

بسم الله الرحمن الرحيم

**Sudan University of Science and Technology**

**Graduate College**

**Comparison of efficacy, persistent effect, and treatment intervals of anthelmintics in naturally infected donkeys (*Equus asinus*) in North Darfur State, Sudan**

مقارنة الفعالية و الأثر المستمر والفترات العلاجية لمضادات الديدان في الحمير المصابة طبيعيا بالديدان في ولاية شمال دارفور، السودان

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## **Declaration**

Here it is to declare this research work entitled: (Comparison efficacy, Persistent effect and treatment interval of anthelmintics in naturally infected donkeys in North Darfur State, Sudan), was carried out in the department of Veterinary Medicine and Surgery, Collage of Veterinary Medicine, Sudan University of Science and Technology under the supervision of Dr. Hisham Ismail Seri Farah and Dr Siham Elias Suliman.

Abdelrahim Abdellah Adam Mohammed

## **Dedication**

To My parents, My wife, My daughter Janat Abdelrahim, My son Mohammed Abdelrahim and Dr Ahmed Abdelrahman Ismail.

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## LIST OF ABBERVIATION

AST	Aspartate aminotransferase.....
AVM	Avernectin.....
Aba	Abamectin.....
Aba1	Abamectin a single dose .....
Aba2	Abamectin multiple doses.....
CNS	Central nervous system.....
EpG	Eggs per gram of faeces.....
ERP	Eggs reappearance period.....
FECRT	Faecal egg count reduction test .....
GABA	Gamma amino butyric acid.....
GLUCL	Glutamate gated chloride.....
IVM	Ivermectin.....
MLS	Macrocyclic lactones.....
No	Number.....
PRZ	Praziquantel.....
SD	Standard deviation.....
TSP	Total serum protein.....
+ve	Position or infected animals.....

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## **Abstract**

In a field survey conducted in El fashir city, North Darfur State 900 fecal samples of donkeys and 500 fecal samples of horses were examined for the presence of helminthes parasites by assessment of fecal eggs count during October 2011 to May 2012. The overall prevalence of infection with GIT parasites in donkeys and horses was found to be 24.64%. The prevalence of internal parasites in donkey and horses was 35.5% and 5%, respectively. About 51.25% of donkeys had single infection, whereas the remaining had 48.75% mixed infection, while in horses 92% had single infection and the remaining 8% mixed infection. The rate of infection in donkeys were 69.7%, 15.6% and 14.7% for mild, moderate and severe infection respectively, while the rate of infection in horses was 84% mild and 8% for both moderate and severe infection.

Twenty four donkeys naturally infected with gastrointestinal nematodes were selected to evaluate the therapeutic efficacy and persistent effect using abamectin 0.2 mg/kg body weight oral formulation single dose, abamectin 5 doses and single dose of 1% Ivermectin injectable solution at 0.2 mg/kg body weight. The animals were divided in four treated random groups of 6 donkeys each. Fecal egg counts was conducted 3 days before treatment daily and on day 7 in first week after treatment and then every week for 10 successive weeks. Both abamectin single dose, abamectin 5 doses and ivermectin single dose reduced the eggs counts per gram to zero on day 7 to day 49 in abamectin single dose and to day 56 in both abamectin 5 doses and ivermectin single dose. The percentage of efficacy of three medicated groups abamectin single dose, abamectin 5 doses and ivermectin against nematodes parasites were found to be 100% on day 14 post treatment. The persistent effect of single dose of abamectin was continuous to day 70, while in both abamectin 5 doses and ivermectin single dose extended to day 77. The treatment interval was  $66.5 \pm 52$  in abamectin single dose and  $72.3 \pm 32.7$  in both abamectin 5 doses and ivermectin single dose.

The same twenty four donkeys used to evaluate the toxicity of a single dose of abamectin paste formulation, abamectin for 5 successive days and ivermectin a single dose solution. Blood sample collected on day 7, 10, 14, 24 and 39, result was received post treatment compared to pretreatment level. Significant increase ( $p < 0.05$ ) showed in serum total protein, albumin and urea in three evaluated groups compared to day zero, while significant decrease and significant increase ( $p < 0.05$ ) showed in in creatinine, bilirubin, calcium and AST compared to day zero. Content of serum post treatment was normal value.

