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**Anti-microbial Screening of Aqueous and Ethanolic Extract
of Flower of *Guizotia abyssinica* (L.F.) Cass.**

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Abstract

The aqueous and ethanolic extracts of *Guizotia abyssinica* (L.f.) Cass. Syn. *G. oleifera* D.C., *Polymnia abyssinica* L.f., Suppl., *Verbesina sativa* Roxb., *Jaegeria abyssinica* Spr., flower were screened for antimicrobial activities against some pathogens viz., *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Enterobacter faecalis*. Extracts were found to produce significant inhibition against all the pathogens. Ethanolic extract were observed to be more active than aqueous extract as compared to the standard drug.

Key-Words: *Guizotia abyssinica*, Flower, Anti-microbial activity

Introduction

In India and Libya, from ancient times, different parts of medicinal plants have been used to cure specific ailments. Today, there is widespread interest in drugs derived from plants. This interest primarily stems from the belief that green medicine is safe and dependable, compared with costly synthetic drugs that have adverse effects. Natural antimicrobials can be derived from plants, animal tissues, or microorganisms.¹⁻² The shortcomings of the drugs available today, propel the discovery of new pharmacotherapeutic agents in medicinal plants.³ Therefore, to determine the potential and promote the use of herbal medicine, it is essential to intensify the study of medicinal plants that find place in folklore.⁴⁻⁵

Microbial infections are a leading cause of morbidity and health care expenditures in persons of all ages. Several other populations, including elderly persons and those who are living in unhygienic conditions, are also at major risk. Keeping all these aspects in mind the search of natural anti-microbial agents is essential.

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The plant *Guizotia abyssinica* (L.f.) Cass., (Niger/Ramtil), family Asteraceae is an indigenous and oil yielding plant grown under cultivation in some parts in India and was chosen for the present investigation. The scanty availability of information on this plant facilitates the study on it. The attempt was made to study anti-microbial activity of aqueous and ethanolic extract of flower.

Material and Methods

Selection, collection and authentication of plant/plant material

The seeds of the selected plant were collected in the months of July 2011 from the Jawahar Lal Nehru Krishi Vishwavidyalaya (JNKVV) Agriculture University, Jabalpur, M.P. and identified & authenticated by Dr. (Mrs.) Neeta Singh, Prof. and Head, Department of Botany, Govt. Girls PG College, A.P.S. University, Rewa and was deposited in Laboratory, Voucher specimen No. PCog/GA/0914. The seeds were then sown in soil, irrigated regularly and after 3-4 months flower was collected, dried under shade, powdered and stored in an air-tight container for further use.

Preparation of microorganisms for experiment

The micro-organism strains used for anti-microbial studies were obtained from RD Gardi Medical College, Ujjain, (M.P.), Banghazi medical center (Libya) and Al-Bayda, hospital (Libya). For use in experiments, the organisms were sub-cultured in nutrient broth, nutrient agar, Macconky agar and Blood agar media. Muller Hinton agar was used in antibiotic sensitivity testing.

Preparation and application of disks for experiment

Different concentration of the extracts (10-60 µg/ml) was prepared by reconstituting with DMSO. The test microorganisms were streak to Muller Hinton agar medium by streaking plate method. After streaking the autoclaved filter paper discs (5 mm in diameter) impregnated with the extracts were placed on plates using flame-sterilized forceps. The antibacterial assay plates were incubated at 37°C for 24hr. For positive control Amoxycillin/Cefitaxime (60µg/ml) and for negative control solvent DMSO was used.⁶⁻⁸

Observation of results

Results were recorded as presence or absence of zone of inhibition. The inhibitory zone around test paper disks indicated absence of bacterial growth and it was reported as positive (growth inhibition observed) and absence of zone as negative. The test was repeated thrice in interday interval to insure reliability of the results. The diameters of the inhibition zones were measured in mm (after subtraction the diameter of disc i.e 5mm), shown in table 1. The Percentage of relative inhibition zone diameter (% RIZD) as compare to inhibition obtained from standard drug at same concentration was calculated, shown in table 2.

Results and Discussion

In this study the results of the investigations show that aqueous and ethanolic extracts of flower of *Guizotia abyssinica* (L.f.) Cass. possess antimicrobial activities against selected micro-organism organisms (Table 1). Ethanolic extract were observe to be more active than aqueous extracts. As compare to the standard, extracts were observed to be less active at concentration 60µg/ml. The percentage of relative inhibition zone diameter (% RIZD) was observed and reported (Table 3). Results clearly indicate that further purification of this extract can leads to isolation of potent antibacterial compound.

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Table 1: Screening of Anti-microbial activity of *Guizotia abyssinica* (L.f.) Cass.

| S/No. | Treatment | Concentration (µg/ml) | Zone of Inhibition (mm) | | | |
|-------|-----------|-----------------------|-------------------------|-------------------|-------------------|------------------|
| | | | EC | PA | SA | EF |
| 1. | C | - | - | - | - | - |
| 2. | AEGAF | 10 | - | - | - | - |
| | | 20 | 4.23±0.30 | - | - | - |
| | | 40 | 6.14±0.13 | 10.29±0.31 | 8.06±0.11 | 8.01±0.11 |
| | | 60 | 12.80±0.13 | 15.39±0.20 | 14.2±0.21 | 11.03±0.46 |
| 3. | EEGAF | 10 | - | - | - | - |
| | | 20 | 5.5±0.27 | 6.6±0.22 | 4.14±0.13 | 3.5±0.20 |
| | | 40 | 8.32±0.14 | 11.15±0.23 | 7.49±0.12 | 6.80±0.39 |
| | | 60 | 12.80±0.16 | 12.66±0.14 | 13.29±0.31 | 12.61±0.39 |
| 6. | SD | 60 | 22.5±0.76 (a) | 24.16±0.72 (a) | 25.16±0.72 (b) | 19.5±0.28 (b) |

Values are expressed as Mean (X)±SEM, n=3 **Abbr.:** AEGAL = Aqueous extract of *Guizotia abyssinica* Flower, EEGAL= Ethanolic extract of *Guizotia abyssinica* Flower, EC= *Escherichia coli*, PA = *Pseudomonas aeruginosa*, EF = *Enterococcus faecalis*, SA= *Staphylococcus aureus*, EC (G-), PA (G-), SA (G+), EF (G+), C: Control (DMSO), SD= Standard (a = Cefitaxime, b= Amoxycillin)

Table 2: Percentage of relative Inhibition Zone diameter (% RIZD) for extracts as compare to standard at 60µg/ml

| Extract/Organism | % RIZD | | | |
|------------------|--------|-----|-----|-----|
| | EC | PA | SA | EF |
| AEGAL | 52% | 59% | 57% | 57% |
| EEGAL | 57% | 56% | 52% | 59% |

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