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**BIOCHEMICAL AND PARASITOLOGICAL  
EVALUATION OF *NIGELLA SATIVA* AGAINST  
RUMEN FLUKE (*PARAMPHISTOMUM*) IN SHEEP  
AS COMPARED WITH TREMATOCIDE "HAPADEx"**

(With 4 Tables)

By

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(Received at 26/4/1998)

التقييم الكيمياءى والطفيلى لربة البركة على دودة الكرش "البارمفيستوموم"  
فى الأغنام مقارنة بمستحضر الهباديكس

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قورن تأثير ربة البركة مع مستحضر الهباديكس على ديدان البارمفيستوموم فى الأغنام وتم استخدام ثلاثون نعجة مصابة بديدان البارمفيستوموم قسمت الى ثلاث مجموعات متساوية: مجموعة عولجت بالهباديكس ومجموعة عولجت بمستخلص ربة البركة ومجموعة بمسحوق ربة البركة. تم أخذ عينات دم للتحليل الكيمياءى الحيوى وعينات براز لعد البويضات من كل الأغنام قبل العلاج ثم بعد ثلاثة وسبعة وخمسة عشر يوما من العلاج وكانت أفضل النتائج حسب الترتيب هى فى مجموعة الهباديكس ثم مسحوق ربة البركة يليه مستخلص ربة البركة.

### SUMMARY

The trematocide activity of *Nigella sativa* compared with Hapadex against *paramphistomum* in sheep was investigated. A total number of 30 adult sheep (1-2 years old) were used in this study. The animals were allocated into three equal groups. Hapadex treated group, *Nigella sativa* extract treated group and *Nigella sativa* powder treated group. The blood and faecal samples were collected from all animals just before

treatment and after 3,7 and 15 days of treatment. The parasitological and biochemical data of the different groups of sheep reflexed a very good efficacy of Hapadex, *Nigella sativa* powder and *Nigella sativa* extract, respectively. The use of *Nigella sativa* in correct dose as a new trematocide in veterinary field can overcome the disadvantages of other drugs, moreover it is economically cheap.

**Key Words:** *Nigella Sativa*, Sheep, Trematocide "Hapadex".

## INTRODUCTION

*Paramphistomum* infestation is the major disease that greatly threaten sheep production. It is characterized by a severe enteritis, weakness, depression and dehydration (Rolfe et al., 1994). Recently, El-Tedawy (1977) recorded that paramphistomiasis in sheep alters amino acids and serum proteins patterns.

There is evidence that, the incidence of anthelmintic resistance is increasing in livestock (Jackson, 1993), as well as, beside their toxic effect and the treated animals must not be slaughtered during treatment also milk must be discarded.

Therefore, the use of natural products in the treatment of paramphistomiasis was tried to assess the efficacy of *Nigella sativa* compared with Hapadex in sheep with special reference to the biochemical changes in host serum.

## MATERIAL and METHODS

### 1) Animals and treatment trials:

A total number of 30 adult sheep (1-2 years old) were used in this study. These animals were selected from a flock with a high incidence of *paramphistomum* in Etay El Baroud district "Behaira Governorate". Animals were classified into equal three groups as the following design:

Group I: Animals in this group were treated orally by Hapadex, 20mg/kg body weight (Netobimin, Schering-Plough Animal Health).

Group II: This group was treated with *Nigella sativa* extract \* (1 ml/5kg body weight).

Group III: The animals of this group were given *Nigella sativa* powder by oral dose (200 mg /kg b.w).

## **2) Preparation of extract:**

*Nigella sativa* seeds were washed in distilled water, dried in oven at 60°C and powdered. Five grams of powder were extracted with 100ml of 95% methanol, by Keeping over night. The extract was filtered and the filtrate was concentrated to remove methanol completely (Salomi, *et al.*, 1991).

## **3) Faecal and blood collections:**

Faecal and blood samples were collected from each animal of all groups just before treatment, and after 3, 7 and 15 days post-treatment

## **4) Faecal examination:**

Faecal samples were collected directly from the rectum in clean plastic containers labelled and examined rapidly, using Macmaster slide according to the modified technique of Kelly (1974).

## **5) Biochemical analytical procedures:**

The clean non haemolysed sera were prepared after blood coagulation and kept in clean vials at -20°C until analysis. The serum was used for quantitative determination of serum gamma-glutamyl transferase (GGT), Serum alanine aminotransferase (SALT) and aspartate aminotransferase (SAST) (Reitman and Frankel, 1957); s.alkaline phosphatase (SALP) (Kind and King, 1954); total serum protein (Weichselbaum, 1946); s.albumin, (Barholmer and Delangy 1966); blood urea, (Fawcet and Scott, 1960); s.uric acid, (Caraway, 1955) and s.creatinine, (Husdan and Rapaport, 1968). Serum globulins was calculated after Coles (1974).

