



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2017; 6(3): 248-251  
Received: 14-03-2017  
Accepted: 15-04-2017

**Dr. Neethu S Kumar**

Post Graduate Department and  
Research Centre of Botany,  
Mahatma Gandhi College,  
Affiliated to University of  
Kerala, Kesavadasapuram,  
Thiruvananthapuram, Kerala,  
India

**Arun S Nair**

Post Graduate Department and  
Research Centre of Botany,  
Mahatma Gandhi College,  
Affiliated to University of  
Kerala, Kesavadasapuram,  
Thiruvananthapuram, Kerala,  
India

**Megha Murali**

Post Graduate Department and  
Research Centre of Botany,  
Mahatma Gandhi College,  
Affiliated to University of  
Kerala, Kesavadasapuram,  
Thiruvananthapuram, Kerala,  
India

**Sreeja Devi PS**

Post Graduate Department and  
Research Centre of Botany,  
Mahatma Gandhi College,  
Affiliated to University of  
Kerala, Kesavadasapuram,  
Thiruvananthapuram, Kerala,  
India

**Correspondence****Dr. Neethu S Kumar**

Post Graduate Department and  
Research Centre of Botany,  
Mahatma Gandhi College,  
Affiliated to University of  
Kerala, Kesavadasapuram,  
Thiruvananthapuram, Kerala,  
India

## Qualitative phytochemical analysis of triphala extracts

**Dr. Neethu S Kumar, Arun S Nair, Megha Murali and Sreeja Devi PS**

**Abstract**

Triphala (tri = three and phala = fruits), is an ayurvedic preparation composed of three equal proportions of herbal fruits native to the Indian subcontinent: viz. Terminalia chebula, Phyllanthus emblica, and Terminalia belerica. Triphala is a tridoshic rasayana having a balancing and rejuvenating effect on the three constitutional elements that govern the human life. Triphala is rich in antioxidants, possess antibacterial, anti-viral and anti-cancer properties. Triphala is also known to cure cataract and effective in the treatment of Acquired immune deficiency syndrome (AIDS). The present study intends to provide an overview of the chemical constituents present in the crude extracts of dried powdered Triphala with special emphasis on their pharmacological actions. The powdered Triphala extracts have been screened for phytochemical constituents in five different solvents as water, acetone, chloroform, methanol and ethanol. Preliminary phytochemical analysis revealed the presence of ten compounds such as carbohydrates, tannins, steroids, terpenoids, alkaloids, flavanoids, cardiac glycosides, saponins, coumarins etc. Phytochemical analysis of the samples were more positive for acetone and ethanol extracts. The results suggest that Triphala are a rich source of valuable primary and secondary metabolites which make "Triphala" one of the most valuable herbal preparations in the world.

**Keywords:** Triphala, Ayurveda, Rasayana drug, Qualitative, Phytochemical analysis

**1. Introduction**

Ayurveda is india's traditional natural system of medicine that has been practiced for more than 5000 years and is often called "Mother of all healing". Ayurveda is a Sanskrit word that literally means "science of life" or "practices of longevity". Ayurveda was the system of health care conceived and developed by the rishis and natural scientists through centuries of observations, experiments, discussions and meditations. For several thousands of years their teachings were passed on orally from teacher to student and about the fifth to sixth century BC, elaborately detailed texts were written in Sanskrit, the ancient language of India. For many years Ayurveda flourished and was used by rich and poor in India and South-East Asia. In ayurveda, triphala is a well-known poly herbal formulation. In Indian system of medicine (ISM) it is a rasayana drug [1]. Triphala is a mixture of the dried powders of three fruits such as Emblica officinalis Garetn (Euphorbiaceae), Terminalia belerica Linn (Combretaceae) and Terminalia chebula (Combretaceae) in equal proportions. Triphala is one among the ayurvedic medicinal herbal formulation mostly preferred by medical practitioners [2]. It can be used by all people irrespective of their age. In ayurveda it is described as a tridoshic rasayana that can balance and rejuvenate the three constitutional elements that govern human life ie; vata, pitta and kapha. It has various applications in medical field like laxative, eye rejuvenator, anti-inflammatory, antiviral and so on. It is also effective in headache, dyspepsia, ascites, and leucorrhea, also used as a blood purifier and possess anti-inflammatory, analgesic, antiarthritic, hypoglycemic and anti-aging properties. Triphala is claimed to have antiviral and antibacterial effect [3]. Triphala is prescribed for fatigue, assimilation, reduces oxidative stress and infectious diseases such as tuberculosis, pneumonia, AIDS, periodontal diseases etc [4]. Triphala is reported to reduce considerably the damage due to oxidative stress [5]. Studies show that it inhibits the growth of Gram-positive and Gram-negative bacteria [6]. The recent studies prove that triphala is rich in gallic acid, vitamin C, ellagic acid, chebulic acid, bellaricanin, beta – sitosterol and flavanoids [7].

