

Dedication

This work is dedicated to my father's soul Abdallah Hag Mosa, Mother Nafeesa Umer Dyab, Brother and Sisters Eiman, Tahra, Sami, ALzhra, Wala, and Amna. And to my sister kid Hassan.

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ABSTRACT

Effect of Some Botanical and Chemical preservatives against Termite *Macrotermes bellicosus* (Smeath.) in Preserving Some Sudanese Timbers

Neem Seed Kernel Oil (NSKO), Neem Seed Kernel Powder (NSKP) and boric acid (BA) were examined to test their effects on preserving wood of some valuable species against dry wood termites. Three locations representing different ecological zones of the Sudan were selected for the Study. These are; Berber (Northern Sudan), Shambat (Central Sudan), and Sinja (South-central Sudan). Two trials were carried out. First, field trial. In this experiment wood blocks from *A. seyal*, *E. microthica*, and *C. africana* of 5x5x30cm dimensions treated with NSKO, NSKP and BA and controlled untreated blocks were laid in a grave yard. Wood loss was determined at intervals for one year. Second experiment was laboratory test. The aim of this experiment is to investigate termite behavior while attacking the wood. A number of treated and untreated blocks of 5X5X5 cm dimensions were kept on glass gars size 15X15X20 cm. These gars were filled with termites nest individuals, and then put on a dark and conditioned room (28~32 C, and 80~90% MC).

In the field experiment results showed that chemical and botanical preservatives significantly reduced termite attack and weight loss. Botanicals used at this experiment keep treated blocks free from termites attack. The weight loss recorded at site No.1 (0.5 g) to *C.africana* treated with NSKO,(1 g) to *A.seyal* samples treated with NSKO,(1.1 g) to *A.seyal* samples treated with NSKP, and (1.3 g) to *C.africana* samples treated with NSKP, as a minimum weight loss reduction. at site No.2 weight loss recorded (0.8 g) to *A.seyal* samples treated with NSKP, (0.9 g) to *E.microthica* samples treated with NSKP, (2.9 g) to *E.microthica* samples treated

with NSKO, (3.2 g) to *C.africana* samples treated with NSKO, (4.3 g) to *C.africana* samples treated with NSKO, (5.3 g) to *E.microthica* samples treated with NSKO, and (5.5 g) to *E.microthica* samples treated with NSKO, as a minimum weight loss reduction. And at site No-3 weight loss recorded (6.4 g) to *E.microthica* samples treated with NSKP as a minimum weight loss reduction.

On the other hand Chemical preservative used in these experiments was also control the termite's damage at the three graveyard areas. At site No-1 weight loss recorded (1.9 g) to *C.africana* treated with BA, (2.9 g) to *C.africana* treated with BA, and (5.3 g) to *A.seyal* samples treated with BA as a minimum weight loss reduction. At site No-2 weight loss recorded (.9 g) to *E.microthica* samples treated with BA, (1.4 g) to *E.microthica* samples treated with BA, (1.46 g) to *E.microthica* samples treated with BA, (1.5 g) to *C.africana* samples treated with BA, (2.4 g) to *A.seyal* samples treated with BA, and (2.8 g) to *C.africana* samples treated with BA, as a minimum weight loss reduction. And at the site No-3 weight loss recorded (6.7 g) to *E.microthica* samples treated with BA, and (11.22 g) to *E.microthica* samples treated with BA, as a minimum weight loss reduction.

For the behavior experiment results showed that the treated samples of (NSKO, and NSKP) was either sufficiently toxic and/or repellent to prevent termites feeding, termites mortality reached 100% in the third week to glass gars filled with samples treated with NSKO,95% to NSKP,85% to BA.

Termites attack was increased at the period from August - November during the rainy season There were no significant differences between the concentration used at (BA), and (NSKP), but concentration of 10% of (NSKO) at Shambat and Singa site is more effective.

The length of protection time is yet to be ascertained from record of service life time according to Findlay 1985 classified the three species used in this study *A.seyal* was moderately durable with no expected life of the test stakes in field, *E.microthica* was durable with 5-10 years as an expected on test stakes in field, and *C.africana* was durable with 5-10 years as an expected on test stakes in field.

M.bellicosus (smeath) was common in the south and west, but reaches further north along the banks of the Nile. It was distributed commonly at the east bank of the Blue Nile increased at Eljazair and Abujaily forest mainly.

موجز الدراسة

ثر بعض حافظات الخشب الطبيعية والكيميائية علي بعض الأخشاب السودانية ضد الارضه

Macrotermes bellicosus (Smeath.)

