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Phytochemical Investigation and Antidepressant Activity of *Coccinia Grandis*

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ABSTRACT

In this present work systemic phytochemical investigation of *Coccinia grandis* work done and it is also evaluated for antidepressant activity by the aqueous extract of leaves. In phytochemical investigation of the plant leaves we found that it contains alkaloids, glycosides, tannins, reducing sugars, steroids, flavonoids, carbohydrates. The leaves were extracted with water by using soxhlet apparatus and the crude extracts were administered to albino rats of six groups. Before administration of crude extract, depression was induced to all groups by using forced swim test apparatus method and this it is tested for its activity.

Keywords: Forced Swim test Apparatus, *coccinia grandis*, anti depressant activity, phyto chemical, soxhlet apparatus, albino rats

ARTICLE INFO

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1. Introduction

A vast majority of the population, particularly those living in rural areas depends largely on medicinal plants treatment of diseases. There are about 7000 plant species found India. The WHO estimates that about 80% of the populations living in the developing countries rely almost on traditional

medicine for their primary health care needs. Plants have played a significant role in maintaining human health and improving the quality of human life. The Cucurbitaceae family is commonly known as gourd, melon and pumpkin family. The family of *Coccinia grandis* is Cucurbitaceous,

comprises 960 species. The family is predominantly distributed around the tropics. Most of the plants in Cucurbitaceae family are annual vines [1]. Traditional medicinal plants have been recognized for their therapeutic benefits for centuries. However, there is still lack of evidence for the clarification of their typical mechanisms of action. *Coccinia grandis* (L.) J. Voigt or Ivy gourd of Cucurbitaceae, an indigenous plant to Bangladesh and other South Asian countries, grows luxuriantly as tendril climber all over Bangladesh in the wild. *Coccinia grandis* leaf is traditionally used in anorexia, cough, diabetic, wounds and biliary-hepatic disorders. It has been reported to have anti-inflammatory, antioxidant, anti mutagenic, antimicrobial, antiulcer, Hepato protective, expectorants and analgesic activities. But the systemic effects and mechanisms of its anticancer properties like anti mitotic, cyto toxic and antitumor activities have not been investigated in relation to its secondary metabolites content. Therefore, we aimed to investigate these properties in the present work along with the qualitative assessment of its secondary metabolites [2].

Depression:

Depression is a state of low mood and aversion to activity that can have a negative effect on a person's thoughts, behavior, feelings, world view and physical well-being [3]. A depressive disorder is a syndrome that reflects a sad mood exceeding normal sadness and grief. Characterized by apathy, low self esteem, insomnia, personal neglect, loss of appetite, loss of libido, pessimism, lack of motivation not thought disturbances. Depressed people may feel sad, anxious, empty, hopeless, worried, helpless, worthless, guilty, irritable, and hurt or restless [4].

Types of Depression [5, 6, 7]:

All depression types are not the same. Major depression, also known as clinical depression, and chronic depression, also known as dysthymia, are the most common types. But there are also other types of depression with unique signs, symptoms, and treatment.

- Major Depressive Disorder or Clinical Depression.
- Chronic Depression or Dysthymia.
- A typical Depression.
- Regular or Typical depression.
- Bipolar Depression or Manic Depression.

There are two subtypes of bipolar disorder.

Bipolar I and bipolar II.

- Seasonal Depression (SAD)
- Psychotic Depression.

2. Experimental

Plant collection and authentication: The plant material consists of dried powdered leaves of *Coccinia grandis* L. Voigt. (Cucurbitaceae). The plant was collected in and around the farms of Anantapur, Andhra pradesh, India during the month of December-2015 and was authenticated by Balaji College of pharmacy, Anantapur-515001(Ref No. BCP/COG/SPECIES/ 2015/24 dated 23 /12 /2015.

Extraction Procedure:

Air-dried powdered leaves (100gm) of *Coccinia grandis* L. were extracted with 250 ml Water by using Soxhlet apparatus. An exhausted marc was collected. After the

removal of solvent by concentration under reduced pressure extract was obtained, respectively.

Phytochemical screening of the plant Extract:

Test for carbohydrates (Tests for reducing sugar):

- Benedict's test.
- Fehling's Test (Standard Test).

Tests for tannins.

- Ferric Chloride Test.
- Test for Flavonoids.
- Test for Saponins.

Chemical Group Tests:

Tests for Alkaloids:

- Mayer's test.
- Dragendroff's test

Tests for Glycosides.

- Tests for Steroids.
- Sulphuric acid test.

Acute Toxicity studies:

Laboratory Models for Testing Antidepressant Activity:

Forced Swim Test (FST):

FST or behavior despair was proposed as a model to test for antidepressant activity. Depression was produced by forcing the animal to swim individually in a glass jar containing fresh water of 15cm height and maintained at 25°C. This constituted pretest session. Twenty-four hour later each animal was again forced to swim. After an initial 2 min period of vigorous activity, each animal assumed a typical immobile posture. The total duration of immobility was recorded in next 4 min of a total 6 min test. The change in the immobility period was calculated after administering drugs to the groups as mentioned [8].



