

## Phytochemical and Antibacterial Activity Analysis of Different Medicinal Plants

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**ABSTRACT:** The present study was performed to examine the Phytochemical and antibacterial effect of *Ganoderma lucidum*, *Andrographis paniculata* and *Moringa oleifera* against gram positive and gram negative bacteria. The plant part of *A. Paniculata* and *Moringa oleifera* such as leaf and *Ganoderma lucidum* mushroom were calculated for antibacterial activity. Different solvents were used to extract the bioactive compounds from the plant parts. The antibacterial activity was studied against *Escherichia coli* and *Staphylococcus aureus* the different solvents, chloroform, acetone and water. Acetone extract of *Andrographis paniculata* showed greater antibacterial activity against *E. coli* (24.6 mm) and *Staphylococcus aureus* (12.5 mm). The phytochemical screening shown the presence of phenolics, flavonoids, carbohydrates, glycosides, terpenoids in the extracts. whereas the antibacterial activity in extracts indicates that the bioactive compounds responsible for the antibacterial. This study provides an indication to support traditional medicinal uses of the plants.

**KEYWORDS:** *Andrographis paniculata*, Carbohydrates, *Escherichia coli*, Phytochemical, Bioactive.

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### I. INTRODUCTION

Medicinal plants have been used since time immemorial by humans for curing disease and natural drugs. Bioactive compounds have been investigated from medicinal plant extract, this extract can care human against diseases and infection. Medicinal plants are an important source for the therapeutic remedies of various ailments (Kokate, C.K et al., 2003). According to world health organization plant derived drugs comprise the foundation of nearly 80% of the population for their most important Health Care. Currently plant derived drugs are being used all over world. These plant based drugs are either used directly extracted from plants or customized through additional separation (cox and Ballick, 1994). These specific compounds belong to plant derived called phytochemicals includes primary and secondary metabolites. Primary metabolites are high volume chemicals but least important for human health. Secondary metabolites are derived from primary metabolites in less volume and have higher value. The secondary metabolites are a lot of interest due to their Antibiotic, antimicrobial. insecticidal and hormonal properties (Irfan Ali Khan). There is an increasing interest in correlating the Phytochemical compounds of a medicinal plant with pharmacological properties (Kokate, C.K et al., 2003).

#### ***Andrographis paniculata***

*Andrographis paniculata* belongs to Acanthaceae family, native to India, is a remedial herb with bitter taste. It is erect herb which grows mostly in tropical, moist deciduous forest and one of the generally used plant in Ayurvedic formulations (Okeke, M.I et al., 2001). kalmegh used to overcome *sannipata* type of fever, hemopathy burning sensation difficulty in breathing, fever, cough, skin diseases, worms and ulcer (Aiyer KN 1962). There are a number of phytochemical compounds present which works differently (Argal A and Pathak AK 2006). *A. Paniculata* have some pharmacological properties including antiheptotoxicity, anticancer, anti – inflammation and Anti-diabetic (Negi AS et al., 2008). This plant is found in Taiwan, China with bitter taste used to bowel complaints of children, treat liver disorders, respiratory infection and common cold. Some other Medicinal properties such as antidiarrhoeal, immunostimulant have been qualified to this plant in traditional medicinal plant (The Wealth of India 1998; H hang C J 2008).

#### ***Ganoderma lucidum***

*Ganoderma lucidum* belongs to Polyporaceae family which is an edible and medicinal mushroom, normally called as *Reishi*, is extremely ranked in oriental folklore. *Ganoderma lucidum* have been regarded as a cure for many types of diseases, may be because of its established usefulness as a popular medicine to treat number of diseases. The mushroom is a costly herb because of its biological activities like anti-tumor, immuno -

modulatory, cardiovascular, respiratory, antinociceptive and antihepatotoxic effect. *Ganoderma* have been reported anti-tumor, antiviral agents and anti-bacterial agents (Choi et al., 1993).

### ***Moringa oleifera***

*Moringa oleifera* belongs to Moringaceae family. It is an aboriginal of Indian subcontinent. Generally known as Drum Stick has been usually distributed and naturalized in the tropical and subtropical areas worldwide (Ramachandran et al., 1980). *Moringa oleifera* has important food product which has huge natural nutrition of the tropics. Further reported that *M. oleifera* as a wonderful source of nutritional agents. The leaves, fruit, flowers and immature pods are used as vegetable in many countries. *M. oleifera* leaves have been investigated as a rich source of vitamin C,  $\beta$ -carotene, protein, calcium, potassium as well as a good source of natural antioxidants (Anwar et al., 2005; Mahmood et al., 2010). *M. oleifera* leaves possess the vitamin C content seven times more than oranges, calcium which is equivalent of four times of milk, while its potassium content is three times more than bananas, three times more iron content of spinach, four times more amount of vitamin A in carrots, and two times more protein content than that of milk (Kamal, 2008).

