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Short Communication

EFFECT OF A*ZADIRACHTA INDICA* LEAF EXTRACT ON FUNGI ASSOCIATED WITH *IPOMOEA BATATA* TUBER ROT IN ANYIGBA, KOGI STATE

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ABSTRACT
Three fungi (*R. oryzae, A. niger, and Penicillium spp)* were isolated from rotted potato. Two of the fungi (*R. oryzae and A. niger)* were pathogenic, while the third fungus (*Penicillium spp*) was not pathogenic. The fugal rot caused by the pathogens was completely prevented with 100% concentration of *A indica. R oryzae* was more pathogenic than *A. niger*. It was suggest that proper handling during harvesting and transportation and improved storage methods should be observed to minimize injuries on potato tubers.

KEYWORDS: *R. oryzae, A. niger, and Penicillium spp*.pathogen pototo tubers.

INTRODUCTION

The major important root crops of the tropical regions include cassava, yam, sweet potatoes and Irish potatoes. These tubers suffer from post-harvest losses resulting from physical, physiological or pathological factors; or the combination of all the three (Booth.1974). Sweet potato (*Ipomoea batata*) is the only economical species of the family Convulvulaceae (Colbley and Steel, (1976). It is ranked seventh in the world production after wheat, maize, rice, Irish potatoes, barley and cassava, (FAO, 1982).Post-harvest losses of all perishable tropical produce have been conservatively estimated at 25% of production, (Booth 1974; and Burton, 1966). Attack by fungi, bacterial and viruses are probably the most serious causes of post-harvest losses in perishable tropical produce. Although many bacterial posses the ability to produce tissue-macerating enzymes: Lund, (1979) reported that only a few have been associated with decay of living plant tissue. Surkova, (1978) reported *Fusarium oxysporum, F. trichothecioides and F. radicicola* to cause potato tuber rots; also, *Rhyzopus* spp has been associated with sweet potato rot (Surkova, (1978). Fajola and Alasoadura (1973) reported that various synthetic chemicals have been used in the control of potato tuber rot. The uses of Chemicals in agriculture have negative effect on the environment, because they are not biodegradable (Taiga, 2003), hence there is the need for alternative to chemicals. The aim of this study is to find out the causal organism responsible for the fungal rot of potato tuber in storage in Anyigba Kogi State; and to investigate the effect of *A. indica* leaf extract in the control of the fungal rot.

MATERIALS AND METHODS

A laboratory experiment was conducted to test the antimicrobial activity of compounds from two aromatic plants Direct isolation was carried out by using sterile scalpels to cut about 3mm pieces of the potato tuber at the periphery of the healthy portion and rotten portion. The small pieces were surface sterilized by immersing in 1% sodium hypochlorite for 10 seconds and rinsed thrice with different changes of sterile distilled water before two pieces were aseptically placed in each Petri-dishes containing PDA medium and incubated at room temperature for 5 days. From the pure cultures, each of the isolated fungi was identified with reference to illustrated genera of imperfect fungi (Bannette and Hunter, 1972). Pathogenicity test was carried out according to Koch's postulate.

Hot water extraction was obtained by infusing 10g, 20g, 30g and 40g of *A, indica* powder in 100 ml of sterile distilled water, using a 250 ml Erlenmeyer's flask in a water bath set at 100^{o}C for 30 minutes. This was allowed to cool and the crude extract was obtained from the infusion by filtration through four folds of sterile Cheese cloth, to give concentrations of 10, 20, 30 and 40% respectively. Each of the extract concentration was kept aseptically in 150 ml conical flasks. The contents in the flasks were exposed to UV light for further sterilization. *In vitro* assay of the plant extract efficacy was determined by inoculating the PDA/Plant extract with 4mm disc of each pathogenic fungus, using the different plant extract concentrations. Daily records of mycelia growth were taken for 5days. *In vivo* test was carried out by determining the effect of the extract concentrations on rot depth as follows. With sterile cork borer, a 5.0 mm diameter holes were made on each potato tuber. A disc of each fungus culture (4.0 mm diameter) was soaked for 30 seconds in 1ml of plant extract in sterile Petri-dish; and immediately introduced into the hole, using a sterile mounting needle and forceps; the tissue previously removed from the hole was replaced after about 2.0 mm had been cut off to compensate for the thickness of the inoculums. The point of inoculation was sealed with Vaseline and the inoculated tubers were incubated on clean laboratory table for 5 days at room temperature (25±3^{o}C).

Descriptive statistics of values are presented as means in bar charts. In order to compare the efficacy of the plant extracts *in vivo*, the treatments were analyzed by one- way ANOVA and multiple comparisons, to obtain extract

effect with significant difference compared to the LSD at 0.05 p value.

RESULTS AND DISCUSSIONS

Three fungi were isolated (*Rhyzopus oryzae*, *Aspergillus niger* and a *Penicillium* spp.) from the rotted sample of *I. batata*. Only *R. oryzae* and *A. niger* were pathogenic from the Pathogenicity test. This is suggestive that the isolated *Penicillium* spp was as a result of secondary infection. Only the 40% concentration of *A. indica* extract completely inhibited mycelia radial growth of both *R. oryzae* and *A. niger* on extract/PDA media. However, the growth of *A. niger* was also completely inhibited by 30% concentration of the extract. There was a significant difference in mean mycelia inhibition of *R. oryzae* on comparing with *A. niger* at different concentrations.

No rot was recorded in all the tubers inoculated with fungi / 40% concentration of extract at the end of 5 days of incubation, while the control recorded significant rot depth. Therefore, we recommend *A. indica* extract at 40% concentration as an alternative to chemicals in the control of potato tuber rot in storage.

TABLE 1a: Percentage inhibition of rot caused by *Rhizopus oryzae* wth 100% concentration of extract.

Days	Control A	Treated with extract B	Inhibition A –B	Percentage Inhibition $\frac{A-B}{A} \times \frac{100}{1}$
1	0	0	0	0
2	0.1	0	0	100%
3	(0.2)	0	0.2	100%
4	0.5	0	0.5	100%
5	0.8	0	0.8	100%
6	1.0	0	1.0	100%
7	1.5	0	15	100%

TABLE 1b: Percentage inhibition of rot caused by *Aspergillus niger* with 100% concentration of extract.

Days	Control A	Treated with extract B	Inhibition A –B	Percentage Inhibition $\frac{A-B}{A} \times \frac{100}{1}$
1	0	0	0	0
2	0.1	0	0.1	100%
3	0.1	0	0.1	100%
4	0.2	0	0.2	100%
5	0.3	0	0.3	100%
6	0.6	0	0.6	100%
7	0.9	0	0.9	100%

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