Nematicidal Effect of Certain Agrochemicals, Nutritional Compounds and Bio-Agents on The Population of Root-Knot Nematode (Meloidogyne spp.) Infecting Potato

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ABSTRACT: The nematicidal effect of certain agrochemicals, nutritional compounds and bio-agents on the population of root-knot nematode (Meloidogyne spp.) infecting potato was evaluated through two seasons (2018/2019).

The overall reduction percentages in both seasons followed the same pattern and were almost parallel. Oxamyl, abamectin-2%, and azadirachtin were the most effective and significant treatments for decreasing the number of J3 nematodes, with reductions of 77.72 and 85.16 %, 72.40% and 78.41 %, and 72.40% and 78.55% in both seasons, respectively. In both subsequent seasons, garlic oil (54.09 and 53.39%), chitosan (47.54 and 48.32%), and abamectin-1.8% (41.08 and 48.32%) had moderate overall reductions. The nutritional agrochemicals had the weakest overall reduction, potassium silicate (28.73 and 27.30%), EDDHA chelated iron (36.80 and 13.42%), and sulfuric acid (7.06 and 17.22%) for both seasons.

On the other hand, abamectin 2% and oxamyl treatments gave the greatest potato yield during both seasons.

Keywords: Potato, Nematodes, pesticides, oxamyl, abamectin, chitosan, silicate, eddha chelated iron, sulfuric acid, azadirachtin, garlic oil.

INTRODUCTION

Potato (Solanum tuberosum L.) is the world’s leading vegetable crop grown in 79% of the world’s countries (Janaki et al., 2017). It is considered to be one of the most important vegetable crops belonging to the Solanaceae family, and it occupies, globally, the fourth position after rice, wheat, and maize in terms of world food production (Abdeldaym et al., 2018 and Abuarab et al., 2019).

Potato is the third most consumed crop globally after rice and wheat. It is a short-duration crop, versatile in use, and suitable for growing in a wide range of environments, and its production is increasing rapidly (Nasir and Toth 2022). According to FAO statistics, the world production of potatoes reached 400 million tons, which were harvested from 19.25 million ha, in 2019 (Ali et al., 2021).

In Egypt, potato is one of the main crops and the second most important vegetable crop after tomato in economic value (Abdeldaym et al., 2018 and Abdeldaym et al., 2019). Egypt is one of the top 20 producers of potatoes worldwide and the first largest producer and exporter of potatoes in Africa in 2019 (Rabia et al., 2021).

Nowadays, potato cultivation is facing several challenges to maintain and improve production, from the point of view of both quality and quantity. Potato plants typically face an increased number of abiotic and biotic stress combinations, which seriously affect their growth and production (Abdallah et al., 2021 and Cocozza et al., 2021).

Root-knot nematodes (Meloidogyne spp.) are among the world’s most damaging endoparasitic sedentary nematodes, especially Meloidogyne incognita that infect a wide range of plant hosts (AbdelRazek and Yaseen, 2020).

The root-knot nematode is one of the major challenges in eggplant (S. melongena L.) production. Many plant-parasitic nematodes (PPNs) can penetrate the roots of this plant and feed on it, causing heavy losses in its yield. Meloidogyne spp. (root-knot nematodes, RKNs) and Rotylenchulus reniformis rank high among these parasites in Egypt (Abd-Elgawad, 2021).

Among plant-parasitic nematode management strategies, chemical nematicides are the most frequently used. However, their potential negative impact on the environment and human health has led to restricted use of most nematicicides. The use of root-knot nematode-resistant genotypes is an effective alternative strategy for nematode management that reduces nematode populations in soil (Molinari 2011).

