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Antimicrobial and Neuropharmacological Evaluation of Leaves and Fruits (Fruit-Pulp) Of *Adansonia Digitata* L.

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Abstract

The leaves and fruits (fruit-pulp) *of Adansonia digitata* L. were collected in the month of January and processed to dry powder separately. They were subjected to soxhlet extraction using petroleum ether and alcohol. The extracts were screened for antimicrobial activity against the organisms *Bacillus subtilis, Escherichia coli, Klebsiella pneumonia, Aspergillus niger* and

Aspergillus flavus following cup- plate method. The extracts were also used to test various neuropharmacological potentiality viz., marble burying test, forced swimming test, horizontal wire test and chimney test. The results of antimicrobial screening of ethanolic extract were encouraging. The ethanolic extract of leaves has shown good results as sedative, muscle relaxant, anti-anxiety agent, than petroleum ether extract. Phytochemical screening revealed the presence of flavonoids, steroids, triterpenoids and alkaloids in either or both extracts. These results show that *Adansonia digitata L* has potential drug molecules which need to be isolated and studied, further, in detail.

Keywords: neuropharmacological, antimicrobial, *Adansonia digitata* L.

Introduction

The plant is a biosynthetic laboratory, not only for chemical compounds, but also a multitude of compounds like glycosides, alkaloids etc. these exert physiological and therapeutic effect. The compounds that responsible for medicinal property of the drug are usually secondary metabolites. A systematic study of crude drug embraces through consideration of primary and secondary metabolites derived as a result of plant metabolism. The plant material is subjected to phytochemical screening for the detection of various plant constituents.

With onset of scientific research in herbals, it is becoming clearer that the medicinal herbs have a potential in today`s synthetic era, as numbers of medicines are becoming resistant. According to one estimate only 20% of the plant flora has been studied and 60% of synthetic medicine owe their origin to plants. Ancient knowledge coupled with scientific principles can come to the forefront and provide us with powerful remedies to eradicate diseases. Many of the pharmaceuticals which are currently used can be traced back to herbal remedies which were developed long ago.

The medicinal plants find application in pharmaceutical, cosmetic, agricultural and food industry. The use of the medicinal herbs for curing disease has been documented in history of all civilizations. Before onset of synthetic era, man was completely dependent on medicinal herbs for prevention and treatment of diseases. Because of enormous advantages of herbal medicines, plants all over the world are being studied systematically in search of medicinally active constituents. Such an effort is being done in our laboratory, where in we are studying various locally available plants which are used as medication by folks of our region. In one of such efforts, we found *Adansonia digitat (L),* being used for different ailments was showing good activity against some bacteria and it has shown considerable antidepressant activity also. The details of our present investigation are as follow.

Present Plant

Adansonia digitata L. is known by many common names. The most common of which is 'Baobab' [1]. It is also known as 'dead-rat tree, 'monkey breed tree' etc [2]. The plant belongs to malvaceae family and is a deciduous tree, native to central Africa. It is also found distributed in peninsular India particularly in the states of Andhra Pradesh and Karnataka. It is used as an antipyretic agent by the folks to overcome fever. Its fruit pulp has traditionally been used as an immunostimulant, anti-inflammatory and analgesic agent. Seeds are used in cases of diarrhea and hiccough. Oil extracted from seeds is used for inflamed gums and to ease diseased teeth [3]. These inputs from our folks inspired us to investigate the active constituents of the plant.

The leaves of *A. digitata* normally having 5-7 leaflets, when mature, have entiremargins, elliptic to obovate elliptic with acuminate apex and a decurrent base. Mature leaf size may reach a diameter of 20 cm. The tree sheds its leaves during the dry season. The fresh leaves are harvested in the rainy season. The Baobab fruit is composed of an outer shell (epicarp), fruit pulp and seeds. The woody epicarp contains the internal fruit pulp which is split flowery, dehydrated and powdery slides enclose multiple seeds and filaments.

Materials and Method

The plant material (leaves and fruits) was collected in the month of January 2011 from Marthur village 18 km towards north east of Gulbarga district of Karnataka, India. The leaves were washed, shade dried and crushed manually to get a fine powder. Fruits were also dried, deseeded and crushed to powder along with the pulp. About 40 grams of leaf powder, 95 grams of fruit pulp powder and 55 grams of seed powder were mixed thoroughly and this mixture was subjected to soxhlet extraction using solvents petroleum ether and alcohol. After 18 hours of extraction procedure (for each solvent) the residue of extract was recovered by evaporating the solvent on water a bath. The residues were brownish in color, clear and non-sticky.

A little portion of the extract was used for phytochemical screening. This has revealed the presence of flavonoids, steroids, triterpenoids and etc.

Evaluation of antimicrobial screening

The antimicrobial activity of these extracts was studied comparatively using Streptomycin as standard drug following cup-plate method [4]. The microorganisms used were

Escherichia coli, Bacillus subtillis, Klebsiella sps., Asparagillus niger and *Asparagillus flavus.*

The medium used for the test was prepared by dissolving bacteriological peptone (6 grams), pancreatic digest of casein (4 grams), yeast extract (3 grams), beef extract (1.5 grams), dextrose (1 gram) and agar (15 grams) in distilled water to produce 1 liter of medium. The pH was adjusted to 6.5-6.6 using 1M sodium hydroxide and 1M hydrochloric acid. It was sterilized for 30 minutes at 15 lbs o pressure.

Nutrient broth was prepared by dissolving bacteriological peptone (6 grams), pancreatic digest of casein (4 grams), yeast extract (3 grams), beef extract (1.5 grams) and dextrose (1 gram) in distilled water to produce one liter of nutrient broth. The pH was adjusted to 6.2 and sterilized by autoclaving. The test solutions both standard and extracts were prepared as follow.

