Iprojekthi yeWSU kwinkunkuma yesitrasi
WSU CITRUS WASTE PROJECT

Citrus solutions towards environmental challenges

14/02/2023

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Citrus plants and their benefits

- Citrus plants have been a commercially important crop for thousands of years.
- South Africa is one of the major citrus producing countries
- Citrus peels and leaves regarded as waste leading to environmental hazards

Benefits of Citrus plants

nutritional and therapeutic awareness:

Citrus aurantium peel brewed to laxative & cooking

- antiepileptic, appetizer, brain booster properties; skin rashes and acne,
- control anxiety in women during the first stage of labor

C. aurantifolia, known as lime, as possessing anticancer, antibacterial (Narang et al., 2016)

antidiabetic, antifungal, antihypertensive antilipidemia properties (Okeke et al., 2015)

- citrus polyphenols - obesity, since they cause a reduction in lipid content in the cell (Nakajima et al., 2014)
- reported lemon peel an alternative source of protein, fats, and essential macro minerals in animals (Janati et al., 2012)
- They are essential oil-bearing plants that have found application in perfumery, food, and beverage industries, and have been used in aromatherapy and as medicinal agents.
- Citrus plants essential oils exhibit biological activity against a wide spectrum of plant pests and may act as fumigants, contact insecticides and repellents.

have been found to be a potential source of essential oils and secon[illegible]

Purpose of the study

Repurpose peels and leaves (citrus waste) into making materials that will:

Serve to prevent infestation of weevils

Elongate shelf life of some products like maize

Umbona (maize)

Ingqokoqhwane (Maize weevels)

Plant collection and production of essential oils

Essential oils

Hydrodistillation

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Preparation of insecticidal powder

Citrus peels

OR

Citrus leaves

Grinder

Leaf and peel

Maize weevil – The maize farmer nightmare

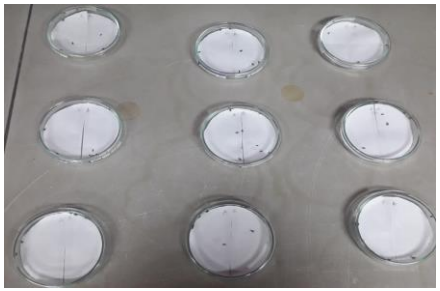
Contact experiment of the powdered plant extracts

