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PHYTOCHEMICAL ANALYSIS AND GROWTH INHIBITORY EFFECTS OF SOME BOTANICALS ON SEED BORNE FUNGI OF AVOCADO PEAR (*Persea gratissima)* FRUITS IN RIVERS STATE, NIGERIA

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INTRODUCTION

- The avocado, also known as alligator pear, is a tropical and subtropical fruit, belonging to the family of Luraceae. avocado spread to Asia in the mid l9 Century. In 1833 and 1956 avocado was found in Florida and California respectively for the first time (Chen *et al.,* 2008).

- In Nigeria, some work has been done on the rot of some fruits and vegetables but little research has been reported on avocado pears rot during storage. Generally, fruits and vegetables are stored for a period of time following harvest. Disease or related losses may occur no matter how short the storage period. One of these most devising post-harvest diseases is caused by fungi.

- Amongst natural preservatives, the use of natural essential oils obtained from plants, particularly medicinal plants has been promising. They have shown to reduce microbial and chemical spoilage amongst agricultural produce with no proven detrimental effect on human and the environment even at high concentration (Pessoa *et al*., 2002).

INTRODUCTION CONTD.

- These botanicals of medicinal importance have been proven to be very effective against fungal infection even where treatments with synthetic antibiotics failed. (Oshin *et al*., 2016). Among such proven botanicals are *Ocimum gratissimum* (scent leaf) and *Azadirachta indica* (neem).

- This study was aimed at isolating and identifying rot fungi of avocado pear, determine the phytochemical constituents and effects of plant leaf extracts of *Ocimum gratissimum* and *Azadirachta indica* on mycelium growth.

MATERIALS AND METHODS

Isolation and Identification of Fruit-Borne Pathogen

- Infected avocado pears were surface sterilized with 70% alcohol and cut through using a sterile knife. The infected parts were cut and plated on 100 Petri-dishes and incubated at 25°C for 3-5 days as described by Chukunda (2014).

Pathogenicity Test

- In order to ascertain that the isolated micro-organism caused rot, cylindrical cores (10mm) long was used to remove surface sterilized healthy fruits by means of 5 mm sterile Cork borer disc (5 mm) of 7 day old fungal culture creatures growing on Petri-dishes were introduced into the holes and sealed by means of sterile vaseline while the controls were without fungi.

- Inoculums (not containing fungal mycelium) incubated at 25°C for 2 weeks in sterile polyethene bags. At the end 50 fruits of avocado were cut through and examined for rot (Chukunda, 2014).

MATERIALS AND METHODS CONTD.

- **Analyzing the Active Ingredient in the Plant Leaf Extract of *Ocimum gratissimum* and *Azadirachta indica***
  The screening of phytochemical constituents of Ocimzirn gralissirnum and Azadirachyta indica plant extract was to identity the active ingredient. This was done using standard procedures as described by Harborne (1998) and Kokate (2001) at the Biochemistry laboratory of the Rivers State. University of Science and Technology (RSUST) and Plant Physiology laboratory of the University of Port Harcourt, Nigeria.

- The plant materials were washed three times with sterile distilled water and dried at room temperature. Hundred grams (100g) of plant parts were separately crushed to powder using sterilized mortar and pestle. These crushed materials were extracted sequentially into 300m1 sterile distilled water. The extracts, thus obtained were subjected to preliminary phytochemical screening, following the methodology of A.O.A.C (2004).

(a) Diseased

(b) Healthy

Table 1: Percentage Frequency of occurrence in Infected Fruits of Avacado Pear (*Persea gratissima*)

S/N	Fungal Isolates	% Frequency in *P. gratissima*
1	*Botryodiplodia theobromae*	32.00
2	*Rhizopus stolonifer*	30.00
3	*Colletotrichum gloeosporoides*	36.00
4	*Fusarium pallidoroseum*	76.00
5	*Penicillum expansum*	20.00
6	*Botrytis cineerea*	24.00
7	*Aspergillus niger*	26.00
8	LSD (P0.05)	0.019

- However, the commonly isolated and most frequent of abundant fungi among these were *F .pallidoroseum* (76.00%) followed by *C. gloeosporoides,(36.00%) B theobromae (32.00%), R. stolonifer (30.00%). A nig*er (26.00%), *B*. *cinerea* (24.00%) respectively.

- Table 1: Percentage frequency of occurrence in infected fruits of Avocado pear (*Persea gratissima*).Most of these fungal of pathogens identified from the test fruit have earlier been associated with Avocado pear fruits rot by several researchers. Minyahil and Addisie (2019) implicated some of this fungal isolates to be responsible for soft rot diseases of Avocado fruits.

