Research Article

The Antioxidant Study of an Ayurvedic Medicine, Balarishtam

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Received: 13-07-2016; **Revised:** 30-11-2016; **Accepted:** 18-12-2016.

ABSTRACT

Balarishtam is an Ayurvedic formulation used for the treatment of diseases caused due to Vata imbalance such as brain related dysfunctions. The present study deals with the antioxidant activities such as DPPH assay, FRAP assay and Hydrogen Peroxide Scavenging Activities of Balarishtam. The results indicated that Balarishtam has very good antioxidant properties which could be one of the mechanisms responsible for the treatment of such diseases.

Keywords: Balarishtam, DPPH, FRAP, Hydrogen Peroxide Scavenging, Antioxidant.

INTRODUCTION

Ayurveda and sidha are traditional medical practices of India which are an age old and time tested modes of treatment.

Modern medical practice is beset with problems like, Adverse Drug Reactions (ADR), major side effects and multidrug resistant pathogenic (MDR) strains.

Thus there is an urgent need to re-evaluate the traditional medical systems to come to rescue for the safe treatment of mankind.

The traditional systems of medicine are good candidates to serve the purpose being safe, more natural, easily available and affordable. But this system requires thorough efficacy evaluation in the light of modern medical standards and parameters to prove or disprove the claims that they are safe with less side effects. It is heartening that since last decade or two many reports in this regard have come and this is welcome sign.[1-5]

Balarishtam is an Ayurvedic preparation made out of nine different plants and jaggary and is used for the treatment of diseases caused due to Vata imbalance in the body, like neuralgia, hemiplegia, paraplegia, arthritis, spondylosis etc. and works as a nerve tonic.

This is also used for strengthening muscles and bones.

This medicine finds reference in the Ayurvedic treatise, Bhaishaja Ratnavali Vatavydhi-569-572.

Balarishtam is taken 12-24 ml once or twice daily after food or as per the advice of prescribed Ayurvedic medicine practitioner.

Balarishtam ingredients: Balarishtam is prepared by the following ingredients.

Bala (*Sida cordifolia*) – root / whole plant – 4.8 kg

Ashwagandha (*Withania somnifera*) – root – 4.8 kg

Water for decoction – 49.152 liters, boiled and reduced to 12.288 liters.

Jaggery – 14.400 kg

Dhataki (*Woodfordia fruticosa*) – flower – 768 g

Payasya (*Ipomea digitata*) – – root /whole plant 96 g

Eranda (*Ricinus communis*) – root – 96 g

Rasna (*Pluchea lanceolata*) – root -48 g

Ela (Cardamom) (*Elettaria cardamomum*)– 48 g

Prasarini (*Paederia foetida*) – root – 48 g

Usheera (*Vetiveria zizanioides*) – 48 g

Gokshura (*Tribulus terrestris*) – whole plant / fruit – 48 g

Method of Manufacturing

Coarse powders of Bala and Ashwagandha are added to water, boiled and filtered. To this Kashayam, jaggery is added, filtered for impurities. Rest of the ingredients is added and kept closed in an air tight container for a month time.

After fermentation, the liquid is filtered and stored in air tight container. The standard manufactures of Balarishtam are Dabur, Baidyanath, Arya vaidya Sala, AVP etc.

Although it is a standard medicine, not much scientific documentation about its efficacy in terms of pharmacology, pharmacokinetics, toxicology etc. is available.

Rajalakshmy and Sindhu, 2011, have reported the primary phytochemical and antioxidant activity of Balarishtam.[6] Tiwari, 2014 has given a comparative account of the antihyperlipidemic activities of Balarishtam prepared by traditional and modern methods.[7] The present study deals with the antioxidant activity of Balarishtam by some standard methods. This is the first step of our work to prove the scientific efficacy of this medicine.

A general account of the medicinal values of constituent ingredients plants of Balarishtam is mentioned below.

Bala (*Sida cordifolia*)

This is known as Bala in Ayurvedic literature and is supposed to control all the three doshas namely, Vata, Pitta and Kapha, although it works predominantly on Vata. This plant contains Ephedrine, hypaphorine, vasicinone, choline, betaine, phytosterol etc. and the roots are rich source of β- sitosterols, known for their immunomodulatory role.

