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Evaluation of antimicrobial activity and toxicity of *Vernonia hymenolepis* (A. Rich) traditionally used for toothache in Kenya

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Abstract

Aim: The main aim of the study was to ascertain the antimicrobial properties and safety of *Vernonia hymenolepis* leaves to validate its use in treatment of toothache. **Materials and Methods:** The Leaves were collected from Trans Nzoia County, shade dried, ground and both organic and water extraction done. Minimum inhibitory concentration against *Staphylococcus aureus* ATCC 25923, *Bacillus cereus* ATCC 11778, *Pseudomonas aeruginosa* ATCC 27853, *Escherichia coli* ATCC 25922 and *Candida albicans* was done. Cytotoxicity was done using Brine Shrimp lethality test and lethal concentration (LC₅₀) determined using Finney computer program. The Oral Acute Toxicity Testing (ATC method) was performed as per Organization for economic co-operation and development (OECD) guideline. **Result and Discussion:** The results showed that the aqueous extract had an inhibitory activity against *Staphylococcus aureus* and had no significant effect on *Pseudomonas aeruginosa*, *Escherichia coli*, *Bacillus cereus* and *Candida albicans* at concentration of 400 mg/ml. The organic extract had inhibitory effect against *Staphylococcus aureus* at a dose of 100 mg/ml and against *Pseudomonas aeruginosa* and *Escherichia coli* both at a dose of 400 mg/ml, *Bacillus cereus* at a dose of 200 mg/ml and *Candida albicans* at 50 mg/ml. This study has shown that the plant extracts has a moderate Cytotoxicity with the LC₅₀ (µg/ml) of 491.8 (µg/ml) and 481.7 (µg/ml) for water and organic extract respectively. Acute oral toxicity ATC method showed that the plant extracts in both preparations were not toxic even at a high dose of 2000 mg/kg. **Conclusion:** It's concluded that *Vernonia hymenolepis* possesses antimicrobial activity and is not toxic.

Keywords: *Vernonia hymenolepis*, Antimicrobial activity, Cytotoxicity, In-vitro.

Introduction

Oral health problems affect all age groups and more especially in rural communities this is because of lack of availability of good oral hygiene due to high cost of tooth paste and other commercial preparations that are used for oral health care and also due to resistance of conventional antimicrobials that are available for treatment of oral conditions. This implies that there is a high demand of oral health care, hence resulting to alternative use of herbal medicine. Many people in various communities in Kenya have used plants and other natural products for treatment of various ailments including oral diseases but this sometimes result to death of individuals due to overdose, this may be attributed to lack of sufficient and scientific knowledge about the dose and toxicity of the herbal preparation.

Vernonia is a genus in the family Asteraceae and has very many species of forbs and