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A CRITICAL STUDY ON PHYTOCHEMICALSCREENINGOF*LUFFA CYLINDRICA*

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ABSTRACT

Luffa cylindrica leaf extract was first tentatively tested to determine the presence of several physiologically active chemicals. Luffa cylindrica leaves that had been ground up were used to make the extract, which was then concentrated on a water bath and dried by air at a temperature of 25 oC. The phytochemical screening investigation, which was carried out using conventional techniques, utilised the produced aqueous extract. Flavonoids, saponins, tannins, and cardiac glycoside compounds were found in the phytochemicals that were successfully screened from the aqueous extract of Luffa cylindrica. These substances discovered in the aqueous extract of leaves from Luffa cylindrica may exhibit a wide range of biological actions that may be significant for medicinal purposes.

KEY WORDS: Luffa cylindrica, leaves,phytochemicals,aqueous-extract

INTRODUCTION

India is known as the world's Botanical Garden and one of the world's twelve most important biodiversity hotspots, with over 45,000 plant species, of which 15,000-20,000 have medicinal characteristics and only 7,000-7,500 are employed by traditional practitioners. There are around 25,000 licensed Indian system of medicine pharmacies in India, according to estimates. Approximately 1000 single medicines and 3000 compound formulations are now registered. In India, the herbal business utilizes over 8000 medicinal plants, and the Indian herbal medical sector has a higher yearly turnover. Around 600 plant species are used in the Siddha school of medicine, 700 in Ayurveda, 700 in Unani, and 30 in contemporary medicine. Herbal technology is India's second-largest income generator after information technology

(Sharma et al, 2008). According to an article published in SME Times on March 6, 2010, the Associated Chambers of Commerce and Business (ASSOCHAM) estimates that the Indian herbal industry would double in size by 2018, from Rs 7,500 crore to Rs 15,000 crore.

Ayurveda is one of India's traditional medical systems. Ayurveda's concept is based on avoiding unnecessary pain and enjoying a long and healthy life. Ayurveda uses natural components to address the fundamental cause of disease by restoring balance while also promoting a healthy lifestyle to prevent recurrence of imbalance.

Herbal medications have a long history in medicine, and they were utilized for numerous therapies in ancient Chinese, Greek, Egyptian, and Indian medicine. According to the World Health Organization, traditional medicines are still used by 80 percent of the world's population for health care. With over 45,000 plant species, India's subcontinent is well-known as one of the world's main biodiversity hotspots. About 15,000 medicinal plants have been identified in India, with people using 7,000-7,500 of them to treat various maladies. Single or many herbs (polyherbal) are utilized in Ayurveda for therapy. Polyherbalism was emphasised in the Ayurvedic literature SarangdharSamhita' to obtain better medicinal effectiveness. Individual plant active phytochemical components are inadequate to provide the desired therapeutic effects. When numerous herbs are combined in a certain ratio, the medicinal impact is enhanced and toxicity is reduced.

OVERVIEW OF AYURVEDA

Ayurveda is a traditional medical system with a long history dating back centuries. This ancient Vedic wisdom, also known as Ayurvedic Medicine, is one of the oldest healing sciences and has been passed down down the generations over many centuries of tradition. Ayurveda is recognized as the "Mother of All Healing" since it originated thousands of years ago in India. [1] It is derived from the Sanskrit terms ayur (life) and veda (science or knowledge), and means "the science of life," emphasizing the need of achieving harmony and balance in all aspects of life, including mind, body, and spirit. In Ayurveda, the five elements Vayu (air), Teja (fire), Aap (water), Prithvi (earth), and Akasha (aether) are said to make up

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the living microcosm (humans) and macrocosm (nature) (external universe). When the Panchamahabhutas are combined in pairs, they form Tridosha, or the three humors: Vata (responsible for body movement), Pitta (responsible for bodily chemical reactions such as metabolism and temperature), and Kapha (responsible for bodily chemical reactions such as metabolism and temperature) (responsible for growth, protection, lubrication and sustenance). All of them make up an individual's constitution, or Prakriti, which defines a person's physical and mental characteristics. The idea is that health is gained when these three essential doshas are in balance, whereas imbalance produces ailments. The Prakriti of a person is identified based on these PanchamahabhutasandTridosha, and a customized treatment plan may be recommended based on their unique constitution.

SINGLEHERBVERSUSPOLYHERBALFORMULATION

In Ayurveda, medication formulation is founded on two principles: single-drug usage and multiple-drug use, the latter of which is known as PHF. Polypharmacy or polyherbalism is a fundamental traditional therapeutic herbal method that involves mixing many medicinal plants to increase therapeutic efficacy.