Sharma, 2013 and Jain have reviewed the medicinal values of this plant.[8,9] The CNS pharmacological effect of *Sida* extracts was reported by Franco.[10] Its anti-inflammatory and analgesic activities were studied by Franzotti.[11] Mediros have studied the role of *Sida* on the cardiovascular system.[12] Sharma have worked on the hepato-protective activity of *Sida cordifolia*.[13]

Aswagandha (*Withinia somnifera*)

This is considered to be a wonder drug in Ayurveda for its numerous medicinal values. It has activities like immunomodulatory, cardioprotective, anticancer and as a rasayana (rejuvenenant).[14-21]

Dhataki (Woodfordia fruticosa)

It was reported by Dubey that the presence of therapeutically potent antimicrobial compounds against MDR bacteria in *Woodfordia fruticosa* and the crude leaf extract had no host toxicity on human lymphocytes.[22]

The n-butanol fraction of the extract was the most suitable bio-active fraction. The terpenes isolated were, phenol, 5-methyl-2-(1-methylethyl)-, phenol, 2-methoxy-4-(2-propenyl)-, 2, 6-octadien-1-ol, 3, 7-dimethyl-(E)-, 2, 6-octadienal, 3, 7-dimethyl-, cyclohexanol, and 2-methylene-5-(1-methylethenyl).

The leaves have sedative properties and the juice of its fresh flowers, when applied on the head, supposed to reduce headache.

The curative properties of *Woodfordia* are due to the presence of secondary metabolites like alkaloids, flavonoids, glycosides, phenols, saponins, sterols etc. Grover and Patni, 2013 have identified 21 compounds in the GC MS analysis of *Woodfordia* leaf extracts with important medicinal properties.[23]

Payasya or Vidari *(Ipomea digitata)*

This plant is reported to have activities like hypolipidemic, cardoprotective, and antidiabetic. The root is used by natives for gynecological disorders.[24-26]

Erand *(Ricinis communis)*

The oil of Erand is commonly used in India as purgative for children and also as lamp oil. The medicinal role of Erand has been reported by many researchers. Rachhadiya have reported the cytoprotective role of the oil of Erand on gastric mucosa thus reducing the risk of ulcer formation.[27] Castor oil is shown to have lypolytic, antidiabetic, antibacterial, anti-inflammatory, wound healing, hepatoprotective and antioxidant activities.[28-37] Darmanin have reported the cytotoxic and apoptotic activity of castor.[38]

Rasna (*Pluchea lanceolata)*

It was observed that *Pluchea lanceolata* is a very good antioxidant and immunosuppressant.[39,40]

Ela *(Elettaria cardamomum)*

Cardamom is another important culinary ingredient used for its characteristic aroma. Apart from the aroma it has medicinal value. Verma have reported blood pressure lowering, fibrinolysis enhancing and antioxidant activities of Cardamom.[41] Khan have shown the pharmacological basis of cardamom as medicine for asthma.[42]

Prasarini *(Paederia foetida L.)*

This plant is reported to have antimicrobial, thrombolytic, cytotoxic and antidiabetic activities.[43-45] The leaf extracts showed protective effect on induced colitis in animal model (Das).[46]

Usheera - Vetiver *(Vetiveria zizanoides)*

Vetiveria zizanoides is a densely tufted grass. Vetiver oil is supposed be have a nerve relaxant reducing mental stress. Chemical components of *Vetiveria* roots have very high fungicidal, bactericidal and insecticidal properties.[47-50] The oil is reported to be carminative in flatulence, colic and obstinate vomiting. It is regarded as a stimulant, diaphoric, refrigerant, astringent and antimicrobial. When applied externally it removes excess heat from the body and gives cooling effect. The decoction of the roots is believed to dissolve kidney stones and the paste made from pounded fresh roots is considered as an abortifacient. Medicinally this plant oil is reported to be used as a carminative in flatulence and colic, as antipyretic and as anthelmintic.[51-52] Bhushan and Sharma in their reviews have described the various medicinal properties of *V. zizanoides*.[53,54]

Gokshura (*Tribulus terrestris*)

Tribulus is known as Gokshura in Ayurveda. It is an ancient herb with immense medicinal qualities. *Tribulus*, in modern day, is used for body building, to relieve diseases of uro-genital system and as an aphrodisiac. Fatima have elaborated in their review on the various pharmacological activities of *Tribulus*[55]. This plant has various medicinal applications such as diuretic, antitumor, antibacterial and antifungal, antioxidant and hypoglycemic.[56-61]

MATERIALS AND METHODS

Balarishtam was procured from standard Ayurvedic shop from Chennai. Antioxidant studies, namely, DPPH assay, FRAP assay, Hydrogen Peroxide scavenging activity assay and were conducted by standard methods.