## **6) Statistical analytical:**

The obtained results were analyzed by SAS computer program.

## **RESULTS and DISCUSSION**

*Nigella sativa* has been commonly used in medicine for treatment of various diseases (Nordkarni, 1976).

On the other hand, many investigators reported that hepatic and renal damage were usually noticed following administration of many drugs (Mori, 1976; El-Fadely 1993 and Mandour, *et al.*, 1994).

Therefore, a field trial was conducted to evaluate the efficacy of *Nigella sativa* extract as well *Nigella sativa* powder compared with Hapadex against *paramphistomum* in sheep.

The obtained data (Table 1) showed that the egg count was greatly decreased in faecal samples of sheep treated with Hapadex and *Nigella*

*sativa* powder, although Hapadex showed best results at 3 days followed by *Nigella sativa* powder. The *Nigella sativa* extract showed acceptable reduction at 15 days after treatment.

It is well known that, the internal parasites of the animal exert toxins which may produce damage in the liver cells (Ismail *et al.*, 1990), also kidney impairment and dysfunction caused by toxins produced by parasites (Idris *et al.*, 1984).

Table (2) revealed that, the values of total serum proteins, albumin and globulins were insignificantly increased in all treated groups. This increase is clearly observed in groups treated with *Nigella sativa*.

On the other hand, Table (3) showed that the serum enzymatic activities were slightly decreased. The improvement of SALT, SAST, SALP and GGT activities as well as serum proteins is criteria confirming a good efficacy of both Hapadex and *Nigella sativa* as trematocides.

Finally the data listed in Table (4) showed that serum uric acid levels were insignificantly decreased in all treated groups, while, the values of blood urea and serum creatinine still as in infested non-treated groups. It is well known that *Nigella sativa* increases the uric acid excretion outside via urine, also, uric acid is the first constituent which returns to normal level after improvement of kidney.

The obtained results are confirmed by the results obtained by Rakesh, *et al.* (1979) who concluded that the essential oil of *Nigella sativa* has a good antibacterial and antifungal activity, while it was found to has fairly good activity against earth worms and tape worms.

The present study do encourage the possible use of this cheap indigenous plant in treatment of *paramphistomum* which need further studies.

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**Table. 1** The mean values of *paramphistomum* eggs before and after treatment with *Nigella sativa* and Hapadex.

| Type of treatment            | Before treatment | After treatment |               |             |
|------------------------------|------------------|-----------------|---------------|-------------|
|                              |                  | 3days           | 7days         | 15 days     |
| Hapadex                      | 353±122 A        | 18.20±5.08 B    | 13.00±4 B     | 12.8±3.50 B |
| <i>Nigella sativa</i> Ext    | 358.4±137.6 A    | 300±110 AB      | 233.8±87.7 BC | 115.6±30.8C |
| <i>Nigella sativa</i> powder | 380±156 A        | 170.7±62.3 B    | 61±38.10 C    | 20±3.2 D    |

The different letters means significant at  $P < 0.05$  while the similar letters mean non significant.

**Table. 2** Total serum protein, albumin and globulin levels in sheep treated with Hapadex and *Nigella sativa*.

| Parameter                | Treatment                    | Before treatment | After treatment |           |           |
|--------------------------|------------------------------|------------------|-----------------|-----------|-----------|
|                          |                              |                  | 3days           | 7days     | 15 days   |
| Total serum protein g/dl | Hapadex                      | 6.55±0.59        | 6.00±0.93       | 6.44±0.66 | 6.72±0.51 |
|                          | <i>Nigella sativa</i> extr.  | 6.27±0.11        | 6.11±0.65       | 6.78±0.36 | 6.85±0.36 |
|                          | <i>Nigella sativa</i> powder | 6.08±0.46        | 6.47±0.67       | 6.49±0.46 | 6.76±0.31 |
| Serum Albumin g/dl       | Hapadex                      | 3.66±0.66        | 3.57±0.54       | 3.57±0.54 | 3.87±0.69 |
|                          | <i>Nigella sativa</i> extr.  | 3.06±0.11        | 4.09±0.69       | 4.09±0.69 | 4.20±0.58 |
|                          | <i>Nigella sativa</i> powder | 3.73±0.61        | 3.89±0.43       | 3.89±0.43 | 4.09±0.63 |
| Serum globulin g/dl      | Hapadex                      | 2.89±0.11        | 2.87±0.44       | 2.87±0.44 | 2.85±0.71 |
|                          | <i>Nigella sativa</i> extr.  | 2.42±0.22        | 2.69±0.36       | 2.69±0.36 | 2.65±0.63 |
|                          | <i>Nigella sativa</i> powder | 2.35±0.41        | 2.60±0.28       | 2.60±0.28 | 2.67±0.51 |