## II. MATERIALS AND METHODOLOGY

### **Plant Material**

*Moringa oleifera* leaves were collected from a herbal garden, *Andrographis paniculata* and *Ganoderma lucidum* were procured from a medicinal herbs supplier. Leaves of *Moringa oleifera* (20-30 gm) *Andrographis paniculata* and *Ganoderma lucidum* were shade dried at room temperature (32 – 35 °C). The dried samples were ground into powdered form with the help of mortar and pestle.

### **Preparation of Extracts**

25 g of the powdered samples were separately extracted with 100ml chloroform, Acetone and water. Then shaken at 120 rpm for 30 min and kept it for 24 hours. The extracts were separately filtered using sterile Whatman no. 1 filter paper. These extracts were used in further process.

### **Phytochemical Screening**

Qualitative analysis of Phytochemicals from *Moringa oleifera* leaves extract, *Ganoderma* extract and Kalmegh Extracts were performed using previously described methods with slight modification (Kokate 2005). Phytochemicals such as Alkaloids, tannins, carbohydrates, flavonoids, phytosterols, phenols, triterpenoids, glycosides, saponins, proteins and amino acids were tested.

### **Antibacterial Activity**

Antibacterial activity of *Moringa oleifera* leaves, *Andrographis paniculata* and *Ganoderma lucidum* extracts were performed by well diffusion method. Mueller Hinton agar was prepared then sterilized by autoclaving at a temperature of 121°C and pressure 15psi for 15 minutes. In the agar petri dishes, wells using 8 mm diameter cork borer (Balouiri M et al., 2015). The test microorganisms *Escherichia coli* and *Staphylococcus aureus* were equally spread on each plate and 30 microlitre extract was dispensed into each well using micropipettes and incubated at 37°C for 24 hours. The samples were done in replicates. Zones of inhibition against bacterial growth were observed and the diameter of each was calculated in millimetres.

## III. RESULT AND DISCUSSION

### **Phytochemical Screening**

The phytochemical screening of *Moringa oleifera*, *G. lucidum* and *Andrographis paniculata* determined that the extracts contain alkaloids, flavonoids, Carbohydrates, Glycosides, Triterpenoids and Phenolic compounds. Water and ethanol extracts were found maximum active components these are important for human health. Results of *Andrographis paniculata* (Table 1), *Moringa oleifera* (Table 2), *G. Lucidum* (Table 3) were shown in following tables.

**Table 1.** – Phytochemical Screening of *Andrographis paniculata* Extracts.

Phytochemicals	Water Extract	Acetone Extract	Chloroform Extract
Flavonoids	+	-	-
Phenols	-	-	-
Alkaloids	+	-	+
Carbohydrates	-	+	+
Tannins	-	-	-
Glycosides	-	-	-
Saponins	+	-	-
Terpenoids	+	-	+

**Table 2.** – Phytochemical Screening of *Ganoderma lucidum* Extracts.

Phytochemicals	Water Extract	Acetone Extract	Chloroform Extract
Flavonoids	+	-	-
Phenols	-	-	-
Alkaloids	+	+	+
Carbohydrates	+	+	+
Tannins	-	-	-
Glycosides	+	-	-
Saponins	+	-	-
Terpenoids	+	-	+

**Table 3.** – Phytochemical Screening of *Moringa oleifera* Extracts.

Phytochemicals	Water Extract	Acetone Extract	Chloroform Extract
Flavonoids	+	-	+
Phenols	+	-	-
Alkaloids	+	+	+
Carbohydrates	-	-	-
Tannins	-	-	-
Glycosides	+	-	-
Saponins	-	-	-
Terpenoids	+	-	-

**Antibacterial Activity**

Antibacterial activity of *Moringa oleifera*, *G. lucidum* and *Andrographis paniculata* extracts against *Escherichia coli* and *Staphylococcus aureus* were presented in table 4.

**Table 4** – Antibacterial Activity of Medicinal Plant Extracts.

Microorganism	<i>Ganoderma lucidum</i>			<i>Moringa oleifera</i>			<i>Andrographis paniculata</i>		
	CHCL <sub>3</sub>	H <sub>2</sub> O	Acetone	CHCL <sub>3</sub>	H <sub>2</sub> O	Acetone	CHCL <sub>3</sub>	H <sub>2</sub> O	Acetone
<i>E.coli</i>	ND	10.2	10.5	8.0	ND	11.3	23.8	10.6	24.6
<i>Staphylococcus aureus</i>	3.6	15.1	18.0	ND	10.1	15.2	13.2	7.9	12.5

**IV. CONCLUSION**

The results of this present study have been showed the potentials of *M. oleifera* leaves *G. lucidum* and *Andrographis paniculata* on chloroform, acetone and aqueous extracts used contain bioactive compounds whose antibacterial potentials are higher against the gram positive and gram negative bacteria tested. The activity of *Escherichia coli* and *Staphylococcus aureus* may be suggestive of the presence of broad variety of bioactive compounds. Therefore, *M. Oleifera*, *G. lucidum* and *Andrographis paniculata* could be a capable natural antimicrobial agent with possible applications in pharmaceutical industry.

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