Powder stored in an air-tight zip lock plastic bag

Healthy maize for storage

Powder contact experimental setup

Repellent and fumigation experiment of the essential oils



Repellent experimental setup

Fumigation experimental setup

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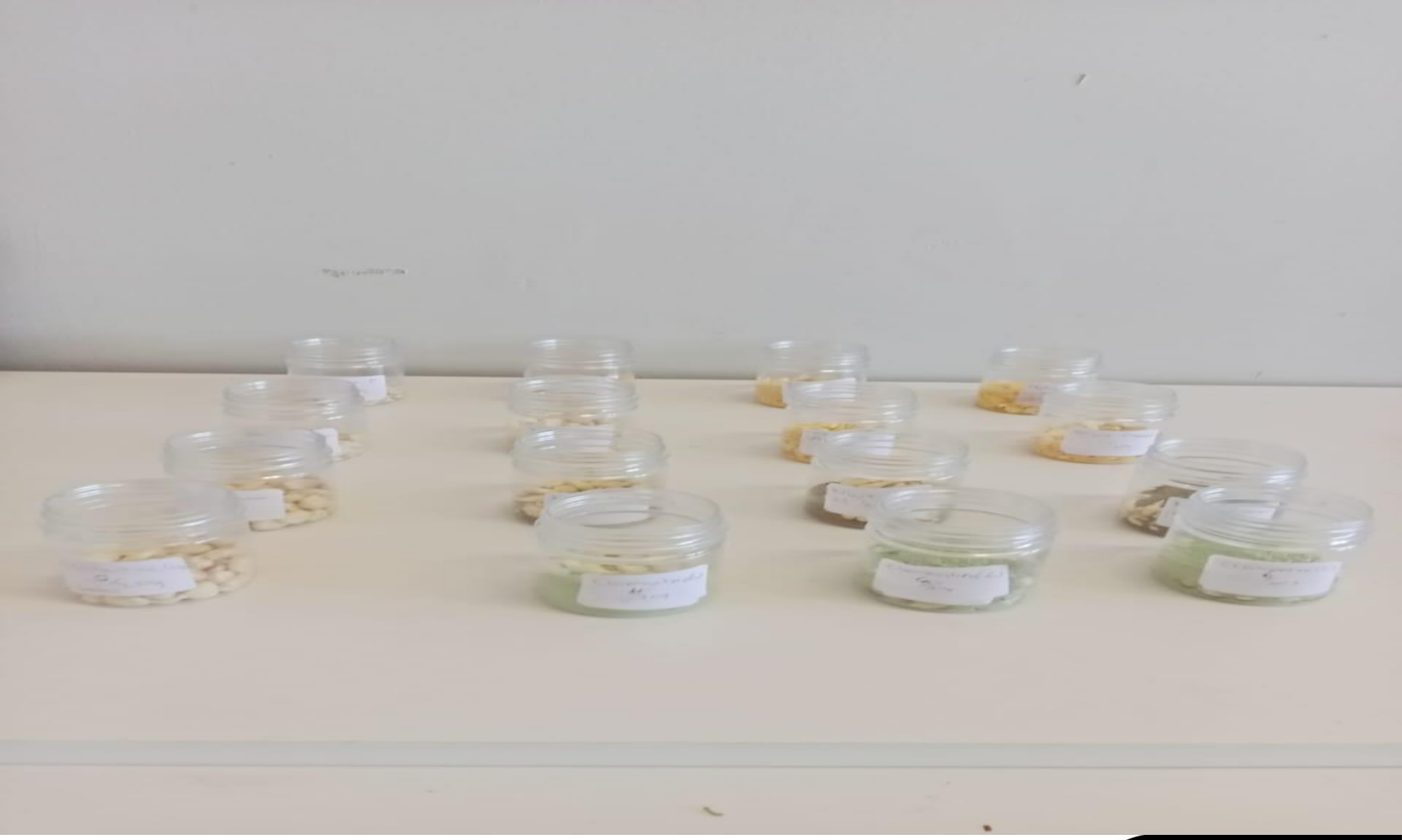
Lab Vs Farm storage setting



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Nutritional Analysis of treated and untreated maize

- It was discovered that citrus waste improves the shelf life of maize.
- The moisture contents of maize treated with leaves and peels were 10.5% and 10.52%, respectively, while untreated maize had a moisture content of 10.58%. Food with high moisture content can speed up microbial growth.
- The elemental analysis demonstrated that citrus waste improves the mineral composition of maize because the minerals of treated maize were higher than those of untreated maize.
- Citrus waste was discovered to improve the nutritional composition of maize.
- The ash contents of maize treated with leaves and peels were 1.67% and 1.57%, respectively, and were higher than the ash content of untreated maize (1.56%).
- According to the literature, the higher the ash content in food, the more minerals.

Preparation of the Consumers acceptability test of preserved maize

Dried citrus peel

Dried citrus leaves

Preserved maize

Washing of the maize from the plant extracts

Drying of the washed maize

Grounded mealie waiting for cooking

Synthesis of ZnO nanocomposite films

Stirring ~ 2hrs

1 M NAOH

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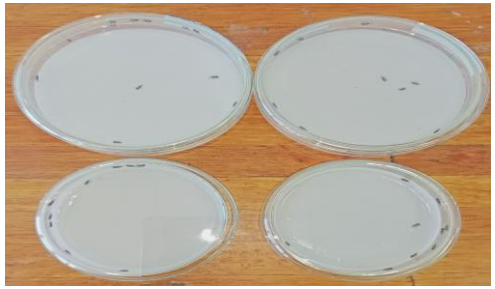
Insecticidal activity screening of nanofilms

Nanofilm



Contact experimental setup

Nanofilm

Healthy maize for storage

Contact experimental setup

Acknowledgements

- Community
- Research group
- Sponsors –CSIR and RTF-NRF

Thank you