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Preliminary Qualitative Phytochemical Profiling of Luffa Aegyptiaca

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ABSTRACT

Aqueous extract of the fruits and leaves of Luffa aegyptiaca was preliminary screened with the aim of assessing the availability of some biologically active compounds. Pulverized leaves sample of Luffa aegyptiaca was extracted with water; the filtrate was concentrated on water bath and then air-dried at 25oC. The prepared aqueous-extract was used for the phytochemical screening study which was carried out using standard methods. The phytochemicals screened from the aqueous extract of Luffa aegyptiaca showed positive result for flavonoids, saponins, tannins, and cardiac glycoside compounds. These compounds found in the aqueous extract of Luffa aegyptiaca fruits and leaves may have a wide range of biological activities which could of pharmaceutical importance. Sterols, saponins, terpinoids, flavonoids, fatty acids, amino acids, phenolic types of compounds and antioxidants (Qizhen Du et al., 2006) have been isolated by different workers from the Luffa aegyptiaca. More investigation and thorough study of this plant may open a new chapter towards the significant role of the plant for the human well- beings. With this end in view, phytochemical studies of the fruit Luffa aegyptiaca have been undertaken.

Keywords : Luffa Aegyptiaca, Leaves, Phytochemicals, Aqueous-Extract

I. INTRODUCTION

Luffa aegyptiaca is one of the important medicinal plants of the family of Cucurbitaceae. Medicinal plants have been used from ancient time for their medicinal values. Nowadays, the crude extracts samples from medicinal plants have been shown interest for the development and preparation of

alternative traditional medicine. Plants are the best sources for chemical ingredients or phytochemical agents for cure of different diseases.

The botanical features of the genus Luffa and the order cucurbitals have been recorded. The fruit of *Luffa cylindrica* is used for the treatment of skin disease. It is also good for the liver, lungs, heart and stomach; having a cooling effect on the body (Kirtikar *et al*.) In Chinese medicine, the inner skeleton of the dried fruit is used to treat pain in the muscle and joints, chest and abdomen. It is also used as a edible vegetable. It is a good source of vitamin C, vitamin K, and potassium, also providing dietary fiber, vitamin A, vitamin B6, thiamin, folate, pantothenic acid, magnesium, phosphorus, copper, and manganese (Duke at al. 2002 and Leung *et al*. 1996). It is a vigorous climbing annual vine with several lobed cucumber-like leaves. The fruits were also cucumber-like shape develops at maturing, with a network of fibers surrounding a large number of flat blackish seeds. It was reported to have been originated from India. It is widely distributed in tropics, subtropics as a cultivated and/or neutralized plant. In Nigeria, *Luffa aegyptiaca* is grown in all most parts of the country as weed; and it have been reported to posses both medicinal and nutritional potential. It have been reported that phytochemicals which are considered as secondary metabolites components are directly responsible for activity such as antioxidant, antimicrobial, antifungal, anticancer, anti-inflammatory among others. Therefore, screening of chemical constituents in medicinal plants in order to assess for their availability may provide new useful information to the scientific community and in claiming for their therapeutic efficacies. This study therefore aimed at screening chemical constituents of *Luffa aegyptiaca* fruits and leaves samples in order to provide vital information on their availability.

II. METHODS AND MATERIAL

The fruits of *Luffa aegyptiaca* were collected from farmers' field and markets. The collected fruits were cleaned with water. The fruits were then cut into small pieces and dried in the direct sunlight. Then they were ground to yield powder and the powder was preserved in thimbals for extraction. The powder (800 g) in four thimballs was extracted in a Soxhlet apparatus with petroleum ether (40º - 70º C) and ethyl acetate (EtOAC) sequentially. The extracts were filtered and concentrated to a small volume. This process changes the extracts into dark green liquid.

PREPARATION OF PLANT SAMPLE

Luffa aegyptiaca obtained were washed thoroughly with double distilled water to devoid of any impurities and minerals. The skin of cleaned *Luffa aegyptiaca* was peeled off carefully with a skin peeler. The peeled skin was shade dried for dehydration for about a week. The completely dried skin was made into a fine powder using electric mixing grinder. The ground powder was sieved, stored in an air tight container and used whenever it was needed.

PREPARATION OF PEEL

10 grams of *Luffa aegyptiaca* peel powder was weighed and added to 100 ml of double distilled water in the conical flask. This was kept in boiling water bath at 100°C for 60minutes. The conical flask was removed after that period and allowed to cool to room temperature. Then the contents were filtered through Whatman No: 1 filter paper. The filtrate can be used for further studies by storing in refrigerator at 4°C not more than a week.

EXTRACTION

The leaves of *Luffa aegyptiaca* were air-dried at 25°C for7 days. It was then pulverized using mortar and pestle into fine powdered. The pulverized-leaves

were extracted with aqueous. About 100g of pulverized leaves sample was macerated into100 mL of water and left for24 hrs at room temperature. It was then filtered using Whatman No 1 filter paper and the filtrate was concentrated by allowing evaporating at 50 °C on water bath and then air-dried at 25°C then stored in an air-tired sterile container until used.