Biological control or biopesticide is defined as an application of live microbes (bacteria and fungi) and their gene products, essential oils,
Chemicals used in the experiments:
- Oxamyl (Vydate 24% SL) ®
- Abamectin (VERTIMEC) 1.8% EC) ®
- Abamectin (Tervigo 2% SC) ®
- Chitosan (Chitopower 5.5% liquid polymer) ®
- Potassium silicate (Super silicate 50%) ®
- Azadirachtin (Achook 0.15%) ®
- EDDHA- chelated iron (KELKAT 6%) ®
- Sulfuric acid (Sulfuric acid 40%) ®
- Garlic oil (Nematofera 1%) ®

Data recorded:
The soil samples were collected according to the method of Barker (1985). Three sub-samples were collected from 10 to 35 cm depth of each replicate to form a composite sample of approximately 2 kg, which was then thoroughly mixed. The soil samples were collected directly before the treatment applications to identify the initial populations of parasitic nematodes. After applying the treatments, the soil samples were collected by 15 days post each of both applications. The No. of nematode/250g soil with all treatments were counted. The reduction percentages of infestation were calculated according to Henderson and Tilton’s (1955) as follows:

\[
\text{Red.} (\%) = \left(1 - \frac{a}{b} \times \frac{c}{d}\right) \times 100
\]

Where:
a = Population in treatment after treatment
b = Population in treatment before treatment
c = Population in check untreated (control) before treatment
d = Population in check untreated after treatment

Statistical analysis:
The obtained data of the measured parameters were subjected to computerized statistical analysis using COSTAT package for analysis of variance (ANOVA) and means of treatments were compared using LSD at 0.05 according to Snedecor and Cochran (1990).

RESULTS AND DISCUSSION
Results presented in Tables (1 and 2) illustrated the effect of certain agrochemicals, nutritional compounds and bio-agents on the population of root-knot nematode through two seasons against the root-knot nematode (Meloidogyne spp.) in soil cultivated with potato. Two applications of each treatment were carried out over an interval of 15 days. The juvenile counts were estimated after 15 days post-treatment. So, there were 3 counts at zero, 15, and 30 days post-treatment. In addition, the reduction percentage after each treatment as well as the mean of the general reduction percentages after both applications were calculated.

A. The Effect of different treatments on the root-knot nematode (Meloidogyne spp.) in soil

1. The first season
The obtained results before treatments in the first season (2018-2019), indicated that the mean number of root-knot nematodes, \((J_2)\) nematodes/250g soil, varied considerably among the tested treatments.

The data obtained recorded significant difference in the mean number of nematodes \((J_2)\) nematodes/250g soil in the soil compared to the
untreated check (control), except for the treatment with sulfuric acid at 40%, in which the mean number increased to 220.00 after it was 193.33 before the treatment (Table 1). While, the lowest mean number of root-knot nematodes (116.67 J/250g soil) was recorded by oxamyl treatment, followed by abamectin 2% (123.33), azadirachtin (143.33), garlic oil (143.33), abamectin 1.8% (165), chitosan (173.33), potassium silicate (183.33), and EDDHA chelated iron 6% (183.33 J nematodes/250g soil).

At second application after 30 days from treatments, the results were in the same line. Where, the oxamyl treatment showed the lowest rate of the J2 number with 66.67 J2/250g soil, followed by abamectin 2% (73.33), azadirachtin (76.67), garlic oil (120), chitosan (153.33), abamectin 1.8% (158.33), potassium silicate (203.33), EDDHA chelated iron 6% (203.33), and sulfuric acid (260.00), which compared with 286.67 J2/250g soil in the untreated check (Table 1 and Fig. 1).