Figure 1: Before administration of drug



Figure 2: Before administration of drug



Figure 3: Five mins after administration



Figure 4: Ten mins after administration



Figure 5: Anti-depressant activity

3. Results and Discussion

Phytochemical Screening:

Preliminary phytochemical screening of the crude water extracts of *Coccinia grandis* L. leaves (ML) were carried out. Phytochemical screening of the extract was performed using the following reagents and chemicals alkaloids with Dragendorff's reagent, flavonoids with the use of Mg and HCl; tannins with 1% gelatin and 10% NaCl solutions and saponins with ability to produce suds and haemolysis reaction.

Table 1

Test	Aqueous extract
Carbohydrates	-
Proteins & aminoacids	-
Glycosides	+
Alkaloids	+
Phytosterols	+
Flavanoids	+
Tannins	+
Phenolic compounds	-
Gums & mucilage	-
Fixed oils & fats	-

Saponins	+
Volatile oils	-
Triterpenoids	-

+ Positive Test

-Negative Test



Figure 6: benedicts test

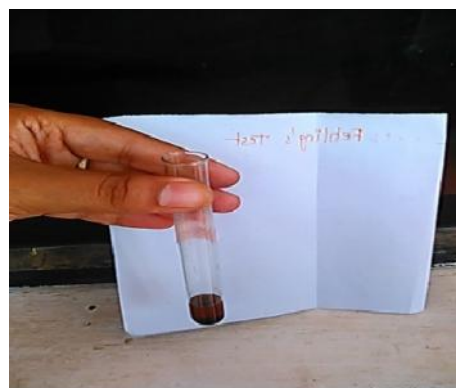


Figure 7: Fehilings test

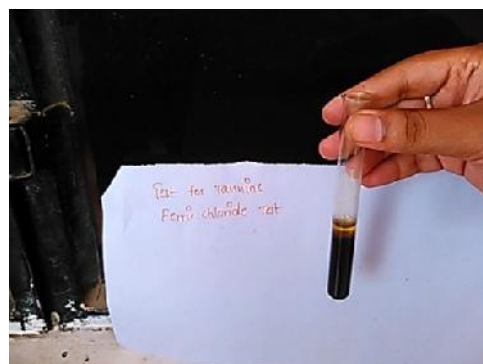


Figure 8: Ferric chloride test

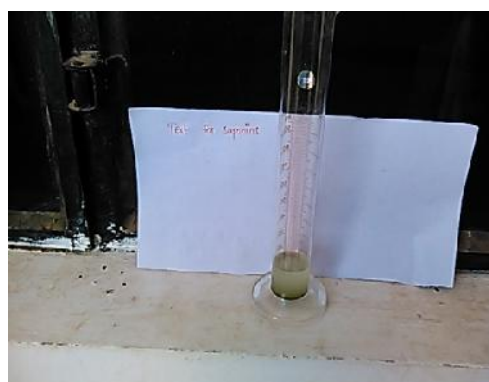


Figure 9: Saponin test

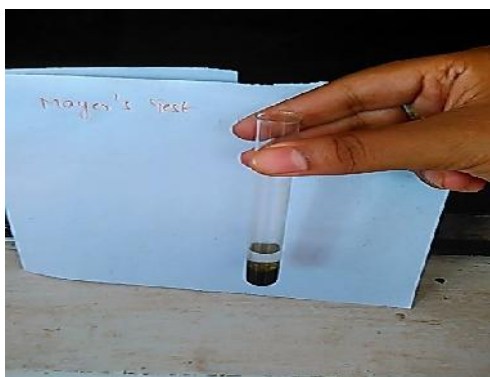


Figure 10: Mayer's test

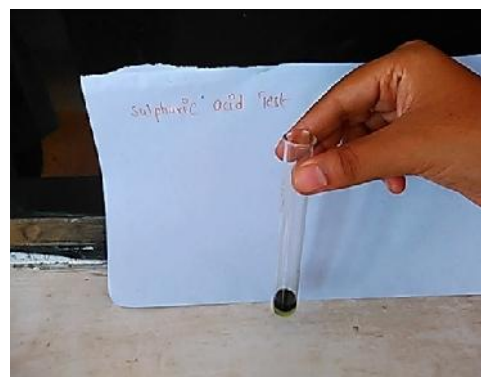


Figure 11: Sulphuric acid test

Table 2: Protocol of the Study [Approved by IAEC]

Group	Drug	Dose
1	PEG	1ml/100gm
2	Coccinia grandis	200mg/kg
3	Coccinia grandis	400mg/kg
5	Imipramine	15mg/kg

Table 3: Effect of crude aqueous extract of *Coccinia Grandis* on immobility time of rats during Forced swim test apparatus (FSTA).

Treatment	Dose(mg/kg)-Routes	Immobility time (FSTA) in sec
Normal	-	125±13.79
Standard	Imipramine (10mg/kg)	18.50±2.29****
Test-1	Coccinia grandis(200mg/kg)	50.67±11.65****
Test-2	Coccinia grandis(400mg/kg)	20.83±5.160****

+ Positive Test

-Negative Test

All values are expressed as Mean±SEM (n=6). **** p<0.0001, when compare to control. Statistical comparison was performed by using One-way ANOVA followed by Bonferroni's test.

4. Conclusion

The present day work is concluded that *Coccinia grandis* aqueous extract possess significant anti-depressant effect in laboratory animals. The results provided experimental evidence for traditional use of this plant in some alterations in mood conditions and also suggest the presence of biologically active principles, which may be worth of further investigation and elucidation.

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