0), initial body weight, total egg count of parasites were recorded. During the study period the fecal samples were collected directly from the rectum and examined on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day using Modified Stoll's egg counting method. Body weights were recorded on day 3, 7, 14 and 28 following the treatments.

#### Measurement of body weight

The body weight of all cattle was taken as described by Samad (2001).

Body weight = Length x (Girth)<sup>2</sup>/300 x 2.2 kg

Here Length = Length from the point of shoulder to the buttock in inches.

Girth was also measured in inches at the point of xyphoid cartilage.

#### Statistical analysis

Collected data were statistically analyzed by the computer using statistical package programmed MSTAT-C developed by Russel (1996). A one way ANOVA was done by F variance test.

### Results

The result of the comparative efficacies of different products against fascioliasis in cattle is shown in Table 1. In treatment group A, mean EPG count before treatment was 176 and after treatment mean EPG on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day were 28.3, 32.3, 38.5 and 46.3, respectively. Reduction of mean EPG on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day after treatment were 83.9 %, 81.7 %, 78.1 % and 73.7 %, respectively. In treatment group B, mean EPG count before treatment was 168 and after treatment mean EPG on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day were 32.4, 32.4, 38.7 and 65.4, respectively. Reduction of mean EPG on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day after treatment were 80.8 %, 80.7 %, 77.0 % and 61.2 %, respectively. In untreated control group C, the mean EPG of untreated control group on pre-treatment (day 0) was 159. The mean EPG on the 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day were 170, 175, 202 and 230, respectively. The mean EPG were increased 6.7 %, 9.2 %, 21.4 % and 30.9 % on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day, respectively. The results of the effects of two different products on body weight are shown in the Table 2. The body weight was increased significantly ( $P < 0.01$ ) in group A and B, respectively. Mean body weight before treatment

was 195 and after treatment mean body weight on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day were 196, 201, 203 and 220 in group A, respectively. Mean body weight before treatment was 190 and after treatment mean body weight on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day were 192, 196, 201 and 206 in group B, respectively. Mean body weight of untreated control group C (day 0) was 210 and on the 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day were 207, 204, 197 and 196, respectively.

### Discussion

The efficacies of products were evaluated on the basis of the percentage of reduction in mean egg count compared to the mean egg count per gram of feces. A significant ( $P < 0.01$ ) reduction of EPG count was found on 3<sup>rd</sup>, 7<sup>th</sup>, 14<sup>th</sup> and 28<sup>th</sup> day of treated cattle of group A and B, respectively. The present finding was in agreement with the work of Gupta (1988) in buffaloes, Coles and Stafford (2001) in lamb. Paraud et al (2009) also reported that the efficacy of oxcyclozanide was 96 % in goat and concluded that oxcyclozanide is highly effective in reducing the number of rumen flukes. On the other hand, the EPG count of control group were significantly ( $P < 0.01$ ) increased 7 day onwards up to study period. This study supports the previous findings recorded by Islam and Samad (1989). In controlled studies of cattle, Rapic et al (1988) and Richards et al (1990) reported that the nitroxylin showed the better efficacy against liver fluke than other anthelmintics. Mooney et al (2009) also reported more than 98 % efficacy in hill sheep flock in the west of Ireland. However it could be concluded that, nitroxylin is a potent antihelmintic from the family of substituted phenols that is utilized in ruminants for the control of trematodes, particularly for *Fasciola hepatica* (Queiroz et al 2013).

The body weight increased significantly ( $P < 0.01$ ) after treatments in group A and B. The body weight was increased and this may be due to removal of parasitic load, proper absorption and metabolism of nutrient in the parasite free gastro-intestinal tract. The body weight gains in the nitroxylin treated sheep are supported by Isles et al (1985) in heifers. On the other hand, the body weight significantly decreased in untreated control group due to overload of parasites within the body of cow.

### Conclusions

The finding of the present study reveals that both commercial products are effective for reduction of EPG of liver fluke. These two drugs have wide therapeutic index and they may kill or inhibit egg production of liver fluke and other gastrointestinal nematodes. However, the preliminary control efficacy studies of anthelmintics may help to explore the details of pharmacokinetic study.



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