After 15 days from the first application as found in Table 1, only oxamyl and abamectin 2% SC led to a significant moderate reduction in the soil population densities of *Meloidogyne* spp. by 54.50 and 45.55%, followed by azadirachtin (38.83%), garlic oil (35.50%), chitosan (32.40%), and abamectin 1.8% EC (29.25%). The least effective treatments were the nutritional agrochemicals potassium silicate (24.74%), EDDHA-chelated iron (24.74%), and sulfuric acid (11.24%). Meanwhile, in the second application (30 days) there was a significant increase in the overall reduction percentage in the soil population densities of *Meloidogyne* spp J2s with treatment with oxamyl, abamectin 2% SC, and neem oil, recording 77.72, 72.40, and 68.96%, respectively. While there was a moderate reduction with garlic oil, chitosan, and abamectin (1.8% EC), the reductions were 54.09, 47.54, and 41.08%, respectively. In addition, nutritional agrochemicals had little effect on J2s population density, with EDDHA-chelated iron, potassium silicate, and sulfuric acid producing the least significant reductions of 36.80, 28.73, and 7.06%, respectively. Root galls were reduced by 81.6%, 62.4%, and 61.5% when abamectin and oxamyl were treated as soil drenches, respectively. Another experiment was done by Hala et al. (2010); Khalil et al., (2012) and Saad et al., (2017) on potato cyst nematodes (PCN) with oxamyl treatments. They reported that cyst and juvenile numbers were lower in oxamyl-treated plots compared to control areas. Also, *Meloidogyne*, *Ditylenchus*, *Radopholus*, *Hoplolaimus*, and *Tylenchorhynchus* are all plant parasitic nematodes, and abamectin has been shown to lower their populations on multiple crops.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>No. Nematode/250g soil</th>
<th>Reduction% after 1st application</th>
<th>Overall reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-treatment</td>
<td>1st application</td>
<td>2nd application</td>
</tr>
<tr>
<td>Oxamyl 24 %</td>
<td>200.00a</td>
<td>116.67d</td>
<td>66.67e</td>
</tr>
<tr>
<td>Abamectin 2 %</td>
<td>176.67a</td>
<td>123.33d</td>
<td>73.33e</td>
</tr>
<tr>
<td>Abamectin 1.8 %</td>
<td>181.66a</td>
<td>165.00bcd</td>
<td>158.33cd</td>
</tr>
<tr>
<td>Azadirachtin 0.15 %</td>
<td>170.00a</td>
<td>133.33cd</td>
<td>76.67e</td>
</tr>
<tr>
<td>Garlic oil 1 %</td>
<td>173.33a</td>
<td>143.33cd</td>
<td>120.00de</td>
</tr>
<tr>
<td>Chitosan5.5 %</td>
<td>200.00a</td>
<td>173.33bcd</td>
<td>153.33cd</td>
</tr>
<tr>
<td>Potassium silicate 50%</td>
<td>190.00a</td>
<td>183.33bc</td>
<td>203.33bc</td>
</tr>
<tr>
<td>EDDHA chelated iron 6%</td>
<td>223.3a</td>
<td>183.33bc</td>
<td>203.33bc</td>
</tr>
<tr>
<td>Sulfuric acid 40%</td>
<td>193.33a</td>
<td>220.00ab</td>
<td>260.00ab</td>
</tr>
<tr>
<td>Untreated check</td>
<td>193.33a</td>
<td>246.67a</td>
<td>286.67a</td>
</tr>
</tbody>
</table>

* Means with the same letter(s) are not significantly different at 0.05 probability level.
2. The second season

Regarding to the rate of mean number of \( J_2 \) / 250g soil in the second season of 2019, the results demonstrated that, 15 days after the first application, both oxamyl and azadirachtin were the most effective treatments, as it decreased the mean number rate to 113.33. However, these mean number rates \( (J_2/250g\ soil) \) were significantly higher in the chitosan (183.33), abamectin 2% (186.67), garlic oil (196.67), and abamectin 1.8% (201.67) treatments. Also, as in the first season, the nutritional agrochemicals potassium silicate, EDDHA chelated iron, and sulfuric acid produced the highest mean values of 246.67, 283.33, and 296.67 \( J_2/250g\ soil \), respectively, showing insignificant effects on Meloidogyne spp. the population density in soil (Table 2).