- Therefore, the present findings agree with earlier researches on the fruit-borne fungal incidence of Avocado. In this study, *A. niger, R. stolonifer, F. pallidoroseum, B. theobromae, C. gloesporoides, P. expansum* and *B. cinerea* were pathogens when inoculated into a relatively healthy fruits of Avocado fruits apparently caused soft rot disease of the fruits.

Table 2: Quantitative Phytochemical Constituents of leaf extracts *O. gratissimum* and *A. indica*. Phytochemical Constituents (mg 110g)

Test plants	Essential Oil	Quinores	Flavonoid	Tannins	Saponins	Tarpenes
O. gratissimum	10.25 ± 0.02	25.10 ± 0.01	15.00 ± 0.03	5.20 ± 0.02	12.00 ± 0.02	10.30 ± 0.01
A. Indica	5.30 ± 0.04	3.20 ± 0.03	10.25 ± 0.01	2.30 ± 0.03	8.30 ± 0.04	10.30 ± 0.01
LSD (P≤0.05)	2.35	10.90	2.37	1.45	1.85	0.00

- The results on phytochemical analysis of leaf extracts *of O. gratissimum* and *A. indica* as seen in Table 2, shows the presence of the following phytochemical constituent: essential oil, (eugenol), flavonoid, quinones, tannins, saponins and terpenes. Significant differences existed among the various phytochemical constituents with quinones, having the highest quantity present in *O. gratissimum*, while terpenes was the most prevalent in *A. indica*.

Table 3: Effect of O.gratissimum Leaf Extracts Concentrations on in-vitro Growth of Fungal Rots isololate of Avocado Pear

Plant leaf Extract Fungal Isolates/ Fungicide Concentrations (%)							
Fungicide	A. niger	R. stolonifer	F. pallidoroseum	B. theobromae	C.gloeosporoides	P. expansum	B. cinerea
A. indica	Y= -0.07x+ 7.32	Y= -0.08x+ 8.34	Y= -0.06x+ 6.07	Y= -0.07x+ 8.01	Y= -0.08x+ 7.10	Y= -0.06x+ 5.8	Y= -0.06x+ 7.11
Regression (r)	r = 0.9097*	r = 0.9821***	r = 0.9973***	r = 0.9882*	r = 0.9711*	r = 0.9544*	r = -0.9386*
O. gratissimum	Y= -0.08x+ 7.26	Y= -0.08x+ 7.35	Y= -0.07x+ 6.40	Y= -0.08x+ 6.85	Y= -0.07x+ 6.8	Y= -0.05x+ 4.50	Y= -0.07x+ 7.0
Regression (r)	r = 0.9428**	r = 0.9213**	r = 0.9941**	r = 0.9638**	r = 0.9636**	r = 0.8721**	r = 0.9402**

Results on O. gratissimum and A. indica leaf extracts on In-vitro control of Fungal rot isolates of Avocado Pear showed a significant reduction on the growth of fungal isolates. However, O. gratissimum performed better than A. indica with corresponding increase in concentration of the extracts.

CONCLUSION AND RECOMMENDATIONS

- The investigation into the post-harvest fungal disease of avocado pear implicated *A. niger*, *R.stolonifer* among others. The result obtained confirmed the anti-microbial potency of *O. gratissimum* and *A. indica* as alternative to toxic pesticide due to its biodegradability. It is therefore recommended to farmers to help achieve healthy fruits production

REFERENCES

Chukunda, F. A. (2014). Post-harvest fungal diseases of *persea gralissima Gaetn* F. and Dacryodes edulis (G. Don) H. J. Lam Fruits (Ph.D) Rivers State University of science and technology, Port Harcourt.

Pessoa, I., M., Morais, S. M., Bevilaqua, C. M. L., Luciano, J. H. S. Anthelmintic activity of essential oil of Ocimum gratissimum Linn, and eugenol against *Haemomchus contortus*. Veterinary parasitology. V. 109, no. ½, p. 59-63, 2002.https://doi.org/10.1016/s0304-4017(02)00253-4.

Oshim, L. O., Desmond, C. O., Anyi, R., Nwobu, U., Ezugwu, U.M., Umana, E. U. (2016). Kinetics of minimum inhibitory concentration, minimum bacterial concentration and minimum fungicidal concentration of *Vernonia amygydalina* (bitter leaf) on micro-organism isolates from wound infections. *International journal of surgical research.* 5(8), 14.


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