

PRELIMINARY RESULTS ON THE ACTION OF PLANT EXTRACTS ON GERMINATION AND ROOT GROWTH PROCESSES IN SEEDS OF PLANT SPECIES GROWN ON SANDY SOILS

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ABSTRACT

In the context of global climate change, Romania is also seeing changes related mainly to the annual average temperature increase of about 1.6 ° C, the increase in summer temperatures (July and August), which led to changes in the biology of the diseases and pests.

Combating crop pests is done through several methods: physical-mechanical (thermal disinfections of seeds), chemical (using pesticides), agro-technical (through soil works, including weeds) but also biological (by using natural and of antagonistic organisms). Bioproducts are biological means made on the basis of natural compounds (plant extracts) with a complex action on crop plants, biopreparations that have been shown to be stimulants of vegetative growth.

Application of bioproducts is done by treatments, which are either seed treatments or treatments in vegetation (sprays with different volumes of liquid).

In 2016 at CCDCPN Dăbuleni, were tested the basil oil for cowpea seeds, mint oil for peanut seeds, santal oil for green melon seeds to germination and root growth.

INTRODUCTION

In the context of global climate change, Romania is also seeing changes related mainly to the annual average temperature increase of about 1.6°C, the increase in summer temperatures (July and August), which led to changes in the biology of diseases and pests.

Combating crop pests is done through several methods: physical-mechanical (thermal disinfections of seeds), chemical (using pesticides), agro-technical (through soil works, including weeds) but also biological (by using natural and of antagonist organisms). Bioproducts are biological means made on the basis of natural compounds (plant extracts) with a complex action on crop plants, biopreparations that have also proved to be stimulators of vegetative growth (Baker, R., 1988, Saa-Silva S. et al., 2013, Sharma HS et al., (2014).

Aqueous extracts from various plants (horseradish, radish) can be used both as biostimulators and as herbicides, depending on the concentration and the species of the recipient (Bonea et al., 2010).

Essential oils are extracted through distillation processes and are much more concentrated and potent than dry plants.

The application of biopreparations is done through treatments, which are either treatments in vegetation (sprays with different volumes of liquid) or treatments to seed.

MATERIAL AND METHOD

In 2016 at CCDCPN Dăbuleni, for the testing of essential oils on seed germination, treatments were made on cowpea, peanuts, and watermelons. Basil oil was used in cowpea

seeds, peppermint oil at peanut seeds and sandalwood oil in watermelon seeds. Several experimental variants have been chosen by treating seeds with different doses of essential oils: 10 μ l, 25 μ l, 50 μ l, 75 μ l, 100 μ l, 150 μ l, 300 μ l, 500 μ l, 900 μ l.

We used this experiment to perform this experiment 30 seeds / cowpea sample, 25 seeds / peanut sample, 30 seeds / watermelon sample.

For the germination of seeds used Petri dishes. As the germination layer sand was used. The seeds were taken and arranged evenly, on the surface of the germination layer.

Before starting to germinate the seeds were treated with essential oils in different doses. The germination was read by counting germinated seeds and germinating at 3 days, 7 days and 14 days respectively.

RESEARCH RESULTS

At 3 days after sowing cowpea has not been triggered the seed germination process.

The determinations made at 7 days after seeding showed that germination was 13% for the variant values between 75 ml and treated with 100% solution treated with 100 ml of basil oil. In the untreated variant the germination percentage was 33%.

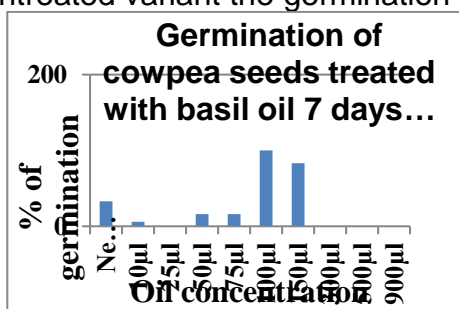


Fig.1 The influence of basil oil concentration on germination of cowpea seeds at 7 days after sowing

At 14 days from sowing to germination percentage was the same as in 7 days in the treated solution was added with 10 ml of basil oil which was 6% germination.

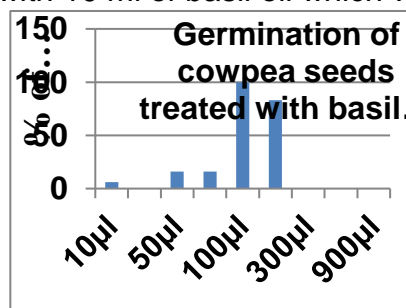


Fig.2 The influence of basil oil concentration on germination of cowpea seeds at 14 days after sowing

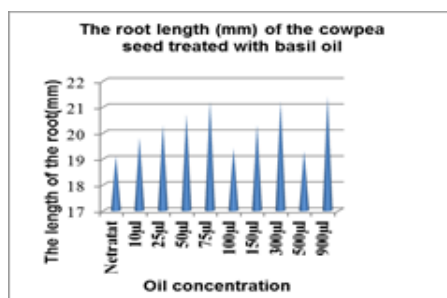


Fig.3 The root length of the cowpea seed treated with basil oil

The biometric measurements made on the root length revealed a variability of this value with values ranging from 19.1mm to the untreated variant and 21.4mm in the variant treated with the 900 μ l dose of basil oil.