The Ayurvedic literature SarangdharSamhita, which was written centuries ago about 1300 A. D., emphasized the notion of polyherbalism in this ancient therapeutic system. Plant formulations and combination extracts of plants are preferred over separate ones in the ancient Indian medical system. Ayurvedic herbals are known to be manufactured in a variety of dosage forms, the majority of which are PHF.

Even if the active phytochemical elements of certain plants have been identified, they are frequently present in trace amounts and are seldom enough to provide the desired therapeutic effects. Scientific investigations have shown that when various plants of varied strength are combined, they can theoretically generate a bigger outcome than when they are used individually, as well as the total of their separate effects. Synergism is the term for this favorable herb-herb interaction. Certain pharmacological effects of herbal active ingredients are only noticeable when combined with those of other plants, but not when consumed alone.

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Here are some examples of Ayurvedic herb combinations:

Bitter and cold herbs are paired with warmer herbs (combination of neem and ginger) to positively balance any severe effects; bitter and cold herbs are coupled with warmer herbs (combination of neem and ginger) to favorably offset any extreme effects. Cumin, black pepper, and asafoetida are historically used to relieve bloating caused by poor digestion, while guduchi and turmeric promote immunity.

There are two processes through which synergism works, depending on the nature of the relationship (i.e., pharmacodynamics and pharmacokinetic). The capacity of one herb to promote the absorption, distribution, metabolism, and elimination of other herbs is the focus of pharmacokinetic synergism. Pharmacodynamic synergism, on the other hand, investigates the synergistic impact that occurs when active elements with equivalent therapeutic efficacy are directed at the same receptor or physiological system. Apart from that, it is thought that illnesses are caused by a variety of variables and complications in the majority of instances, resulting in both apparent and unseen symptoms. In this case, a mixture of herbals may work on many targets at once to offer complete relief.

Polyherbalism gives several advantages not present in single herbal formulations due to synergism. It is clear that a single multi-constituent formulation can achieve a superior therapeutic impact. To achieve desired pharmacological activity, a lesser dose of the herbal product would be required, lowering the likelihood of harmful side effects. Furthermore, PHFs provide patients with increased convenience by reducing the need to take many herbal formulations at once, resulting in enhanced compliance and therapeutic impact. When compared to single herbal formulations, all of these advantages have contributed to PHF's market prominence.

NEED OF THE STUDY

Medicinal plants have long been utilised as medicines, and they continue to play an important part in human health care. The understanding of the basic principles underpinning the biochemical events leading to drug actions is a reasonable approach to the study of

medications and their activities, as there has been a visible concern for health care and the cure of diseases throughout human history.

According to the World Health Organization, traditional medicine is used by 65-80 percent of the world's population as their major source of health care. Herbal medicine, which is the most common kind of medical therapy in developing countries, is now becoming more popular in wealthy countries. Many people believe that herbal medicines are completely "safe" because they are "natural" 13. Herbal medicines are in high demand due to their broad biological activities, higher safety margins, and lower costs than synthetic drugs

The World Health Organization has recognised the value of traditional medicine and has developed plant medicine initiatives, guidelines, and standards. Plant-based materials are prone to contamination, degradation, and compositional changes. As a result, procedures for the rapid, precise, and accurate identification and estimate of active elements must be developed in order to ensure consistency of essential constituents in formulations.

REVIEW OF LITERATURE

The effect of Tinosporacrispa on thioacetamide-induced liver cirrhosis in rats was investigated **by Farkaad et al. in 2011**. The purpose of this study was to see how an ethanolic extract of Tinosporacrispa dried stems affected a male rat model of hepatic fibrosis caused by the hepatotoxin thioacetamide. The rats were given the extract daily at doses of 100 and 200 mg/kg, as well as thioacetamide twice weekly at a rate of 200 mg/kg. The activity of aminotransferases (alanine aminotransferase, aspartate aminotransferase), alkaline phosphatase (AP), and bilirubin, as well as morphological and histopathological indices, were measured in the livers of healthy and thioacetamide-treated rats to assess the extract's efficacy against thioacetamide. The activity of liver enzymes, bilirubin, and G-glutamyl transferase, as well as morphological and histological abnormalities, all increased significantly. The study found that relying solely on data gathered through in vitro methods can lead to incorrect conclusions about the safety of phytopharmaceuticals.

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On wistar rats, Gayatri et al. (2011) investigated the hepatoprotective effect of an ethanolic extract of Stachytarphetaindica. Carbon tetrachloride (1 ml/kg, b.wt) was given intraperitoneallyfor 7 days to cause liver injury. Biochemical parameters were used to determine the amount of the damage. The effects of ethanolic extracts of Stachytarphetaindica (300 mg & 600 mg/kg, b.wt, p.o) on biochemical parameters were compared to the reference medication silymarin (100 mg/kg, b.wt, p.o) in rats treated with carbon tetrachloride. When compared to control rats, Stachytarphetaindica demonstrated a significant reduction in blood enzymes such as AST, ALP, ALT, TP, and Bilirubin. Stachytarphetaindica'shepatoprotective efficacy was comparable to that of the conventional medication silymarin. A histological examination verified it. The effect of the 600 mg/kg extract was nearly identical to that of the conventional medication.

