Pak. j. sci. ind. res. Ser. B: biol. sci. 2014 **57** (3) 161-162

Short Communication

Antimicrobial Activity and Physical Characteristics of Oil Extracted from Alligator Pepper Seed *(Aframomum melegueta)* Cultivated in Owo, Ondo State, Nigeria

Aladekoyi Gbenga* and Itunnu Olubunmi Shakpo

The Department of Food Science & Technology, Rufus Giwa Polytechnic, P.M.B, 1019, Owo, Ondo State, Nigeria

(received February 15, 2013; revised January 16, 2013; accepted January 28, 2014)

Abstract. Antimicrobial activity of oil from alligator pepper (*Aframomum melegueta*) was tested against five pathogenic organisms, *Klebsiella pneumonia, Salmonella typhi., Bacillus cereus, Escherichia coli* and *Staphylococcus aureus.* The zone of inhibition of *K. pneumonia* was found to be 0.90 ± 0.01 mm, *E. coli* 0.70 ± 0.01 mm, *S. typhii* 0.60 ± 0.01 mm, *B. cereus* 0.04 ± 0.02 mm and *Staphylococcus* sp., 0.80 ± 0.02 mm. The oil was found to have more effect on *Klebsiella pneumonia,* followed by *Staph. aureus, E. coli, S. typhii* and *B. cereus* in descending order. These results show that the oil can effectively eliminate *K. pneumonia* and *Staph aureus* from human system if effectively administered in appropriate proportion.The physical characteristics are: %yield is 16.3522 ± 0.01%, specific gravity is 0.9051 ± 0.01, refractive index is 1.3335 ± 0.01, viscosity is 0.2327 ± 0.02 and colour is deep-yellow.

Keywords: alligator pepper, antimicrobial activity, zone of inhibition, pathogenic organisms

Alligator pepper (*Aframomum melegueta*) is a tropical herbaceous perennial plant with both medicinal and nutritive values found commonly in rainforest. It is widely spread across tropical Africa including Nigeria, Liberia, Sierra Leone, Ghana, Cameroon, Cote D'ivoire and Togo. The constituents of essential oil, extracted by hydrodistillation from the seeds of *A. melegueta* contain two sesquiterpene hydrocarbons, humelene and caryophllene, their oxides and five non-terpenoids (Ajaiyeoba and Ekundayo, 1999). Its seeds have pungent peppery taste due to aromatic ketones (Gala, 1996). The phytochemicals obtained from the seeds of *A. melegueta* posses active ingredients that may be exploited for local development of antimicrobials (Oyegade *et al.,* 1999). Gilani and Rahman (2005) and Sommons (1956) have studied traditional/herbal medicines and their uses.

Aframomum has been used in many herbal medicinal formulas. The seeds when ground into a soft paste shows antibiotic properties (Enti, 1988). Oladumoye (2007) and Okwu (2004) have studied that extracts from the seed of *A. melegueta* have potent antiseptic or bactericidal properties, therefore, have been used in treating wounds and preventions of infections caused by pathogenic bacteria.

*Authour for correspondence; E-mail: gbengu7@yahoo.com

The aim of this work was to evaluate the antimicrobial activities of oil extracted from alligator pepper (*A. melegueta*) against some pathogenic organisms.

The matured alligator pepper seeds were purchased from market and sundried for 3-4 h for two days with the pod. After complete dryness, the pod was removed and the seeds were separated manually and all particles were removed. The seeds were milled mechanically by small milling machine in the market and stored in a clean bottle for extraction process.

The physical characteristics which include percentage yield, specific gravity, refractive index, viscosity and colour were carried out by AOAC (2000).

The results presented in the Table 1 show that it has antimicrobial activity against all the tested organisms as indicated by zones of inhibition. The oil showed greater antimicrobial activities in *K. pneumonia* and *Staph. aureus* which indicate that they were more sensitive to the effect of the oil than other organisms. It has ability to kill the organism and eliminate it, if the appropriate proportion is applied.

