*Short Communication*

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# ANTIBACTERIAL ACTIVITY OF *EUPHORBIA HETEROPHYLLA* LINN (FAMILY - EUPHORBIACEAE)

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Dried leaves of *Euphorbia heterophylla* were used for extraction with three different solvents namely petroleum ether (60-80°C), butanol and ethanol. An *in vitro* antibacterial activity of the plant extracts were evaluated using the agar-diffusion method. The butanolic extract exhibited marked inhibitory action on the growth of *Escherichia coli*, NCTC 10418, *Staphylococcus aureus* NCTC 6571, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Bacillus subtilis* at 100 mg/ml.

For a very long time, man has been dependent on plants not only as valuable sources of food, drinks and shelter but have effectively used plants for the well being since his creation (Sofowora 1981 & 1982). *Euphorbia heterophylla* L. (spurge weed) is a weak annual weed growing abundantly in Nigeria in semi-humid places, especially in cassava plantation (Trease & Evans 1989). It is commonly used in southern Nigeria as purgative remedy. According to a traditional medical practitioner, the leaves of the plant are popularly used to "wash out" the bowel. For this purpose, an aqueous extract of the leaves is used to prepare food usually yam porridge or is taken alone and purgation ensues after about 4 h (Oksuz *et al* 1994). The antinociceptive activity of the roots of *Euphorbia heterophylla* has also been reported (Vamsidhar *et al* 2000).

A decoction of the leaves is also used by herbal healers to treat stomach disorders and constipation. This study was, therefore, undertaken to investigate the antibacterial activity of the leaves of *Euphorbia heterophylla* against some selected bacteria.

*Plant materials.* The leaves of *Euphorbia heterophylla* were collected from the main campus of the University of Benin, Edo state, Nigeria for this study. The leaves were sun-dried and pulverized using a mechanical grinder. Ether (60-80°C), butanol and ethanol were used for extraction.

*Extraction method.* The dry powder of the leaves (950g) was used separately for extraction with 500 ml petroleum ether, 300 ml ethanol and 400 ml butanol using a long glass

**Table 1**
Antibacterial activity

| *Extracts* | *E. coli* | *K. pneumoniae* | *S. aureus* | *P. aeruginosa* | *B. subtilis* |
|---|---|---|---|---|---|
| *Petroleum ether* | | | | | |
| 50 mg/ml | + | + | + | + | + |
| 100 mg/ml | + | + | + | + | + |
| 150 mg/ml | + | + | + | + | + |
| 200 mg/ml | + | + | + | + | + |
| DMSO | + | + | + | + | + |
| *Butanolic extract* | | | | | |
| 50 mg/ml | + | + | + | + | + |
| 100 mg/ml | - | - | - | - | - |
| 150 mg/ml | - | - | - | - | - |
| 200 mg/ml | - | - | - | - | - |
| DMSO | + | + | + | + | + |
| *Ethanolic extract* | | | | | |
| 50 mg/ml | + | + | + | + | + |
| 100 mg/ml | + | + | + | + | + |
| 150 mg/ml | + | + | + | + | + |
| 200 mg/ml | + | + | + | + | + |
| DMSO | + | + | + | + | + |

+ ; Indicates presence of growth, - ; Indicates absence of growth.

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**Table 2**
Inhibitory effect of butanolic extract of *Euphorbia heterophylla*

| Butanolic extracts | Zones of Inhibition (mm) | | | | |
|---|---|---|---|---|---|
| | *E. coli* NCTC 10418 | *K. pneumoniae* | *S. aureus* NCTC 6571 | *P. aeruginosa* | *B. subtilis* |
| 50 mg/ml | - | - | - | - | - |
| 100 mg/ml | 15 | 16 | 16 | 14 | 15 |
| 150 mg/ml | 25 | 20 | 20 | 20 | 25 |
| 200 mg/ml | 28 | 25 | 28 | 25 | 28 |
| DMSO | - | - | - | - | - |

- ; Growth without inhibition.

column (11 mm in diameter) at room temperature for 72 h. The extracts were concentrated by using rotary evaporator (Rota-vapour Buchi, AG-CH 9230, SWISS).

*Test bacteria.* The test bacteria used in this study were *Esherichia coli* NCTC 10418, *Klebsiella pneumoniae, Staphyllococcus aureus* NCTC 6571, *Pseudomonas aeruginosa and Bacillus subtillis.* They were obtained from the department of Pharmaceutical Microbiology, Faculty of Pharmacy, University of Benin, Nigeria.

*Antibacterial assay.* Molten nutrient agar (25 ml) was poured in each petri dish and allowed to solidify. The antibacterial activity of the different extracts was demonstrated using the method originally described by Bauer *et al* (1966) which is widely used for antibiotic susceptibility testing (Barry & Thornsberry 1985). The overnight cultures of the bacteria diluted to $10^6$ which was used to flood each of the five nutrient agar plates. Sterile cork borer (7 mm) was used to make five wells in each of the agar plates of the organism were used to flood each of the five nutrient agar plates, and the excess was poured away into discarded jar. The 7 mm sterile cork borer (6 mm) was used to make five wells in each of the agar plates. The wells were filled with 0.1 ml, 0.2 ml, 0.3 ml and 0.4 ml, respectively, of the different extracts in dimethylsulphoxide, DMSO (control). The fifth well was filled with 0.3 ml of DMSO.

Only the butanolic extract exhibited inhibition of the test bacteriae (Table 1). The butanolic extract exhibited marked inhibitory activity on *Esherichia coli*, NCTC 10418, *Staphylococcus aureus* NCTC 6571, *Klebsiella pneumoniae* and *Pseudomonoas aeruginosa* (Table 2). The minimum inhibitory concentration (MIC) was 100 mg/ml. It was observed that the inhibitory effect increased with concentration as shown in Table 2. The sensitivity of the test organisms to the butanolic extract of *Euphorbia heterophylla* justified the claims by traditional herbalists that it is useful in the treatment of stomach disorders (caused by bacterial infection) in the local community.

***Key words:*** *Euphorbia heterophylla*, Extracts, Antibacterial activity.

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