PRELIMINARY PHYTO CHEMICAL SCREENING

The aqueous crude extract (1 g) was completely dissolved in 100 mL of distilled water. It was prepared the stock solution. The obtained stock solution was used for Phyto chemical screening following the methodology of Harbone and Kokate.

TEST FOR FLAVONOIDS:

The stock solution (1 ml) was taken in a test tube and added few drop of dilute NaOH solution. An intense yellow colour was appeared in the test tube. It became colourless when on addition of a few drop of dilute acid that indicated the presence of flavonoids.

TEST FOR SAPONINS:

The stock solution (1 ml) was taken in a test tube and diluted with 20 ml. of distilled water. It was shaken by hand for 15 min. A foam layer was obtained on the top of the test tube this foam layer indicated the presence of saponins.

TEST FOR TANNINS:

The stock solution (3 ml) was taken in a test tube and diluted with chloroform and added acetic anhydride (1 ml). Finally, sulphuric acid (1 ml) was added carefully by the side of the test tube to the solution. A green colour was formed which showed the presence of tannins.

TEST FOR CARDIAC GLYCOSIDE (KELLER-KILLANI TEST):

About 0.5 gm of plant extract in a test tube with 2 ml of glacial acetic acid containing a drop of ferric chloride solution. This was under layered with 1 ml of concentrated tetra oxo sulphate acid. Brown ring formation was observed which indicated the presence of cardiac glycoside.

III. RESULTS AND DISCUSSION

The physical properties of the aqueous extract of *Luffa aegyptiaca* leaves observed were its colour (light greenish) and texture (sticky powdered). The percentage yield was 17.75%. The result for phyto chemical screening showed the presence of moderate flavonoids (++), saponins (++), tannins (++), while mild cardiac glycoside (+) was obtained. The chemical constituents in the plant or crude extract are known to be biologically active compounds. Some chemical constituents are considered as secondary metabolites components. They are directly responsible for different activity such as antioxidant, antimicrobial, antifungal, anticancer among others.

These entire secondary metabolites component showed antioxidant and antimicrobial properties through different mechanism. Flavonoids have be reported as the most important bioactive compounds which exhibited a wide range of biological activities

such as antioxidant, anti-inflammatory, antimicrobial, anti- angionic, anticancer and anti-alergic. Saponins are other type of bioactive chemical constituents which are involved in plant disease resistance because of their anti-microbial activity. Tannins are phenolic compound and their derivatives are also considered as primary antioxidant or free radical scavengers.

Medicinal plants are the best sources for chemical ingredients, antimicrobial and antioxidant agents for cure of different disease. The aqueous extract of *Luffa aegyptiaca* showed good availability of biologically active compounds and this could be a good source for pharmaceutical and nutritional utilization.

Phyto chemical Activity of *Luffa aegyptiaca* Plant Extract

Table : Phyto chemical screening of *Luffa aegyptiaca* plant extract

S.No	Phytochemical	Test	Result
1	Flavonoids	LeadAcetatetest	+
		Decolorizationtest	+
		Ammoniatest	+
2.	Carbohydrates	Molischtest	+
		Fehling'stest	+
		Cellulosetest	+
		Iodinetest	+
3.	AminoAcidsand Proteins	Millontest	+
		BirutTest	+
		Bradfordtest	+
		Ninhydrintest	+
4.	Phenols	FerricChloridetest	+
		PhosphoMolybdictest	+
5.	Quinones	Chloroform–Ammoniatest	-
6.	Terpenoids	Salkowskitest	-
7.	Saponins	Frothtest	-
8.	Tannin	Braemer'stest	+
9.	Leucoanthocyanidines	Leucoanthocyanidinetest	-
10.	Steroids	Libermann-Buchardtest	+
11.	Volatileoils	Precipitationtest	-
12.	Alkaloids	Mayer'stest	+
		Picricacidtest	+
13	Glycosides	KellarKillani	-

IV. CONCLUSION

This work has been able to reveal the composition of the fruits, leaves and some physiologically active compounds present in the plants. The presence of the major components may make the seed a good candidate for feed. The presence of several phyto chemicals in the plant explains the medicinal importance and herbal usage of the plant. It have been reported that phytochemicals which are considered as secondary metabolites components are directly responsible for activity such as antioxidant, antimicrobial, antifungal, anticancer, anti-inflammatory among others. Therefore, screening of chemical constituents in medicinal plants in order to assess for their availability may provide new useful information to the scientific community and in claiming for their therapeutic efficacies. This study therefore aimed at screening chemical constituents of *Luffa aegyptiaca* fruits and leaves samples in order to provide vital information on their availability.

REFERENCES

1. Anjusha S, Gangaprasad A, Radhamany PM. GC-MS Analysis of Leaf Extract of *Gynochthodes Umbellata* (L.) Razafim. and B. Bremer (Rubiaceae). Int J Pharm Sci Res. 2015; 6(11):

4826-29.