Moreover, after 30 days from the first application, and 15 days from the second application, the treatments maintained their level of effectiveness in reducing the population density of juvenile nematodes \( J_2 \). The treatments of oxamyl, neem oil, and abamectin 2% SC recorded the lowest significant rate of Meloidogyne spp., population density at 40.00, 76.67, and 80.00 \( J_2/250g\ soil \), respectively. The demonstrated moderate efficacy was obtained with the treatments of chitosan, garlic oil, and abamectin 1.8% EC, which demonstrated 146.67, 146.67, and 170.00 \( J_2/250g\ soil \), respectively. Conversely, these rates of averages showed a slightly decreased in potassium silicate, giving 246.67 \( J_2/250g\ soil \) or an increase in the treatments of EDDHA chelated iron, and sulfuric acid, revealing 296.67 \( J_2/250g\ soil \) for both (Table 2 and Fig. 2).

Data in Table 2 showed that neem oil, oxamyl, and abamectin 2% had relatively high reductions in the number of \( J_2 \) after the first application, with 57.59, 51.74, and 42.70%, respectively. Abamectin (1.8%), garlic oil, and chitosan recorded the lowest reductions by 29.99, 26.67, and 24.38%, respectively. As rational, the agrochemicals potassium silicate, sulfuric acid, and EDDHA chelated iron gave weakest reductions of 16.51, 5.64, and 5.32%, respectively.

In addition, the overall reduction percentage of \( J_2 \) after the second application showed that only oxamyl, neem oil, and abamectin (2%) were the most effective treatments for reducing the number of \( J_2 \), with reductions of 85.16, 78.55, and 78.14%, respectively. However, garlic, abamectin (1.8%), and chitosan showed moderate reduction percent of 55.39, 48.32, and 45.02%, respectively. Continuously, potassium silicate, sulfuric acid, and EDDHA chelated iron maintained the weakest efficacy, giving only reductions of 27.30, 17.22, and 13.42%, respectively (Table 2).
Table (2): Mean number and reduction percentage of the root-knot nematode (*Meloidogyne* spp.) after two sequenced treatment applications during the 2019 season.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>No. Nematode / 250g soil</th>
<th>Reduction % after 1st application</th>
<th>Overall reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-treatment</td>
<td>1st application</td>
<td></td>
</tr>
<tr>
<td>Oxamyl 24%</td>
<td>206.67d</td>
<td>113.33e</td>
<td>85.16*</td>
</tr>
<tr>
<td>Abamectin 2%</td>
<td>286.67a</td>
<td>186.67d</td>
<td>78.41*</td>
</tr>
<tr>
<td>Abamectin 1.8%</td>
<td>253.33abcd</td>
<td>201.67cd</td>
<td>48.32b</td>
</tr>
<tr>
<td>Azadirachtin 0.15%</td>
<td>276.67ab</td>
<td>133.33e</td>
<td>78.55*</td>
</tr>
<tr>
<td>Garlic oil 1%</td>
<td>236.67bc</td>
<td>196.67d</td>
<td>53.39b</td>
</tr>
<tr>
<td>Chitosan 5.5%</td>
<td>213.33cd</td>
<td>183.33d</td>
<td>45.02b</td>
</tr>
<tr>
<td>Potassium silicate 50%</td>
<td>260.00abc</td>
<td>246.67bc</td>
<td>27.30c</td>
</tr>
<tr>
<td>EDDHA chelated iron</td>
<td>263.33ab</td>
<td>283.33ab</td>
<td>13.42ed</td>
</tr>
<tr>
<td>Sulfuric acid 40%</td>
<td>276.67ab</td>
<td>296.67ab</td>
<td>17.22c</td>
</tr>
<tr>
<td>Untreated check</td>
<td>243.33abcd</td>
<td>316.67a</td>
<td>0.00d</td>
</tr>
</tbody>
</table>

*Means with the same letter(s) are not significantly different at 0.05 probability level.

