

Short report

Antimicrobial and cytotoxic activities of the fruit essential oil of *Xylopia aethiopica* from Nigeria

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Abstract

The fruits essential oil of *Xylopia aethiopica* showed activity against four microorganisms and cytotoxicity to carcinoma cells (Hep-2 cell line) at 5 mg/ml concentration.

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Keywords: *Xylopia aethiopica*; Essential oil; Monoterpenoids; 1,8-Cineole

Plant. *Xylopia aethiopica* (DUNAL) A. Rich (Annonaceae), fruits picked randomly from five plants in the Agodi Gardens, Ibadan, Nigeria. Mr T.K. Odewo of the Forestry Research Institute of Nigeria (FRIN), Ibadan identified the fruits and the specimens were deposited in the herbarium of FRIN.

Uses in traditional medicine. The plant is commonly known as ‘spice tree’, ‘Africa pepper’, ‘Ethiopian pepper’ or ‘Guinea pepper’. The fruits are reported to have high nutritive and medicinal value [1]. In Nigeria, the fruits are used in cough medicines, as well as a carminative and stimulating additive to other medicines [2]. The powdered root is employed as a dressing and in the local treatment of cancer [3].

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Table 1
Antimicrobial activity of *X. aethiopica* essential oil

Microorganism	Inhibition zone (mm)			
Gram (+) bacteria	X.a.	Amp	Gen	Tio
<i>Escherichia coli</i> ATCC 25922	–	9 ± 0.3	12 ± 0.3	NT
<i>Pseudomonas aeruginosa</i> ATCC 27853	–	–	10 ± 0.2	NT
Gram (–) bacteria				
<i>Staphylococcus aureus</i> ATCC 29213	–	10 ± 0.2	16 ± 0.3	NT
Fungi				
<i>Stellocapella maydis</i>	12 ± 0.3	NT	NT	–
<i>Candida albicans</i>	–	NT	NT	18 ± 0.2
<i>Aspergillus flavus</i>	10 ± 0.5	NT	NT	16 ± 0.3
<i>A. ocheraceus</i>	15 ± 0.5	NT	NT	15 ± 0.2
<i>Fusarium oxysporum</i>	10 ± 0.3	NT	NT	12 ± 0.5

Mean values ($n=3$) ± S.D. are given.

X. a.: *Xylopi aethiopica* (in 10% DMSO dilution) 5 mg/ml; Amp: ampicillin 2.5 µg/ml.

Gen: Gentamycin (1 µg/ml); Tio: tioconazole 5 µg/ml.

NT: not tested ; -no inhibition.

Previously isolated classes of constituents. Diterpenes and monoterpenoids [4–11].

Tested material. Essential oil (yield: 0.42%) by hydrodistillation. The volatile oil comprised of mainly monoterpenoids, 1,8-cineole (15.15%) and terpinen-4-ol (6.6%) were the most abundant compounds.

Studied activities. Antimicrobial by agar disc diffusion method [12], cytotoxic activities by dispensing six concentrations each in triplicates into the established cell culture and incubated for 2 days [13,14].

Results. Antimicrobial activity reported in Table 1. The essential oil was toxic to *Artemia salina* at concentration ranging from 10 µg/ml to 1000 µg/ml. The results also showed that the essential oil was toxic at concentrations ranging from 1.09 µg to 69.5 µg/ml (Table 2).

Table 2
In vitro cell toxicity of the fruit essential oil of *X. aethiopica*

	LC ₅₀ µg/ml (methanol)	LC ₅₀ µg/ml (ethanol)
Brine shrimp	1.22 ± 0.3	0.26 ± 0.4
Hep-2 Cells	0.045 ± 0.3	0.036 ± 0.3

Toxicity expressed as mean ± S.D., $n=3$.

Conclusions. The essential oil of *X. aethiopica* fruits was active against four fungi. It showed no activity against the bacteria at the concentration used (5 mg/ml). It was also lethal to brine shrimps and Hep-2 carcinoma cell lines at six different concentrations.

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