2. Ashwatha narayana R, Raja Naika. Antioxidant and cytotoxic properties of Pavetta crassicaulis Bremek. Leaf crude extract and its isolated pure compound. Indian Journal of natural products and resources. 2017; 8 (4): 335- 350.
3. B Mandal, R K Jain,V Chaudhary, A Varma.2003. First Report of Natural Infection of *Luffa acutangula* by Watermelon bud necrosis virus in India.v.87(5):598.
4. B P Pimple, P V Kadam, M J Patil.2012.Protective effect of *Luffa acutangula* extracts on gastric ulceration in NIDDM rats: role of gastric mucosal glycoproteins and antioxidants.v.5(8):610-615.
5. Brand-Williams, W., Cuvelier, M.E., Berset, C.(1995). Use of a free radical method to evaluate antioxidant activity. LWT-Food Sci. Technol. 28, 25–30.
6. Chatree Saensuk, Saowalak Ruangnam, Mutiara K. Pitaloka, Reajina Dumhai, Sugunya Mahatheeranont, Simon Jan de Hoop, Conrado Balatero, Kanamon Riangwong, Vinitchan Ruanjaichon, TheerayutToojinda, ApichartVanavichit, Samart Wanchana and Siwaret Arikit..2021.ASNP of *betaine aldehyde dehydrogenase* (*BADH*) enhance sanaroma (2-acetyl- 1-pyrroline) in sponge gourd (*Luffa cylindrica*) and ridge gourd (*Luffa acutangula),12.*
7. Dandekar R, Fegade B, Bhaskar VH. GC-MS analysis of phytoconstituents in alcohol extract of *Epiphyllum oxypetalum* leaves. Journal of Pharmacognosy and Phytochemistry.2015; 4(1): 149-154.
8. Devi Nallappan, Agustine Nengsih Fauzi, BalamSatheesh Krishna, Basivi Praveen Kumar, Avula Vijaya Kumar Reddy, Tasqeeruddin Syed, Cirandur Suresh Reddy, Nik Soriani Yaacob, and Pasupuleti Visweswara Rao.2021. Green Biosynthesis, Antioxidant, Antibacterial, and Anticancer Activities of Silver Nanoparticles of *Luffa acutangula* Leaf Extract
9. Elisabete CBAA, Ana PCR, Marta Mendes, Ana MF. Effect of Phenolic Compounds on the Synthesis of Gold Nanoparticles and Its Catalytic Activity in the Reduction of Nitro Compounds. Nanomaterials, 2018; 8:1-18.
10. Erna Harfiani, Dhigna Citra Pradana, Hany Yusmaini.2020.A Review of Phyotochemical and Pharmcological Activitities of Luffa acutangula(L)Rox.v.17.
11. Ezekwe SA, Chikezie PC. GC–MS Analysis of Aqueous Extract of Unripe Fruit of *Carica papaya*. J Nutr Food Sci.2017; 7(3): 1-5.
12. GangjunZhao, CaixiaLuo, Jianning Luo, JunxingLi, Hao Gong, Xiaoming Zheng, Xiaoxi Liu, Jinju Guo, Lingyan Zhou, and Haibin Wu.2021. A mutation in *LacDWARF1* results in a GA-deficient dwarf phenotype in sponge gourd (*Luffa acutangula*). v.135(10):3443-3457.
13. Gnanesh Kumar , Padmanabh Mishra, VellareddyAnantharam, Avadhesha Surolia.2015.*Luffa acutangula* agglutinin: Primary structure determination and identification of a tryptophan residue involved in its carbohydrate-binding activity using mass spectrometry.v.67(12):943-953.
14. M.C. Rota, A Herrera, R.M. Martinez,et al. Antimicrobial activity and chemical composition of Thymus vulgaris, Thymus zygis and thymus hyemalis essential oils. Food Control. 2008; 19: 681-687.
15. I.O. Lawal, NE, Uzokwe, AB, Igboanugo, et al. Ethnomedicinal information on collation and identification of some medicinal plants in research Institutes of South-west Nigeria. African Journal of Pharm. Pharmacol., 2010; 4(1): 001-007.
16. KC.Kakate.4thed.Delhi:Vallabh Prakashan;1997.Practical pharmacognosy;p.218.

17. JB Harbone. Phytochemical methods: A guide to modern techniques of plant analysis. 2nd ed. London: Chapman and Hall; 1998. Pp.54-84.
18. M.A. Hossain, and MR, Nagooru. Biochemical profiling and total flavonoids contents of leaves crude extract of endemic medicinal plant Corydyline terminalis l. kunth. Pharmacogn J. 2011; 3(240: 25-30.
19. MA Hossian, KA Salim Al-Raqmi, ZH AL-Mijizy et al. Study of total phenol, flavonoids contents and phytochemical screening of various leaves crude extracts of locally grown Thymus vulgaris. Asian Pac J Trop Biomed. 2013;3(9):705-710.
20. GA. Ayoola, HAB, Coker, SA. Adesegun et al. Phytochemical screening and antioxidant activities of some selected medicinal plants use for malaria therepy in Southwestern Nigeria. Trop J Pharm res. 2008; 7: 1019-1024.