Fig. (2): Mean numbers of *J₂* root-knot nematodes *Meloidogyne* spp. after both treatment applications in the second season of 2019.

Ultimately, after the first application in both successive seasons, a relative high efficacy, as measured by calculated reduction percentages, was determined with the treatments of oxamyl (54.50 and 51.74%), azadirachtin (38.83 and 57.59%), and abamectin 2% (45.55 and 42.70%), respectively. Meanwhile, low reduction percentages resulted from the treatments of garlic (35.50 and 26.87%), chitosan (32.40 and 24.38%), and abamectin-1.8% (29.25 and 29.99%) for the two successive seasons, respectively. Rationally, the nutritional agrochemicals had the weakest efficacy in reducing the population density of nematodes (*J₂*), as follows: potassium silicate (24.74 and 16.51), EDDHA chelated iron (24.74 and 5.32), and sulfuric acid (11.24 and 5.64), respectively (Tables 1 and 2).

Finally, the overall reduction percentages of the *Meloidogyne* spp. nematode population density (*J₂*) during both successive seasons are presented in Figure 3. Noteworthy, the overall reduction percentages were mostly on the same pattern and parallel in both seasons. Oxamyl, abamectin-2%, and azadirachtin were the most effective and significant treatments in reducing the numbers of *J₂* nematodes, with overall reductions of 77.72 and 85.16%, 72.40 and 78.41%, and 72.40 and 78.55% in both seasons, respectively. The moderate overall reduction percentages in both subsequent seasons occurred in garlic oil (54.09 and 53.39%), chitosan (47.54 and 48.32%), and
abamectin-1.8% (41.08 and 48.32%), respectively. The weakest overall reduction percentages resulted from the nutritional agrochemicals: potassium silicate (28.73 and 27.30%), EDDHA chelated iron (36.80 and 13.42%), and sulfuric acid (7.06 and 17.22%) for both seasons, respectively.

![Fig. (3): Overall reduction percent of root-knot nematodes Meloidogyn spp. by the tested treatments in both seasons.](image)

Tervigo (abamectin 2%) was shown to be more effective than the other treatments in lowering root nodes (61.37%) and nematode populations (80.48%) (Salam and Qais, 2018). The root-knot nematodes population on tomatoes was reduced by 82.1% after treatment with fosthiazate and abamectin. In addition, abamectin decreased galls/root system by 67.2%. In a greenhouse experiment (Saad et al., 2012). In the experiment of “Spunta” potato tuber sprouts in pots with soil infected with G. pallida. Abamectin was found to be successful in lowering the population on potato crops, suggesting its potential utility in organic farming and integrated pest management (Sasanelli et al., 2020).

Neem oil has insecticidal, fungicidal, bactericidal, and nematicidal activities (Gajalakshmi and Abbasi, 2004). The oxamyl and Neem Azal treatments decreased nematode reproduction by 83.3% and 71%, respectively (Trifonova, 2012). Moreover, Garlic extracts (oil or aqueous) have been shown to be effective against nematocidal nematodes in a number of scientific studies (Abd Elgawad et al., 2009; El-Nagdi et al., 2014; Kouamé et al., 2021). Garlic’s activity may be due to its abundance of pyruvic acid, ammonia, and diallyl disulfide (Osman et al., 2005). It also enhances catalase and β-1,3-glucanase activities, potentially causing tomato plant resistance (Abd Elgawad et al., 2009). Additionally, garlic produces an organosulfur compound called allicin, which is unstable and decomposes into dithiines and diallyl polysulfides (Block, 2010). In a greenhouse study, the root-knot nematode (Meloidogyne incognita) population in tomato plants was reduced by an estimated 86.27 and 77.98% after being treated with aqueous and oil extracts of garlic clove, respectively (El-Nagdi et al., 2014). Also, using different doses of garlic aqueous extract caused reductions in soil populations ranging from 17.69% to 53.56% (Kouamé et al., 2021).