No toxicity was observed in three evaluated groups. Abamectin and ivermectin were safe to use in donkeys and horses.

## بسم الله الرحمن الرحيم

### الخلاصة

في مسح حقلي شمل 900 رأس من الحمير و 500 رأس من الخيول في ولاية شمال دارفور الفاشر تم التقصي عن وجود الديدان الأسطوانية المتطفلة في القناة الهضمية وذلك من خلال الفحص المعملي لعينات البراز وعدد بيوض الديدان في الفترة من اكتوبر 2012م الي مايو 2014م.

معدل انتشار الديدان الأسطوانية في الخيول و الحمير كان 24.64 ومعدل انتشار الديدان الأسطوانية في الحمير كان 35.5%، بينما كان معدل انتشار الديدان الأسطوانية في الخيول 5%، وقد سجلت الاصابة بنوع واحد من الديدان في الحمير 51.25% والاصابة المتعددة 48.75%، كانت الاصابة بنوع واحد من الديدان في الخيول 92% وهي اعلي من الاصابة بعدة اجناس من الديدان.

درجة الاصابة في الحمير اظهرت أن 69.69% كانت خفيفة، متوسطة الي شديدة 15.63%، 14.69%. اما درجة الاصابة في الخيول قد اظهرت 84%، كانت درجة الاصابة فيها خفيفة، بينما قد سجلت اصابة متوسطة الي شديدة في 8%.

تم استخدام أربعة و عشرون حماراً مصاباً اصابة بالديدان الاسطوانية لدراسة الفعالية والأثر المستمر لمضادات الديدان (الأبامكتين جرعة واحدة، الأبامكتين متعدد الجرعات و الأيفرمكتين جرعة واحدة) بجرعة 200 ميكروجرام /كيلوجرام من وزن الجسم تحت الجلد. تم تقسيم الحيوانات الي أربعة مجموعات بصورة عشوائية قبل العلاج، 6 حمار لكل مجموعة و تم اجراء العلاج علي ثلاثة مجموعات بينما المجموعة الثالثة تركت بدون علاج بغرض التحكم و المقارنة، تم أخذ العينات في ثلاثة ايام متتالية قبل بدء العلاج، وفي اليوم السابع من العلاج . وقد وجد فيها اختفاء كامل لبيوض الديدان الاسطوانية في المجموعات المعالجة في اليوم 7 وقد استمر في الاختفاء الي اليوم 49 في المجموعة الاولي و الي اليوم 56 في كل من المجموعة الثانية و الثالثة. وقد كانت فعالية الابامكتين وذ الجرعة واحدة،الأبامكتين متعدد الجرعة و الأيفرمكتين جرعة واحدة 100% ضد الديدان الأسطوانية في اليوم 14 بعض العلاج. و كانت الأثر المستمر لمضادات الديدان الاسطوانية الي اليوم 70 في المجموعة اولي و الي اليوم 77 في كل من المجموعة الثانية و الثالثة. وكان الفترات العلاجية  $66.5 \pm 52$  في المجموعة الأولى بينما  $72.3 \pm 32.7$  في كل من المجموعة الأولى و الثانية.

تم جمع مصل الدم من الحيوانات المعالجة بمضادات الديدان الاسطوانية (الأبامكتين جرعة واحدة، الأبامكتين متعدد الجرعات و الأيفرمكتين جرعة واحدة بجرعة 200 ميكروجرام /كيلوجرام من وزن الجسم، قبل العلاج في اليوم، 7، 10، 14، 24 و39، وقد اوضحت النتائج أن هنالك نقص في كل من الكرياتين، البلروبين، الكالسيوم، بينما زيادة في كمية البروتين الكلي، الزلال واليوريا و انزيم AST ( $p<0.05$ )، مقارنة باليوم قبل البدء في اختبار السمية. كل التغيرات التي حدثت في المجموعات المعالجة كانت في الحد الطبيعي. و لا يوجد اي سمية في لكل مضادات المستخدمة في التجربة ، عليه يمكن استعمال الأبامكتين و الايفرمكتين في علاج الديدان الاسطوانية في الخيول و الحمير.