زيت بذر النيم، وبذر النيم و حمض البوريك حافظات أخشاب تم استخدامها لمعرفة تأثيرها علي الارضه آكلة الخشب الجاف وذلك في حفظ ثلاث أنواع من أنواع الأشجار ذات القيمة الاقتصادية بالسودان (الطلح والبان والقمبيل) . تم اختيار ثلاث مواقع للدراسة لتغطي ثلاث أقاليم مناخيه مختلفه وهي شمال السودان (مدينة بربر) ، أواسط السودان (ضاحية شمبات) ، وجنوب (أواسط السودان) غابة الجزائر شرق سنجه

تم تصميم نوعين من الاختبارات إحداهما في أراض مفتوحة مصابة بالارضه، والأخرى في المعمل. استمرت التجربة الأولى سنة كاملة من ديسمبر 2004 – ديسمبر 2005م ،تم دفن عينات بتراكيز NSKO بتراكيز 2.5% و 5%، زيت بذر النيم BA تمت معاملتها بحمض البوريك بتراكيز 1% و 2% من أشجار الطلح، البان ، والقمبيل NSKP 5% و 10%، وبذر النيم سم في الأرض مباشرة لعمق 20سم في ثلاث مناطق تمثل أقاليم مناخيه مختلفه 5x30x5 بأبعاد 5 (Harris 1968) تتوزع علي أساسها أجناس الارضه في السودان في التجربة الثانيه التي أجريت بمعامل المركز القومي للبذور –سوبا حيث وضعت عينات خشبية وتم إضافة عينات 15x15x5سم في آنيه زجاجيه بأبعاد 20x5x5 من الأشجار أعلاه بأبعاد 5 خشبية صغيره لتكون كغذاء بديل للارضه ،وذلك في غرفه مظلمة بدرجة حرارة ورطوبة ثابتتين (28-32 درجة مئوية، 80-90 % رطوبة نسبيه علي التوالي

سجلت العينات التي عوملت باستخدام حافظات أخشاب طبيعية درجات حمايه جيده في مكافحة الارضه في مواقع الدراسة الثلاث، حيث بلغ اقل فقد للوزن في الموقع الأول في المناطق الشماليه و NSKP و 1.1 جم لعينات الطلح المعاملة ب NSKO للبلاد 5. جم لعينات القمبيل المعاملة ب اما في الموقع الثاني للدراسه بضاحية شمبات سجل . NSKP 2.7 جم لعينات البان المعامله ب جم، وعينات NSKP 8.0 اقل نقص في الوزن بعد نهاية التجربه لعينات الطلح التي عوملت ب جم، بينما كان النقص NSKO 5.5 جم، وعينات البان المعامله ب NSKO 3.2 القمبيل المعامله ب في الوزن للعينات في الموقع الثالث بغابة الجزائر جنوب شرق سنجه اكبر مقارنة بالموقعين NSKO جم، ثم الطلح المعامله ب NSKP 6.4 السابقين حيث سجلت عينات البان التي عوملت ب جم. بينما سجلت العينات التي تمت NSKO 22.9 جم ، تليها عينات القمبيل المعامله ب 13.2 فقدان في الوزن مناسب مقارنة BA (معاملتها بحافظ الاخشاب الكيمياءى) حمض البوريك

بالحفاظات الطبيعية المستعمله في هذه الدراسه حيث سجل اقل فقد في الوزن للعينات الثلاث المستخدمه في هذه الدراسه بالموقع الاول بالمنطقه الشماليه 1.9 جم لعينات القمبيل، 5.3 جم لعينات الطلح، و 5.9 جم لعينات البان، اما في الموقع الثاني للدراسه 1.4 جم للبان، 1.5 للقمبيل، و 2.4 جم للطلح، بينما كان اقل فقد في الوزن للعينات في الموقع الثالث علي النحو التالي 6.7 جم للبان، 12.2 جم للقمبيل ، و 51.5 جم للطلح

اما في التجربه التي اجريت في المعمل لدراسة سلوك افراد من مملكة ارضه في المعمل ناحية العينات الخشبيه المعامله بنفس حافظات الاخشاب في التجربه الاولى وجد ان هناك تأثير قاتل و/او طارد للارضه ، حيث سجلت الابهاده نسبة 100% للارضه داخل الآنيه التي تحوي عينات و 95% للارضه داخل الآنيه التي تحوي عينات خشبيه معاملة ب ، NSKO خشبيه معاملة ب وذلك في بداية BA و 85% للارضه داخل الآنيه التي تحوي عينات خشبيه معاملة ب ، NSKP الاسبوع الثالث من التجربه

وجد ان اصابة الارضه تتركز في فصل الخريف حيث ترتفع درجات الرطوبه الجويه في الفتره من اغسطس- نوفمبر، كما لم تسجل اي فروقات معنويه واضحه لاستخدام تراكيز مختلفه عدا تلك % حيث سجلت تراكيز 10% نتيجه افضل من تراكيز 5 NSKO المستخدمه في

ان اخشاب الطلح عند معاملتها بمختلف Findlay 1985 وجد من خلال التقسيم الذي ذكره حافظات الخشب تزداد درجة مقاومتها للارضه لتصبح (متوسطه المقاومه)، البان و القمبيل .تصبح درجة مقاومتها (مقاومه) بمتوسط حياه متوقعه 5-10 سنوات

هو احد اكثر الانواع *Macrotermes bellicosus* وجد من خلال هذه الدراسه ان نوع الارضه انتشاراً من الارضه ساكنة القناطير والتي تنتشر بصورة كبيرةً بمناطق غابات سنجه شرق النيل

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