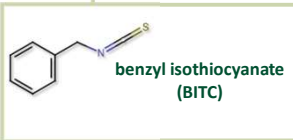


Papaya Ground Seed as a Biofumigant against Root-Knot and Reniform Nematodes In Hawai'i

Lauren Braley¹, and Koon-Hui Wang¹

¹Department of Plant and Environmental Protection Science
University of Hawai'i at Mānoa



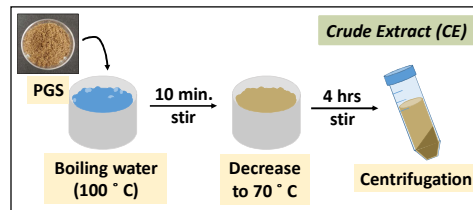
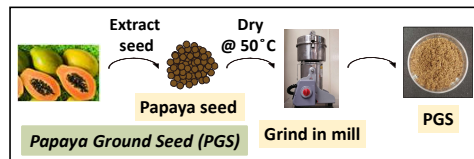
BACKGROUND

- Plant-parasitic nematodes (PPN), such as root-knot (*Meloidogyne* spp.; RKN) and reniform (*Rotylenchulus reniformis*; RN) nematodes, challenge growers in Hawai'i year-round
- Rising cost of agricultural inputs calls for the recycling of farm waste for sustainable pest management
- Papaya production in Hawai'i is a major industry, but up to 50% of fruit produced is culled or wasted
- Papaya contain prerequisites for benzyl isothiocyanate (BITC) production, a toxic volatile to various PPN

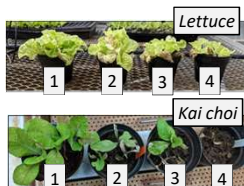
The objective of this project was to examine the use of papaya ground seed (PGS) as a biofumigant against RKN and RN in greenhouse pot trials.

METHODS

Papaya Seed Preparation



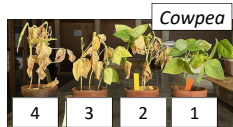
Greenhouse Trials



Treatments (x4 reps each)

- 1) PGS 0.5% = papaya ground seeds at 0.5%
- 2) PGS+CE = PGS 0.5%+0.5% of crude extract
- 3) PGS 1% = papaya ground seeds at 1%
- 4) BM = brown mustard at 1%
- 5) NA = not amended
- 6) Auto = not amended and autoclaved

- Field soil from a commercial lettuce/kai choi field
- 100 *M. incognita* J2s/pot



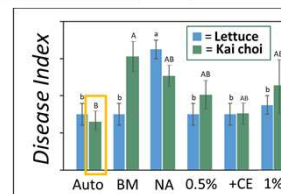
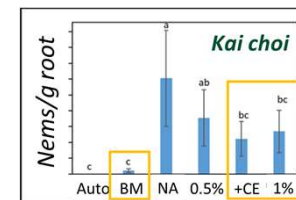
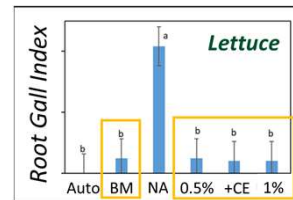
Treatments (x4 reps each)

- 1) PGS 0.5%
- 2) PGS 1%
- 3) NA
- 4) Auto

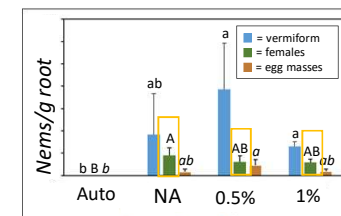
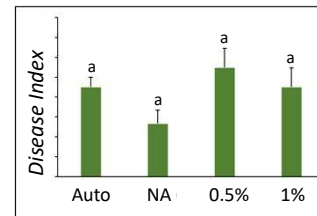
- Sterile sand: soil potting mix
- 200 *R. reniformis* vermiform nematodes/pot

RESULTS

Kai Choi & Lettuce



Cowpea



CONCLUSIONS

- BITC produced by PGS suppressed RKN infection in kai choi and lettuce
- BITC was able to suppress the RN lifecycle and reproduction in cowpea
- PGS did not reduce disease index in kai choi, suggesting possibility of another active pathogen in the soil
- PGS offers a potential biofumigation that does not require extensive plant growth beforehand

FUTURE WORK

- Validate results through additional trials
- Verify BITC suppress PPN through *in vitro* methods
- Examine the use of surfactant in PGS application as a means of increasing BITC movement through soil
- Examine the effects of PGS on inducing systemic resistance (ISR)

This project is supported by WSARE SW20-911, GW22-233, CTAHR Hatch, Multistate (NE2140), Plan of Work (HAW 9048-H, 9034-R, and POW 16-964). Special thanks to Roshan Paudel, Justin Mew, and Wei Wen Su.