The physical parameters have been presented in Table 2. The results of this work suggests that the seed oil from *A. melegueta* have broad spectrum activity. Higher antimicrobial activity of the oil was observed on

Table 1. Antimicrobial activity of oil from alligator pepper (*A. melegueta*)

Sample	Organism	Zones of inhibition (mm)
Oil extract	*Klebsiella pneumonia*	0.90 ± 0.01
	Escherichia coli	0.70 ± 0.01
	Staphylococcus aureus	0.80 ± 0.02
	Salmonella typhi	0.60 ± 0.01
	Bacillus cereus	0.40 ± 0.02

± SD of triplicate results.

Table 2. Physical parameters of oil from alligator pepper (*A. melegueta*)

Parameters of oil extract	Results
% Yeild	16.3522 0.01
Specific gravity	0.9051 0.01
Refractive index	1.3335 0.01
Viscosity(Pas/sec)	0.2327 0.02
Colour	Deep-yellow

± SD of triplicate results.

K. pneumoniae, *S. typhi* and *E. coli.* This indicates that if the oil is smeared or robbed into the affected skin (dermal), it can eliminate pathogenic organisms from the tissues due to its easy penetration into the skin as revealed by its physical characteristics. Adequate proportion can be made into capsules pharmaceutically for easy administration to cure both throat and intestinal pathogenic organisms. This is higher than the earlier results obtained by Oladunmoye and Dada (2007), Oyagade *et al*. (1999) and Akpulu *et al*. (1994) for the ethanol and ether extracts, which were not mainly oil extract. The antimicrobial effect of *A. melegueta* may be due to the phytochemical constituents presents in it (Oyagade *et al*., 1999). *A. melegueta* seeds are rich in phytonutrient such as flavonoids, phenolic compound, tannins, saponins, terperniods, cardiac glycosides and alkaloids which are very concentrated in the oil extracts.

A. melegueta seed oil has the tendency to be stored for a long time, it is edible, and non-drying oil. The oil also showed antimicrobial activity against all the tested bacterial strains even the gram negative pathogens. *A. melegueta* therefore, can be used in healthcare delivery system particularly in the developing economies.

References

AOAC, 2000. *Official Methods of Analysis International, Official Method 920.57,* vol. **11**, 17th edition, Gaithersburg, MD., USA.

Ajaiyeoba, E.O., Ekundayo, O. 1999. Essential oil constituents of *Aframomum melegueta* (Roscoe) Schum seeds (alligator pepper) from Nigeria. *Flavour and Fragrance Journal,* **14:** 109-111.

Akpulu, L.N., Dada, J.D., Odama, E.L., Galadima, H. 1994. Antibacterial activity of aqueous extract of some Nigerian medicinal plants. *Nigerian Journal of Botany,* **7:** 45-48.

Enti, A.A. 1988. *The Rejuvenating Plants of Tropical Africa, Aphrodisiace, Sterility, Impotence, Infertility,* A.K. Adoh (ed.), The North Scale Institute, Atlanta, GA., USA.

Gala, A.M. 1996. Antimicrobial activity of 6-paradol and related compounds. *Pharmaceutical Biology,* **34:** 64-69.

Gilani, A.H., Rahman, A.U. 2005. Trends in ethnopharmacology. *Journal of Ethnopharmacology,* **100:** 43-49.

Okwu, D.E. 2004. Phytochemicals and vitamin content of indigenous spices of south eastern Nigeria. *Journal of Sustain Agriculture and Environment***, 6:** 30-37.

Oladunmoye, M.K., Dada, E.O. 2007. Comparative studies on the antimicrobial activity of leaf extracts from *Aframomum melegueta* and antagonistic activity of isolates from refus on some selected pathogenic bacteria. *Research Journal of Botany,* **2:** 95-101.

Oyagade, J.O., Awotoge, O.O., Adewumi, J.T., Thorpe H.T. 1999. Antimicrobial activity of some Nigerian medicinal plants. *Bioscience Research Communications,* **11:** 193-197.

Sommons, D.C. 1956. Efik divination, ordeals and omens. *Southwestern Journal of Anthropology,* **12:** 223-228.