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Short Communication

Preservative property of *Aframomum danielli* fractions in stored grains

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The use of petroleum ether and ethanol fractions of *Aframomoum danielli* was explored in the preservation of stored grains; soybean, cowpea and maize. Preservation property of *A. danielli* increased with increase in concentration of fractions used. The ethanolic fractions showed higher activity in reducing fungal infestation than petroleum ether fractions.

Key words: Preservative property, *Aframomoum danielli*, stored grains.

INTRODUCTION

Spices are flavour-imparting plant materials. They are derived from different parts of specific plants such as the barks, flowers, roots, seeds and fruits. They could be coloured, aromatic, phenolic or pungent (Dziezak, 1989). Various spices and oils have been known for their preservative properties (Karapinar, 1985). The preservative property of spices is due to the volatile oils and oleoresins (Pruthi, 1980).

Essential oils of thyme and oregano are effective fumigants against fungi which attack stored grains. This property strengthens the probability of their use as alternative chemicals in the storage of grains (Pasteur et al., 1995). *Renea- limia alpinia* oleoresin has been found with insecticidal or repellant properties against *Sitophylhus zeamais* (Lognay et al., 1991). *Ocimum* spp. also has repellant properties against maize weevil (Chogo and Frankel, 1981). *Aframomoum danelli* has shown its potential as a preservative in some food system (Adegoke et al., 2003; Fasoyiro et al., 2001a). Antimicrobial activities of the crude extracts of *A. danielli* against a number of microorganisms have been reported (Adegoke and Skura, 1994; Fasoyiro et al., 2001b). This paper reports the preservative property of *A. danielli* fractions on maize, soybean and cowpea.

MATERIALS AND METHODS

A fresh pod of *A. danielli* spice was obtained from Ondo State, Nigeria. The seeds were removed from the pods, air-dried. pulverized in a warring blender and sieved (200 μm) aperture sieve, packaged in polyethene bag to prevent moisture absorption and stored at 4°C until use.

The seeds were extracted with petroleum ether and the residue of the extraction process was further extracted with ethanol using the procedure of Chang et al. (1977). The hexane and ethanol extracts were fractionated by vacuum liquid chromatographic process as described by Odukoya et al. (1999). The petroleum ether extract were fractionated into four fractions (f1 to f4) and the ethanol extract was also fractionated into another four components (f5 to f8).

Screening of extracts for preservative property was according to the method of Adegoke et al. (2002) with slight modification. 30 ml of sterile distilled water was added to 100 g of maize, soybean and cowpea. These were thoroughly mixed and allowed to equilibrate at room temperature for 4 h after which they were dried at 60°C for 3 - 4 h to obtain a moisture content of 15%. Fractions of the extracts (dissolved in 1 ml of 80% ethanol) were added to the seeds at four concentrations: 0.5, 1, 1.5 and 2%. The samples were left for 30 min for the solvent to evaporate. The samples were package in polythene film (0.05 μm thickness) and stored at room temperature for four weeks at 27 ± 2°C (90 - 95% relative humidity). Ten grains per each treatment as well as control (without solvent) were placed on cooled solidified potato dextrose agar in petri-dishes (8 cm). These were incubated at 26°C for 48 h after which percentage infested seeds and percentage germinated seeds were determined.

RESULT AND DISCUSSION

Figures 1, 2 and 3 show the percentage infestation of maize soybean and cowpea preserved with *A. danielli* fractions. The preservative property of *A. danielli* fractions were determined by recording the fungal infestation of the seeds to which 0.5 to 2% of the fractions were applied. Generally, percentage infestation for the seeds decreased with increase in concentration of fractions. Fraction f5 reduced percentage infestation

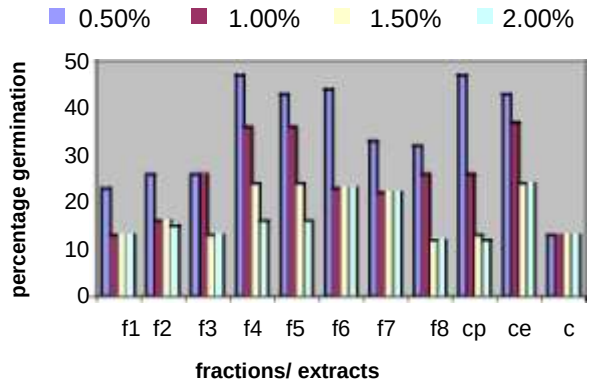

Figure 1. Mean percentage infestation of maize preserved with *A. danielli*.