In the peanut species at 3 days after sowing the seed germination process was initiated at the variant treated with 10 μ l of peppermint oil in 16%. Observations made 7 days after sowing showed that germination of seeds had values between 16% in the variant treated with 10 μ l of peppermint oil and 100% in the variant treated with 100 or 150 μ l of peppermint oil. In the untreated variant the germination percentage was 28%.

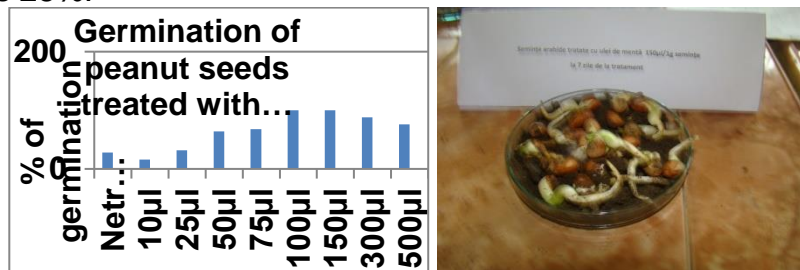


Fig.4 The influence of the peppermint oil concentration on the germination of the peanut seeds at 7 days after sowing

The percentage of germination the seeds of peanuts to 14 days from seeding was higher than 7 days ranged from 28% in the variant treated with 75 ml of pappermint oil and 100% of the variants treated with a dose of 100 and 150 μ l of peppermint oil.

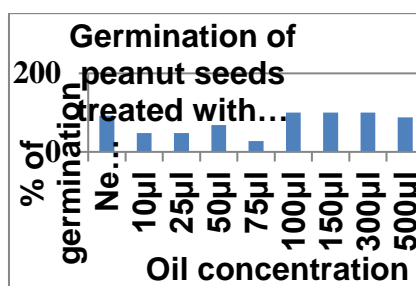


Fig.5 The influence of the peppermint oil concentration on the germination of the peanut seeds at 14 days after sowing

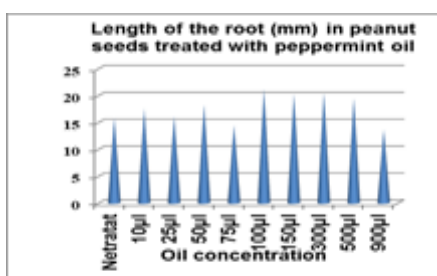


Fig.6 The root length of the peanut seed treated with peppermint oil

The root length is between 13.6 mm the variant treated with a dose of 900 ml and treated with 21.2 mm in the variant treated with a dose of 100 ml peppermint oil.

The seeds of watermelons to 3 days from sowing has not been triggered the seed germination process.

The determinations made at 7 days after sowing seeds showed germination values were 7% of the variants treated with 500 ml and 900 ml 17% sandalwood oil and the variant treated with 100 ml of sandalwood oil.

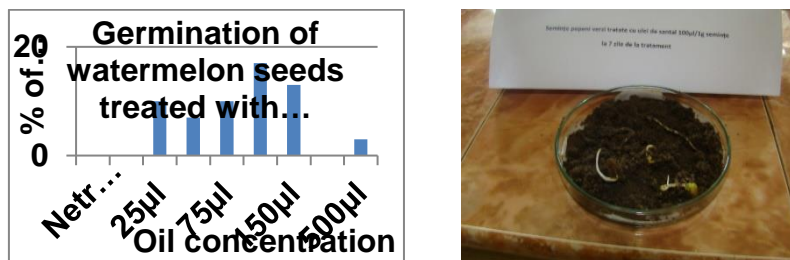


Fig.7 The influence of the sandalwood oil concentration on the germination of the watermelon seeds at 7 days after sowing

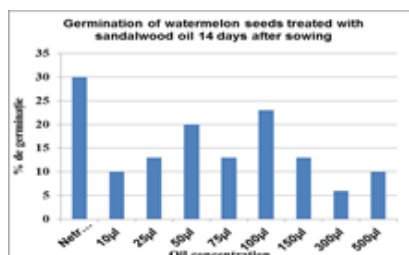


Fig.8 The influence of the sandalwood oil concentration on the germination of the watermelon seeds at 14 days after sowing

The determinations made on the watermelon seeds treated with sandalwood at 14 days after sowing showed that the germination percentage was between 6% to variant treated with the dose of 300 ml sandalwood oil and 23% in the variant treated with dose of 100 µl of sandalwood oil. The highest germination percentage of 30% at 14 days after sowing was recorded in the untreated variant.

The biometric measurements made on the root length of the watermelon seeds treated with sandalwood showed values between 10.8mm in the variant treated with the 10µl dose of sandalwood and 20.1mm in the variant treated with 100µl of sandalwood oil.

CONCLUSIONS

1. The determinations carried out on the cowpea seeds showed that the germination at 7 days and 14 days after sowing was 100% in the variant treated with 100 µl of basil oil.
2. In peanuts, the 7 days and 14 days after sowing showed that variants treated with 100 or 150 µl of peppermint oil triggered germination in 100% percentage.
3. In watermelon seeds the highest germination percentage of 23% occurred 14 days after sowing in the variant treated with 100 µl of sandalwood oil.

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