Streptomycin: 10 mg of streptomycin was dissolved in 100 ml of water to get a final concentration of 10 µg/0.1ml.

Test samples: 10 gram of extract was dissolved in 10 ml of DMSO to get a final concentration of 100 µg/0.1 ml.

The organisms used in the present study were obtained from the laboratory stock on the day of testing. The organisms were sub cultured into sterile nutrient broth. After incubating the same for three hours it was used as inoculum for the test.

Previously liquefied medium was inoculated with the appropriate quantity of broth of microorganisms between 40-45^{o}C and inoculated medium was poured into sterile Petri-dishes to give a depth of 3-4 mm. ensured that the layers of medium were uniform in thickness by placing them on a leveled surface. With the help of a suitable sterile cork borer a cup of 6 mm diameter was scooped out off the set agar in each Petri-dish. Using sterile pipettes the standard and test solution (0.1 ml) were fed into the bored cups. The fed dishes were incubated for 24 hours at 37^{o}C. The zone of inhibition developed was measured and recorded. Each zone of inhibition recorded is an average of six measurements.

Evaluation of neuropharmacological activity

Various tests to assess the neuropharmacological potentiality were carried out using albino mice. The tests are

1. Marble Burying Test [5].
2. Horizontal Wire Test [6].
3. Forced Swimming Test [7] and
4. Chimney Test [8].

Albino mice of either sex weighing 18-30 grams were used to perform the above tests. The mice were divided into four groups, each group containing 4 mice. The first group served as control group (DMSO), second group was treated with the standard drug diazepam at a dose of 20mg/kg body weight. The remaining two groups were administered with test samples at a dose concentration of 2g/kg bodyweight intramuscularly. The results of these four tests are summarized in systematic tables

Results

Antimicrobial Activity.

Table 1

Sl. No.	Organisms	Zone of inhibition in mm			
		Streptomycin	DMSO	Alcoholic Extract	Pet-ether extract
1	*E.coli*	11	Nil	18	10
2	*B.subtillis*	10	Nil	14	09
3	*Klebsiella sps.*	07	Nil	16	10
4	*A.niger*	10	Nil	17	08
5	*A.flavus*	09	Nil	13	05

Neuropharmacological Activity. 1) Marble burying test.

Table 2

Sl. No.	Groups	Mean ± Sem
1	Control	20 ±0.00
2	Standard	02 ± 0.7746
3	Pet-ether extract	5.66 ± 0.7149
4	Alcoholic extract	01 ± 0.4472

2) Horizontal wire test.

Table 3

Sl. No.	Groups	Mean ± Sem
1	Control	2 ±0.2582
2	Standard	5 ± 0.000
3	Pet-ether extract	5 ± 0.000
4	Alcoholic extract	5 ± 0.000

3) Forced swimming test.

Table 4

Sl. No.	Groups	Mean ± Sem
1	Control	7.66 ± 0.2108
2	Standard	3.66 ± 0.3333
3	Pet-ether extract	5.5 ± 0.2236
4	Alcoholic extract	3.5 ± 0.2236

4) Chimney test.

Table 5

Sl. No.	Groups	Mean ± Sem
1	Control	13.5 ±2.247
2	Standard	30 ± 0.000
3	Pet-ether extract	30 ± 0.000
4	Alcoholic extract	30 ± 0.000

Conclusions

Based on the results of antimicrobial screening, it may be inferred that both ethanolic and pet-ether extracts have shown inhibitory effect on microbial growth. Among them the ethanolic extract has shown greater inhibition zone, against almost all organisms, than pet-ether extract.

The results of various neuropharmacological testing reveal that the extract are comparatively good sedative agents, when compared to the standard drug diazepam. The ethanolic extract again has shown enhanced CNS depressant activity than the pet-ether extract. Considering these observations it can be concluded that alcoholic extract of leaves and fruit pulp of *Adansonia digitata* L. possesses antimicrobial and sedative properties. Thus the results primarily substantiate the traditional use of *A. digitata*. Further investigations towards isolation and characterization of bioactive constituents of *A. digitata* leaves and fruits are being carried out in our laboratory.

1. Ajayi IA, Dawodi FA, Oderinde RA. Fattyacid compositon and metal content of *Adansonia digitata* L. seeds and seed oil. La Rivista Italian a belle S sostanze Grasse, 2003; 80:41-43.
2. Grubben GJH, Deneoton OA. Plant resources of tropical Africa, 2004.
3. Sidibe M, Williams JT. Baobab-*Adansonia digitata*. Fruits for the futre, International centre for under utilized crops, South-Ampton, 2002.
4. Sanjeevkuar giri, Basavaraja kM. Synthesis of 3-methoxy-2-(1,3,4-oxadiazolyl, 1,3,4-thiadiazolyl and 1,2,4-triazolyl)naphtho[2,1-b]furans of biological interest. Journal of chemical and pharmaceutical research. 2012; 4(5):2643-2648.
5. Broekkamp CL, Joly Gelovin D. Major tranquillizers can be distinguishing from minor tranquillizers on the basis of effect on marble burying and swimm induced grooming in mice. Eur. J Pharmacol. 1986; 126:223-229.
6. Vogel HG, WH Vogel. Drug Discovery and Evaluation, Pharmacological Assays. 1st Edn., Springer, Berlin, 1997.
7. Porsolt RD, Le Pichon M, Jalfre M. Depression, a new animal model sensitive to antidepressant treatments. Nature, 1977; 266:730-732.
8. Boissier JR, Tardy J, Diverres JC. A nowel method to evaluate or explore the ttransquillisent action by chimney test. Metexp, 1960; 3:81-84.

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