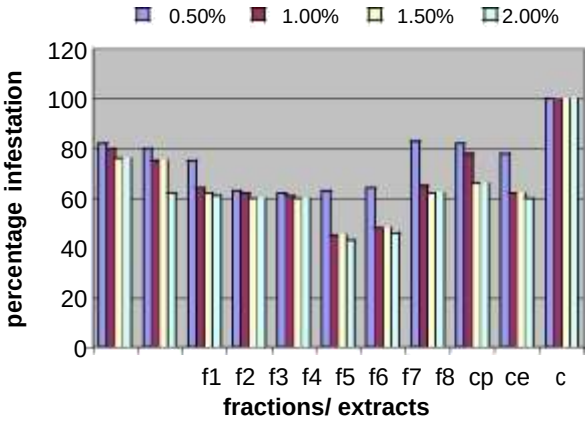

Figure 2. Mean percentage infestation of soybean preserved with *A. danielli.*

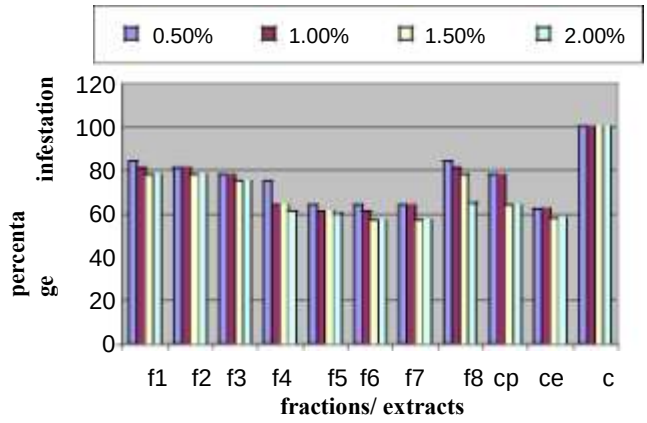

Figure 3. Mean percentage infestation of cowpea preserved with *A. danielli.*

in maize to 47% at 1.5 and 2%. In soybean, fraction f6 was the most effective fraction, percentage infestation was reduced to 53% at 1.5%. In cowpea, percentage infestation was reduced to 57% when f6 was used at

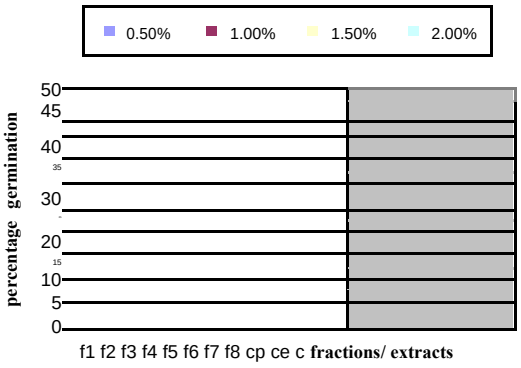

Figure 4. Mean percentage germination of maize preserved with *A. danielli.*

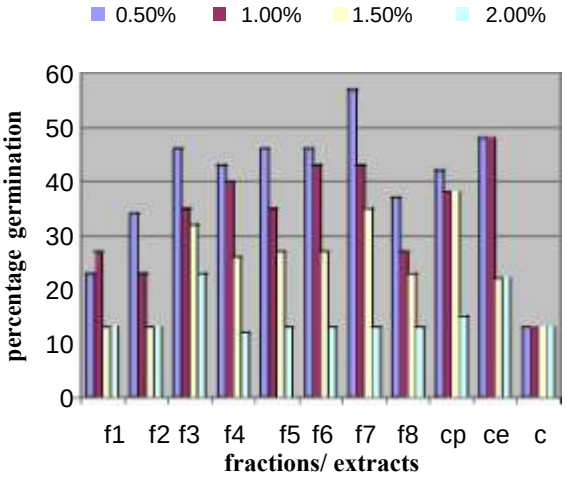

Figure 5. Mean percentage germination of soybean preserved with *A. danielli*

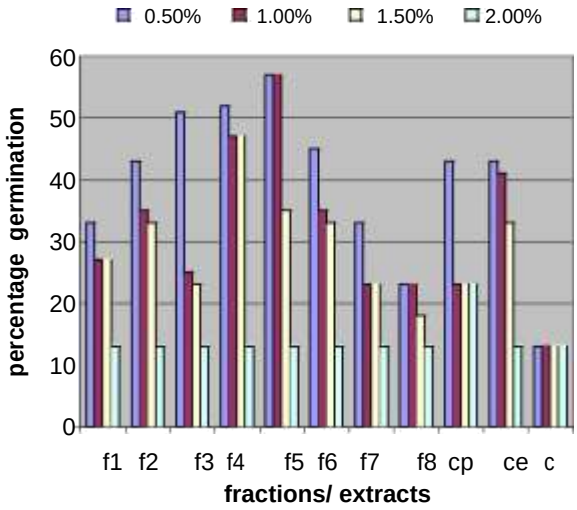

Figure 6. Mean percentage germination of cowpea preserved with *A. danielli.*

1.5%. Ethanolic (Ce) extract showed higher activity than petroleum extract (Cp) in all the food commodities tested. Kimbu et al. (1979) isolated diterpenes from *A. danielli* which exhibited antifungal properties. Powdered *A. danielli* had also exhibited antifungal properties (Adegoke et al., 2002).

Percentage germination of seeds preserved with *A. danielli* fractions is shown in Figures 4, 5 and 6. Percentage germinated seeds decreased with increases in concentrations of fractions of *A. danielli*. Percentage germination of 47% was recorded for maize with fraction f4 applied at 0.5%. Soybean had a germination of 57% when fraction f6 was applied at 0.5%. Adegoke et al. (2002) reported higher germination for soybean and maize to which powdered *A. danielli* was added.

Reduced germination of the seeds with increase in concentration of fractions of *A. danielli* could be as a result of the oily and sticky nature of the fractions which could possibly trap oxygen and moisture needed for the germination process. This means that *A. danielli* fractions reduced viability of the seeds, so that the fractions should not be applied to grains raised for planting purpose.

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