Laboratory and clinical studies on ayurvedic herbal preparations and other therapies have shown them to have a wide range of potentially beneficial effects for preventing and treating various diseases. Mechanisms underlying these effects may include free radical scavenging effects, immune system modulation, brain neurotransmitter modulation, hormonal effects etc. Development of new diseases always insist humans in need of new drugs. So since ancient times, people have been exploring nature's immense plant wealth in search of new drug and thus provided us a huge wealth of medicinal plants with versatile pharmacological properties.

Nearly 80% of the world's population relies on traditional medicines for primary health care, most of which involve the use of plant extracts [8]. In India, almost 95% of the prescriptions were plant based in the traditional systems of Unani, Ayurveda, Homeopathy and Siddha [9].

The failure of chemotherapeutics and the increasing potential of pathogens against antibiotics pressured the researchers for the screening of several medicinal plants for their eminent pharmacological activities. Phytochemistry is the study of phytochemicals, which are chemicals derived from plants. Specifically phytochemistry describes that large number of secondary metabolic compounds found in plants. In present days, secondary metabolites have been extensively investigated as a source of medicinal agents. About 1500 plants with medicinal uses are mentioned in ancient text and around 800 plants have been used in traditional medicine. A large number of secondary metabolic compounds are found in plants. Many of these are known to provide protection against plant diseases and insect attack.

Literature of many research works prove that TRIPHALA is an excellent drug with versatile medicinal property. Triphala has been described in the ancient Ayurvedic text as a Tridoshic Rasayana, a therapeutic agent with balancing and rejuvenating effects on the three constitutional elements in Ayurveda -vata, pitta and kapha. *Terminalia chebula* Retz. And *Terminalia bellerica* Roxb. Have a warm energy, while *Embllica officinalis* Gaertn. Is cool in nature. Triphala, being a combination of all three, is therefore balanced, making it useful as an internal cleansing, detoxifying formula. It is regarded as an important Rasayana and good purgative in Ayurvedic medicine. Recipe for this traditional herbal supplement is described in the traditional Indian texts, the Charaka and Susruta Samhita.

## Materials and Methods

### Collection and extraction of specimen

The Ayurvedic drug selected for the present study is Triphala. Triphala powder was purchased from local Arya Vaidyasala Kottaykkal chirayinkeezhu. The dried powdered samples were then extracted with five different solvents such as water, acetone, chloroform, methanol and ethanol. For aqueous extraction, ten grams of the triphala powder were mixed with 100ml of distilled water, boiled for two hours and filtered. Whereas acetone, chloroform methanol and ethanol extracts were prepared by mixing ten grams of powdered samples with 100ml of each solvent separately in a mechanical shaker for 48 hours at room temperature. Extracts were filtered, concentrated, dried and stored in the refrigerator at 4 °C for further use.

### Qualitative analysis of phytochemicals

The prepared test extracts were analyzed for the presence of alkaloids, glycosides, saponins, fixed oils, phytosterols, phenols, flavonoids, gum, mucilages etc [10]. The presence of phytochemicals extracted in different solvents was confirmed by standard protocols.

### Test for carbohydrates

- **Molish's test:** To two ml of molish's reagent, 2ml of extracts were added and shaken well. To this another 2ml of concentrated sulphuric acid was added carefully through the sides of the test tube. Appearance of a reddish violet ring at the junction of the two layers indicate the presence of carbohydrates.
- **Test for tannins:** To the extracts, a few drops of 10%

ferric chloride solution were added. Appearance of a green or blue colour indicates the presence of tannins.