In albino rats, Lima et al. (2010) investigated the hepatoprotective effect of LIV-first against carbon tetrachloride-induced hepatotoxicity. The administration of CCl4 (1ml/kg, ip) caused hepatotoxicity. The standard was silymarin (25mg/kg, p.o.). The release of malondialdehyde was used to calculate cytotoxicity. In rats, CCl4 treatment increased the levels of SGPT, SGOT, ALP, and bilirubin. LIV-first treatment considerably (P0.01) reduced this increment. Antioxidant enzyme activity was reduced in the CCl4-treated group, but enzyme levels were considerably (P0.05) elevated in the LIV-first treated group. The hepatoprotective action of LIV-first was validated in the study, which could be related to its antioxidant properties.

A biochemical and histological assessment of Luffaacutangula'shepatoprotective efficacy against CCl4 and rifampicin-induced liver damage in rats was conducted **by Vishal et al. in 2010**. In rats, the hepatoprotective effect of a hydroalcoholic extract of Luffaacutangula (HAELA) was tested against CCl4 and rifampicin-induced hepatotoxicity. In rats, silymarin and HAELA administration exhibited considerable hepatoprotective efficacy against CCl4 and rifampicin-induced hepatotoxicity. The hepatoprotective efficacy of HAELA was related to lower levels of serum marker enzymes (AST, ALT, ALP, and LDH) and higher total protein, as well as better histoarchitecture of liver cells in the treated group compared to the control group. MDA production was also reduced significantly by HAELA, as was the

activity of non-enzymatic intracellular antioxidants such as glutathione and enzymatic antioxidants such as catalase and superoxide dismutase (SOD). The findings showed that endogenous antioxidants and prevention of membrane lipid peroxidation contribute to HAELA's hepatoprotective action.

Murugaian et al. (2008) investigated the hepatoprotective effects of Wedeliacalendulacea L. in rats suffering from acute hepatotoxicity. The therapy with CCl4 caused acute hepatotoxicity. Serum enzyme activities of aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), protein, and bilirubin were measured to assess the hepatoprotective effect of the ethanolic-leaf extract of W. calendulacea (EEWC). Treatment with EEWC resulted in a dose-dependent decrease in CCl4 levels, as well as an increase in total protein and bilirubin, indicating that the extract could help the liver maintain its normal functional status.

RESEARCH METHODOLOGY

Plant components from Luffa cylindrica, was obtained in the foothills of Ti All of the plants were chosen based on available research, which indicated that all of the selected plant parts (leaves) were high in antioxidant phytochemicals such as flavanoids, phenolic derivatives, and other compounds. The research was conducting at Punj, Jammu & Kashmir, completely identified and authenticated plant material after collection. A specimen of the obtained plant material was deposited in the herbarium of the University College of Pharmaceutical Sciences' Department of Pharmacology, and a voucher was submitted (Specimen number). The plant components (leaf) were collected, rinsed with distilled water, and dried in the shade. After drying, all of the plant materials (leaves) were ground into a coarse powder. After that, the powdered material was sieved no 44 to ensure uniform particle sizes, and then it was kept in an airtight and color-coded container to keep it stable until it was needed again.

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SAMPLING AND IDENTIFICATION OF PLANT LEAVES:

Fresh Luffa cylindrica leaves were gathered.

EXTRACTION

Luffa cylindrica leaves were dried by air for 7 days at 25 oC. After that, it was ground into a fine powder using a mortar and pestle. Aqueous was used to remove the crushed leaves. A sample of crushed leaves weighing about 100 g was macerated in 100 mL of water and left at room temperature for 24 hours. After filtering it through Whatman No. 1 filter paper, the filtrate was concentrated by allowing it to evaporate at 50 oC on a water bath, then it was air-dried at 25 oC and kept in a sterile container until it was needed.

INITIAL PHYTOCHEMICAL TESTING

100 mL of distilled water was used to thoroughly dissolve 1 g of the aqueous crude extract. The pre-made remedy was used.

EVALUATIONOFPHYSICOCHEMICALPROPERTIESFORPLANTLEAFPOWDER

Organoleptic qualities (color, odor, and taste) were assessed physically, as well as density, moisture content/loss on drying, ash values, extractive values, microbiological load, and phytochemicals.

PHYTOCHEMICAL SCREENING OF HERBAL EXTRACTS

Identification of phytoconstituents in the plant material was carried out using various qualitative and quantitative chemical tests.