The application of chitosan in agriculture is one of the proposed alternatives to synthetic pesticides and has nematicidal activity (El-Sayed and Mahdy, 2015; Alfy et al., 2020). Also, silicon was found to slow down the development of M. incognita larvae and females in cotton plants (Santos et al., 2021). It also stopped second-stage juveniles of M. paranaensis from moving, which seems to help reduce the nematode population. (Bicalho et al., 2019). Potassium silicate may be able to get rid of plant parasitic nematodes because it can make phenolic compounds or hydrogen peroxide, which make PPNs less likely to be there (Zhan et al., 2018 and Sakr, et al., 2022).

**B. Effect of the treatments on potato yield in both seasons of 2018 and 2019**

In comparison to control plants, the data shown in Table 3 illustrated the effect of the tested treatments against root-knot nematodes (Meloidogyne spp.) on the mean yield weight/replicate area of 25 m² (kg/25 m²) in both seasons. According to statistics from the 2018 growing
season, abamectin (2%) and oxamyl treatments produced the highest yields of potatoes, with output rates of 91.33 and 90.00 kg/25 m² indicating an increase over the untreated control of 16.0 and 14.00%, respectively. Then came next, potassium silicate, azadirachtin, garlic oil, chitosan, and abamectin (1.8%) with production of 87.00, 85.00, 84.00, 84.00, and 81 kg/25 m², exhibiting increased percentages of 10.5, 8.0, 6.6, 6.7, and 2.9% over the untreated check. However, because sulfuric acid and EDDHA-chelated iron were ineffective against root-knot nematode juveniles (J2) in soil, there was also no discernible increase in potato output, with 79.00 and 74.33 kg/25 m² reflecting increases of 0.4 and -5.6%, respectively, compared to a yield of 78.67 kg/25 m².

For the second season of 2019, the yield of potatoes increased by 9.6% to 4.6% compared to the untreated control, except for the sulfuric acid and EDDHA-chelated iron treatments, which both decreased the yield by 3.8%. The increased yield ratios occurred in oxamyl, abamectin (2%), azadirachtin, garlic oil, potassium silicate, abamectin (1.8%), and chitosan, giving 87.67, 86.33, 85.67, 85.00, 85.00, 83.67, and 83.33 kg/25 m², resembling increase percentages of 9.6, 7.9, 7.1, 6.6, 6.3, 4.6, and 4.1% over the untreated control (Table 3).

Despite the fact that the values of potato yield ratios and the percentage increases that resulted from the treatments were slightly differentiated between both seasons, they merely followed the same trend and were paralleled in their attitudes (Figure 4). Evidently, potassium silicate increased potato output while having little to no direct effect on the juveniles of the root knot nematode (J2).

Similar to what we found, Desaeger and Csinos (2006) found that oxamyl spraying reduced nematode infestation and increased yields on double-cropped squash by 30-75% after fumigation. Crop yields increased by 10%-15%, with minimal loss in subsequent crops. A similar study by El-Tanany et al. (2018) found that abamectin (Tervigo®), azadirachtin (Achook®), and oxamyl (Vydate®) all decreased the number of nematodes and increased the amount of fruit that could be grown. Abamectin improved chemical properties, particularly vitamin C content, while oxamyl and azadirachtin increased solid-soluble content. El-Sherif et al. (2015) conducted a greenhouse experiment to test the effectiveness of potassium silicate against Meloidogyne incognita on the cucumber plant Hybrid Alpha. Results showed that various methods and times of silicate addition significantly improved plant growth parameters and reduced nematode criteria. Asif et al. (2017) found that chitosan, alone or combined with agricultural waste, reduced root-knot indices and nematode populations, improving eggplant growth and yield characteristics under greenhouse conditions. Elkelany et al. (2020) examined the efficacy of chitosan, rhizobacteria, and Bacillus subtilis. The number of nematodes decreased dramatically, and several indices measuring plant growth increased. Root galls were also decreased by chitosan treatment. In sum, under greenhouse circumstances, eggplant growth metrics were significantly improved.