- **Test for steroids:** Leaf extracts were mixed with 1 ml of chloroform and 2-3 drops of conc. H<sub>2</sub>SO<sub>4</sub> were added to it. Appearance of a pink or red colour indicate the presence of steroids.
- **Test for terpenoids (Salkowski test):** Five ml of the extracts were mixed with 2ml of chloroform and 3ml of conc. H<sub>2</sub>SO<sub>4</sub> solution. A reddish brown colour at the interphase indicate the presence of terpenoids.
- **Test for alkaloids (Mayer's test):** Extracts were treated with mayer's reagent (potassium mercuric chloride). Formation of a yellow coloured precipitate indicates the presence of alkaloids.
- **Test for flavanoids:** The extracts were treated with conc. H<sub>2</sub>SO<sub>4</sub> and formation of a yellowish orange colour indicate the presence of flavanoids.
- **Test for proteins (Xanthoprotein test):** To the leaf extracts 20% NaOH solution were added and the formation of an orange colour confirms the presence of proteins which is characteristic for ammonia formation.
- **Test for cardiac glycosides (Keller-killani test):** Five ml of test extracts were treated with 2ml of glacial acetic acid containing 2-3 drops of ferric chloride solution and 1ml of conc. H<sub>2</sub>SO<sub>4</sub> solution. Appearance of a green ring initially which first turns violet and then to brown at the interphase indicates the presence of cardiac glycosides.
- **Test for fixed oils:** Two drops of extracts were pressed between two filter papers. Appearance of an oil strain on the filter paper indicates the presence of cardiac glycosides.
- **Test for saponins (Foam test):** Two ml of the extracts were diluted with 20ml of distilled water, shaken vigorously and was observed for a stable persistent froth.
- **Test for phenolic compounds (Ferric chloride test):** Two ml of diluted extracts were treated with dil. FeCl<sub>3</sub> solution. Appearance of a violet colour indicate the presence of phenol like compounds.
- **Detection of coumarins:** To the test solution were added a few drops of alcoholic sodium hydroxide solution. Appearance of an intense yellow colour on an addition of concentrated HCl indicate the presence of coumarins.
- **Test for amino acids (Ninhydrin test):** Two drops of ninhydrin solution (10mg of ninhydrin in 200ml of acetone) were added to 2ml of aqueous filtrates. A characteristic purple colour indicate the presence of amino acids.
- **Test for gum and mucilage:** To 100ml of each extract added 10ml of distilled water. To this 25ml of absolute alcohol was added with constant stirring. Appearance of a cloudy precipitate indicates the presence of gum and mucilage.

## Result

### Phytochemical screening

Phytochemicals have been found to possess a wide range of activities, which may help in protection against chronic diseases. The Triphala powdered extract have been screened for phytochemical constituents in five different solvents such as water, acetone, chloroform, methanol and ethanol. Preliminary phytochemical analysis revealed the presence of total 11 compounds such as carbohydrates, tannins, steroids, terpenoids, alkaloids, flavanoids, cardiac glycosides, oils, saponins, coumarins, gum and mucilage (Table 1). Phytochemical studies of all the five different extracts

conclude that acetone and ethanol extracts of test samples had more positive results for carbohydrates, tannins, steroids, cardiac glycosides, coumarins, flavonoids, proteins, alkaloids and phenolic compounds. Primarily phenolic compounds are of great importance as cellular support material because polymeric phenols form the integral part of the cell wall structure [11]. Bioactive polyphenols have attracted special attention because they can protect the human body from the oxidative stress which may lead to many diseases including

cancer, cardiovascular problems and ageing [12].

Traditionally saponins have been extensively used as detergents, pesticides as well as molluscicides, in addition to their industrial application such as foaming, surface active agents etc. and also found to have beneficial health effects [13]. The role of tannins is to protect from predation, pesticides and also in plant growth regulation. Previous studies by various other workers prove that flavanoids provide health benefits through cell signaling pathways and antioxidant effects.