POLY HERBAL EXTRACT PREPARATION

The chosen plant powder (dried leafs) weighed around 600 gms, and each plant powder (dried leaf) weighed 200 gms. The mixture was mixed with 4000 mL of sterile water and left for 30

minutes. Later, the mixture was cooked until the total volume was one-fourth of its original size (i.e. 1000 mL). The mixture was filtered after cooling. It is possible to obtain a synergistic impact of these plants by retaining this repotted plant in each.

Phytochemical screening was used to identify distinct phytoconstituents in the produced polyherbal extracts.

PHYTOCHEMICAL SCREENING OF POLYHERBAL PREPARATION

Identification of phytoconstituents in the plant material was carried out using various qualitative and quantitative chemical tests.

RESULTS AND DISCUSSION

Phytochemicalscreeningoftheplantextract:

Extracts of Gynandropsisgynandra, Luffa cylindrical, Artocarpusheterophyllus, Lawsoniainermis Linn, Euphorbia nerifolia, and Pongamiapinnata were subjected to a preliminary phytochemical screening. Carbohydrates, Proteins & Amino Acids, Alkaloids, Glycosides, Phenolics/Tannins, Flavonoids, Saponins, Fixed oils/Fats, Steroids, Carbohydrates, Proteins & Amino Acids, Alkaloids, Glycosides, Phenolics/Tannins, Flavonoids, Saponins, Fixed oils/Fats, Steroids The results are listed in tables 22 through 27.

TableNo. 1:PhytochemicalScreeningof*Luffacylindrica*(L.)Rox.,

NameoftheTest	**PE**	**EE**	**AE**
Carbohydrates	-	-	+
Molisch'sTest	+	+	+
Bial'sTest	+	-	+
Proteins&Aminoacids	-	-	-
BiuretTest	+	+	-
XanthoproteinTest	+	-	-
Millon'sTest	+	+	-
Alkaloids	-	-	-
Mayer'sTest	-	-	-

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Hager'sTest	-	-	-
Wagner'sTest	-	-	-
Tannicacid	-	-	-
Glycosides	-	+	+
Borntrager'sTest	-	+	+
CardiacGlycoside	+	-	+
CoumarinGlycoside	+	+	+
Phenolics/Tannins	-	+	+
FerricchlorideTest	-	-	+
K_2 Cr_2 O_7 Test	-	+	+
Flavonoids	-	+	+
Shinoda'sTest	-	+	+
NaOHTest	-	+	+
Saponins	+	-	+
Extract+Water(shaking)	+	+	+
Fixedoils/Fats	-	+	-
SpotTest	-	-	-
Steroids	-	-	+
Libermann-BurchardTest	-	+	+

CONCLUSION

The biologically active components of the Luffa cylindrica leaves extract were readily available and may have pharmacological significance.

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REFERENCES

1) R.T. Hong, J.M. Xu, Q. Mei.Melatoninamelioratesexperimentalhepaticfibrosis induced by carbon tetrachloride in rats. World J Gastroenterol, 2009;15: 1452-1458.
2) P. Manna, M. Sinha, P.C. Sil.Aqueousextractof *Terminaliaarjuna*preventscarbontetrachlorideinducedhepaticandrenaldisorders.BMCComlementAlt Med,2006; 6:33-43.
3) A.A. Adeneye, O.P. Ajagbonna, T.I. Adeleke, *et al.* Hematologicalevaluation of methanol seed extract of citrus. J Ethnopharmacol, 2006;105: 374-379
4) F. Yahya, S. S. Mamat, M. F. F. Kamarolzaman et al., "Hepatoprotectiveactivityofmethanolicextractof Bauhiniapurpurea leavesagainstparacetamol-inducedhepaticdamageinrats," Evidance-BasedandComplimentaryAlternativeMedicine,2013; 1-10.
5) J.A.Hinson,D.W.Roberts,andL.P.James,"Mechanismsofacetaminophen-inducedlivernecrosis,"in AdverseDrugReactions.HandbookofExperimental Pharmacology,2010;196: 369–405.
6) A. H. Gilani and K. H. Janbaz, "Preventive and curative effects of Artemisiaabsinthium onacetaminophenandCCl$_4$-inducedhepatotoxicity," GeneralPharmacology, 1995; 26:309–315.
7) Y. H. Chen, F. Y. Lin, P. L. Liu et al., "Antioxidative and hepatoprotectiveeffects of magnolol on acetaminophen-induced liver damage inrats,"Archives ofPharmacalResearch,2009; 32:221–228.
8) R. W. Hong, J. D. Rounds, W. S. Helton, M. K. Robinson, and D. W.Wilmore,"Glutaminepreserveslivergluta thioneafterlethalhepaticinjury,"Annals of Surgery,1992;215: 114–119.