**Table. 3 Serum enzymatic activities in sheep infested with *paramphistomum* and treated with Hapadex and *Nigella sativa***

| Parameter                               | Treatment                    | Before treatment | After treatment |            |            |
|---|------------------------------|------------------|-----------------|------------|------------|
|   |                              |                  | 3days           | 7days      | 15 days    |
| Serum Alanin Amino-transferase Iu/ml    | Hapadex                      | 27.20±1.87       | 28.5±1.5        | 27.9±1.6   | 26.50±1.35 |
|   | <i>Nigella sativa</i> extr.  | 26.34±1.71       | 29.70±1.41      | 28.10±1.18 | 25.56±1.44 |
|   | <i>Nigella sativa</i> powder | 27.80±1.53       | 27.80±1.60      | 26.34±1.08 | 24.34±1.88 |
| Serum Aspartate Amino-transferase Iu/ml | Hapadex                      | 48.44±2.51       | 49.80±3.20      | 49.56±2.5  | 48.5±2.00  |
|   | <i>Nigella sativa</i> extr.  | 47.90±2.60       | 48.77±3.8       | 48.00±1.90 | 46.50±1.28 |
|   | <i>Nigella sativa</i> powder | 47.72±2.17       | 49.60±2.91      | 47.81±2.30 | 43.17±2.36 |
| Serum Alkaline Phosphatase K.A.U./dl    | Hapadex                      | 16.81±1.8        | 17.22±1.08      | 16.24±1.34 | 15.09±1.24 |
|   | <i>Nigella sativa</i> extr.  | 17.00±1.22       | 16.87±2.61      | 15.77±1.48 | 15.29±1.46 |
|   | <i>Nigella sativa</i> powder | 15.80±1.35       | 16.00±1.55      | 16.22±1.65 | 16.5±1.70  |
| Serum Gamma Glutamyl Transferase IU/L   | Hapadex                      | 25.10±2.7        | 26.7±2.65       | 24.83±2.30 | 25.41±2.20 |
|   | <i>Nigella sativa</i> extr.  | 26.34±1.50       | 25.8±2.78       | 25.13±3.10 | 25.40±2.8  |
|   | <i>Nigella sativa</i> powder | 25.98±1.70       | 23.2±2.10       | 25.6±2.24  | 23.45±3.09 |

**Table. 4 Blood urea, uric acid and creatinine values in *paramphistomum* treated sheep with Hapadex and *Nigella Sativa*.**

| Parameter              | Treatment                    | Before treatment | After treatment |            |           |
|------------------------|------------------------------|------------------|-----------------|------------|-----------|
|                        |                              |                  | 3days           | 7days      | 15 days   |
| Blood urea mg/dl       | Hapadex                      | 35.5±1.31        | 36.81±1.60      | 36.75±2.09 | 35.66±1.9 |
|                        | <i>Nigella sativa</i> extr.  | 36.7±1.51        | 36.79±1.28      | 35.87±1.77 | 38.22±1.9 |
|                        | <i>Nigella sativa</i> powder | 35.9±1.45        | 37.27±1.69      | 37.11±1.26 | 36.00±1.4 |
| Serum Uric acid mg/dl  | Hapadex                      | 0.98±0.08        | 0.92±0.10       | 0.95±0.06  | 0.89±0.08 |
|                        | <i>Nigella sativa</i> extr.  | 0.91±0.08        | 0.81±0.12       | 0.80±0.08  | 0.72±0.07 |
|                        | <i>Nigella sativa</i> powder | 0.88±0.05        | 0.86±0.07       | 0.71±0.05  | 0.65±0.13 |
| Serum Creatinine mg/dl | Hapadex                      | 1.34±0.08        | 1.48±0.11       | 1.43±0.07  | 1.36±0.04 |
|                        | <i>Nigella sativa</i> extr.  | 1.41±0.005       | 1.43±0.14       | 1.35±0.09  | 1.42±0.08 |
|                        | <i>Nigella sativa</i> powder | 1.39±0.09        | 1.30±0.08       | 1.38±0.14  | 1.32±0.06 |

