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Preliminary phytochemical analysis of *Andrographis paniculata* (Burm. F)

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ABSTRACT

Plants has always been an exemplary source of drugs. Many of the currently available drugs have been derived directly or indirectly from herbal sources. Herbal sources have proved to be highly effective, economical and safe alternative tool for treatment of various human diseases . *Andrographis paniculata*(kalmegh) is one of the most important medicinal plant used worldwide for its medicinal properties. The medicinal plants are known to contain several phytochemicals such as terpenes, flavonoids, alkaloids, saponins, tanins, enzymes etc. And these phytochemicals posses antibacterial, antioxidant, antiinflimatory, and anticancer properties. The present study showed the presence phenols, saponins, flavonoids, diterpenes, carbohydrates, proteins/aminoacids during the phytochemical screening of *Andrographis paniculata.*

1. Introduction

Andrographis paniculata (Burm.F) wall. ex Nees. also known as "King of Bitters" in English locally known as " kalmegh " (dark cloud) belongs to family Acanthaceae is an important medicinal plant and widely used around the world. In traditional system of medicine, *Andrographis paniculata* is widely used to get rid of body heat, dispel toxins fromthe body; prevent common cold, upper respiratory tract infectionsincluding sinusitis and fever (Gabrielian et al., 2002). The plant has been reported to exhibit various mode of biological activities as well viz., antibacterial (Singha et al., 2003 & Mishra et al., 2009), antiviral (Wiart et al., 2005), anti-inflammatory (Wen et al., 2010), anti HIV (Chao et al., 2010), immunomodulating/ immunostimulatory (Calabrase, 2000) and anticancer (Iruretagoyena et al., 2005& Li et al., 2007). The plant also showed potential therapeutic action in curing liver disorders, common cough and colds in human (Geethangili et al., 2008). *Andrographis paniculata* has been reported to encompass activities like cardioprotective (Gua et al., 1994), anti-angiogenic (Sheeja et al., 2007), upper respiratory tract infection (Saxena et al., 2010), cyclophosphamide-induced toxicity (Sheeja et al., 2006), anti-hyperglycemic, antioxidant (Zhang et al., 2000), hepatoprotective (Singha et al., 2007), hypotensive (Zhang et al., 1997), activation of TRPV4 channels (Smith et al., 2006), filaricidal (Dutta et al., 1982), induction of uterus relaxation (Burgos et al., 2001), inhibition of platelet aggregation (Thisoda et al., 2006), prevention of atherosclerotic stenosis and restenosis (Wang et al., 1994).

World Health Organisation (WHO) has defined medicinal plants as plants that contain properties or compounds that can be use for therapeutic purposes or those that synthesize metabolites to produce useful drugs (WHO 2008).Health benefits has been derived from bioactive compounds that are commonly found in edible plant parts such as fruits, flowers, leaves, roots and have been shown to confer protection against various ailments (Loganayaki et al., 2010). Interestingly, most of them are known to contain large amounts of phenolic antioxidants (Yen et al., 2002). Phytchemicals have become an intense focus of research interest because of their perceived beneficial effects for health, including anticarcinogenic, antiulcer, anti-thrombotic, anti-inflammatory, antiatherogenic, antimicrobial, immunemodulating, varodialatory, and analgesic effects. Therefore, the search for exploitation of natural antioxidants, especially of plant origin, has greatly increased in recent years (Rao et al., 2014). For example, chard extract (*Beta vulgaris* L. var. *cicla)* has been used as a hypoglycaemic agent by diabetic mellitus (DM) patients in Turkey (Balkent et al., 2000) and it has been documented that the number of similarly various phytoconstituent such as epicatechin, rutin, quercetin, nymphayol and flavonoid extracts from *Pterocarpus marsupium* have shown to possess β-cells regeneration capacity (Subash-Babu et al 2009).

2. Material and Methods

Plant material: The seeds of the plant were collected from the Vindhya Herbal Testing Laboratory and Nursery Bhopal, M.P India and were sown in the month of June under controlled conditions in pots in the mixture of sand, soil and vermicompost material. And the plants properly raised in the pots in controlled conditions were harvested and after properly washing under tap water 2 to 3 times were shade dried. The dried plant material was grinded and cold extraction was done. For extraction the whole plant of *Andrographis paniculata* is used for the phytochemical test of alkaloids, glycosides, phenols, saponins, flavonoids, and proteins/ amino acids. but for carbohydrates only leaves were used for extraction.

Preparation of extract: Cold extraction of the grinded material was done in petroleum ether and 80% methanol. And the crude extract was collected after properly filtering and evaporation of the solvents used for extraction.

3. Phytochemical Screening

Test for alkaloids:

(a)Hager test: Filtrate Was treated with Hager's reagent, presence of alkaloids confirmed by the yellow colour precipitate.

(b) Dragendroff's test: The filtrate was treated with Dragendorff's reagent and the formation of orange precipitate indicates the presence of alkaloids.

Test for carbohydrates:
Fehling test: 2ml extract were hydrolyzed with dilute HCL and neutralized with alkali and heated with Fehling's solution A and B, formation of red precipitate indicates the presence of reducing sugars.

Test for Glycosides:
Legal test: To 2ml of the extract, 1ml of pyridine and 1 ml of sodium nitro prusside were added. The change in colour pink or red indicates the presence of cardiac glycoside

Test for saponins:
Froth test: 5 ml extract was mixed with 20 ml of distilled water then agitated in graduated cylinder for 15 min formation of foam indicates Saponin.

Test for phenols:
Ferric Chloride test: Test extract were treated with 4 drops of Alcoholic FeCl3 solution. Formation of bluish black colour indicate the presence of Phenol

Test for flavonoids:
(a)Alkaline reagent test: Extract was treated with 10 % NaOH solution, formation of intense yellow colour indicates presence of Flavonoid.
(b) Lead acetate test: The extract was treated with a few drops of lead acetate solution. Formation of yellow precipitate indicates the presence of flavonoids. Orange to crimson colour shows the presence of flavonones.

Test for protein/Aminoacids:
Xanthoproteic test: Extract was treated with few drops of concentrated HNO3 formation of yellow colour indicates the presence of proteins.

Test for diterpenes:
Copper acetate test: Extract were dissolved in water and treated with 10 drops of copper acetate solution, formation of emerald green colour indicates presence of diterpenes.

Table 1:

S.No.	Secondary metabolite	Tests	Methanolic extract	Petroleum ether extract
01	Alkaloids	Hagers test. Dragondroff test.	$-ve$	$-ve$
02	Glycosides	Legal test.	$-ve$	$-ve$
03	Phenols	Ferric chloride test.	$+ve$	$-ve$
04	Saponins	Froth test	$+ve$	$-ve$
05	Flavonoids	Alkaline reagent test. Lead acetate test	$+ve$	$+ve$
06	Diterpenes	Copper acetate test.	$+ve$	$+ve$
07	Carbohydrates	Fehling test	$+ve$	$-ve$
08	Proteins/Aminoacids	Xanthoprotcic test.	$+ve$	$-ve$

4. Result and Discussion

Preliminary phytochemical analysis of Petroleum ether and methanolic extracts of *Andrographis paniculata* plants were carried outfor the evaluation of presence or absence of thephytochemicals such as alkaloids, glycosides, phenols, saponins,flavonoids,carbohydrates and proteins/ amino acids.The methanolic extracts showed the presence of phenols, saponins,flavonoids, diterpenes, carbohydrates, and porteins/ aminoacids.However, the petroleum ether extract showed only the presence of flavonoids and diterpenes.(Table – 1).

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