**Table 1:** Showing Phytochemical screening of Triphala extracts

Tests Conducted	Solvents Used				
	Water	Acetone	Chloroform	Methanol	Ethanol
<b>Detection Of Carbohydrates</b>					
Molisch's Test	+	+	-	-	-
Test For Tannins	+	+	-	+	+
Test For Steroids	-	+	+	+	+
<b>Test For Terpenoids</b>					
Salkowski Test	+	+	+	+	+
<b>Detection Of Alkaloids</b>					
Mayer's Test	+	-	+	+	+
Detection Of Flavonoids	+	+	-	-	+
<b>Detection Of Proteins</b>					
Biuret Test					
Xanthoprotein Test	-	+	+	-	+
<b>Test For Cardiac Glycosides</b>					
Keller Killani Test	-	+	-	-	-
Test For Fixed Oils	-	-	-	-	-
<b>Test For Saponins</b>					
Foam Test	+	+	-	+	+
<b>Test For Phenolic Compounds</b>					
FeCl <sub>3</sub> Test	-	+	-	+	+
Detection Of Coumarins	+	+	+	+	+
<b>Test For Aminoacids</b>					
Ninhydrin Test	-	-	-	-	-
Test For Gum And Mucilage	-	-	-	-	-

## Conclusion

Medicinal plants were the potent source of human health due to the presence of active phytochemical components that are responsible for its various pharmacological activities. On the basis of the results obtained, the present work conclude that the test extracts of Triphala powder are rich in phytochemical constituents even though the screening of the samples had shown variation in their phytochemical constituents with the presence and or absence of some components. The study reveals that the results of extraction yield, total phenol and flavanoid compounds and bioactivity tests varied depending upon the type of solvent being used. Most components were present in acetone and ethanol extracts. The presence of various secondary metabolites such as glycosides, phytosterols, alkaloids, oils, saponins, phenols and flavanoids were believed to exhibit the antibiotic properties of Triphala and confirmed their antimicrobial efficacy against selected pathogens. The test samples were found to be suitable in the elucidation of bioactive components which could be used effectively in the treatment of several ailments. It would not be surprising therefore to use the plant samples to cure certain types of illness in humans and animals. This obtained information will be helpful as a primary platform for further phytochemical and pharmacological studies.

## Reference

1. Govindarajan R, Vijaykumar M, Pushpangadan P. Antioxidant approach to disease management and the role of Rasayan herbs of Ayurveda; Journal of

Ethnopharmacology. 2005; 99:165-178.

- The Ayurvedic Formulary of India, Part –II, Department of Indian System of Medicine and Homeopathy, New Delhi, 2002.
- Hozumi T, Oyama H. Crude drugs for treating AIDS, Japan Kokai Tokkyo Koho JP. 1997; 09:87-185.
- El-Mekkaway M, Merelhy M. Inhibitory effects of Egyptian folk medicine on Human Immunodeficiency Virus (HIV) reverse transcriptase. Chem. Pharm. Bull. 1995; 43:641-648.
- Srikumar R, Parthasarathy N, Manikandan S, Narayanan G, Sheeladevi R. Effect of Triphala on Oxidative stress and on cellmediated immune response against noise stress in rats. Molecular Cell Biochemistry. 2006; 283:67-74.
- Biradar YS, Jagatap S, Khandelwal KR, Singhania SS. Exploring of Antibacterial activity of Triphala Mashī- an Ayurvedic Formulation, evid Based complement, Alternat Medicine. 2008; 5:107-113.
- Jagetia GC, Baliga MS, Malagi KJ, Settukumar KM. The evaluation of the radioprotective effect of Triphala (an Ayurvedic rejuvenatingdrug) in the mice exposed to gamma-radiation. Phytomedicine. 2002; 9:99-108
- Sandhya B, Thomas S, Isabel W & Shenbagarathai R. Ethnomedicinal Plants used by the Valaiyan Community of Pairanmalai Hills (Reserved Forest), Tamilnadu, India- A Pilot Study. African Journal of Traditional, Complementary and Alternative Medicines. 2006; 3(1):101-114.

9. Sathyavati GV, Gupta AK, Tandon N. Medicinal plants of India, Indian Council of Medical Research, New Delhi, India. 1987.
10. Harborne JB. Phytochemical methods, London, Chapman and Hills. 1998.
11. Gupta VK, Singh GD, Singh S, Kaul A. Medicinal Plants: Phytochemistry, Pharmacology and Therapeutics, Daya Publishing House, Delhi. 2010.
12. Robards K, Prenzler PD, Tucke G, Swatsitang P, Glover W. Phenolic compounds and their role in oxidative processes in fruits. Food Chemistry. 1999; 66:401-436.
13. Arunasalam JK. Saponins from edible legumes: Chemistry, processing and health benefits J. Med. Food. 2004; 7:67-78.