Table (3): The efficacy of single treatments against Meloidogyne spp. on potato yield during the 2018–2019 seasons.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean of yield weight per replicate area of 25 m² (Kg/25 m²) in both seasons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2018</td>
</tr>
<tr>
<td>Oxamyl 24 %</td>
<td>90.00 a</td>
</tr>
<tr>
<td>Abamectin 2 %</td>
<td>91.33 a</td>
</tr>
<tr>
<td>Abamectin 1.8%</td>
<td>81.00 bcd</td>
</tr>
<tr>
<td>Azadirachtin 0.15 %</td>
<td>85.00 abc</td>
</tr>
<tr>
<td>Garlic oil 1 %</td>
<td>84.00 abc</td>
</tr>
<tr>
<td>Chitosan 3 %</td>
<td>84.00 abc</td>
</tr>
<tr>
<td>Potassium silicate 50 %</td>
<td>87.00 ab</td>
</tr>
<tr>
<td>Eddha chelated iron 6 %</td>
<td>79.00 cd</td>
</tr>
<tr>
<td>Sulfuric acid 40 %</td>
<td>74.33 d</td>
</tr>
<tr>
<td>Untreated check</td>
<td>78.67 cd</td>
</tr>
</tbody>
</table>

*Means with the same letter(s) are not significantly different at 0.05 probability level.
Fig. (4): The percentage increase in yield for single treatments against *Meloidogyne* spp.

REFERENCES


phytopathology and plant protection, 45(8), 955-962.


الملخص العربي
التأثير الإبداعي النيماتودي لمبيدات نيماتودية ومغذيات ومركبات حيوية على تعداد نيماتودا تعقد الجذور التي تسبي نبات البطاطس
مجدي عبد الظاهر مسعود، عبدالفتاح سيد عبد الكريم سعد، أحمد عبدالفتاح محمود، أحمد أحمد العش، شادي سليم

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3. قسم كيمياء وتقنية المبيدات - كلية الزراعة الصحراوية والبيئية - جامعة مطروح.

تم تقييم تأثير بعض المواد الكيميائية (مغذيات نباتية ومركبات طبيعية حيوية) على تعداد نيماتودا تعقد الجذور (Meloidogyne spp) التي تسبي نبات البطاطس خلال موسمي الزراعة 2018/2019. حيث اظهرت النتائج انة في كلا الموسمين، كانت نسبة التخفيض الإجمالية على نفس النمط تقريبا ومتشابهة تقريبا.

من خلال النتائج المتحصل عليها اتضح أن الأوكساميل و الأبامكتين 2% والأزدراختين أكثر المعاملات فاعلية وأهمية لتقليص أعداد النيماتودا J2S، جاءت نسبة الخفض كالتالي: 77.72% و 72.2% و 85.16% & 85.16% و 27.30% و 72.40% على التوالي. بينما باقي المركبات جاءت نسبة الخفض كالتالي: زيت الثوم (54.09% و 53.39%) والشيتوزان (47.54% و 48.32%) والأبامكتين 1.8% (41.08% و 48.32%) بنسبة خفض متعددة تقريبا. بينما أعطت المغذيات النباتية أضعف نسب انخفاض عام. كالتالي: سيليكات البوتاسيوم (28.73% و 27.30%) وال الحديد المخلب EDDHA (36.80% و 28.73%) وال الحديد المخلب (17.22% و 27.30%) كلا الموسمين. من ناحية أخرى، كانت النتائج التي تم الحصول عليها في محصول البطاطس هي الأعلى في معاملات (الأبامكتين 2% والأوكساميل) خلال الموسمين.