Antioxidant Study

Antioxidant study was performed by **DPPH Assay, FRAP Assay and Hydrogen Peroxide Scavenging Activity assay.**

DPPH Assay (1,1-diphenyl-2-picrylhydrazyl) (Blios, 1958)[62]

The sample was dissolved in Ethanol in 1mg/ml concentration and used as stock. From the stock, various concentrations (100, 200, 300, 400mg) were taken for further analysis.

Respective solvents were taken as negative control.

Conc. = Concentration of the sample

OD = OD of the sample

Neg. Control = The Solvent

Activity = Neg. Control – OD / Neg. Control

% of Activity = Activity/100

IC50 = 50 – c value / m value

IC50/ml = IC50/3 (3 ml of DPPH for the assay. To find the activity in 1 ml, the value had been divided by 3).

FRAP Assay (Ferric Reducing/Oxidant Power) (Pulido, 2000)[63]

Balarishtam was dissolved in Ethanol. Triplicates had been put for all the Processes.

Conc. = Concentration of the sample

OD = OD of the sample

Linearity (y) = mx + c

M = Slope

C = The point x crosses y axis

X = OD – c value / m value

mM Fe/mg = X value / concentration x 1000

Mean = Average of mM Fe/mg

STDEV = Standard Deviation for mM Fe/mg.

Hydrogen Peroxide Scavenging Activity (Ruch 1989)[64]

Balarishtam was dissolved in Ethanol.

Triplicates had been put for all the Processes.

Conc. = Concentration of the sample

OD = OD of the sample

Neg. control = The solvent

Activity = Negative control – OD / Negative control

% of activity = Activity / 100

Mean = Average of % of Activity

STDEV = Standard Deviation of % of Activity

Graph = (For Mean of % of Inhibition vs samples) Drawn using 2D clustered column.

RESULTS AND DISCUSSION

Table 1: Indicates the Results of DDPH Assay with Ethanol for Balarishtam

S. No.	Solution	Conc.	OD	Neg. Control	% Activity	m value	C value	IC50	IC50/ml
1	Ethanol	100	0.506	0.989	48.83721	0.1221	3.1951	383.3325	127.7775
2		200	0.370		62.58847				
3		300	0.350		64.81072				
4		400	0.213		78.46309				

From the results it shows that IC50/ml was lowest value (127.7775) indicating highest activity.

FRAP test Results are mentioned in Table 2.

Table 2: Indicates the FRAP Assay Patterns of Balarishtam in Ethanol Solution

Solvent	Conc.	OD	M Value	C Value	mM	Fe(II)/mg	Mean	STDEV
Ethanol	10	0.278	0.0274	0.1086	6.182482	61.8248152		
	10	0.267	0.0274	0.1086	5.781022	57.8102689		
	10	0.256	0.0274	0.1086	5.379562	53.7956204	57.81	4.01

From the Table 2 It is clear that ethanol solution of Balarishtam indicated antioxidant activity (57.81).

Hydrogen peroxide scavenging assays results of Balarishtam are mentioned in Table 3.

Table 3: Indicates the Hydrogen Peroxide Scavenging Activity of Balarishtam

Solvent	Conc.	OD	Neg. Control	% Activity	Mean	STDEV
Ethanol	100	0.587	0.748	21.52406		
	100	0.487	0.748	34.89305		
	100	0.429	0.748	42.64706	33.02	10.69

From Table 3 it is clear that Balarishtam has antioxidant activity as averaged to 33.02 % with regard to Hydrogen peroxide scavenging along with other medicinal functions.

The antioxidant results of Balarishtam obtained in this report conforms to such activities by the constituent plant parts. It is a known fact that the role of Reactive Oxygen Species in the manifestation of a disease is very high.

The ROS is generated in the body due to a number of reasons like life style, eating habits, lack of proper exercise, intoxication, pollution, allergies etc. It is thus quite obvious to have high amounts of ROS in the body. Balarishtam seems to play a vital role in reducing the ROS in the body, as suggested in this report, which could be one important mechanism of cure of diseases for which this medicine is prescribed.

CONCLUSION

From the results obtained it could be concluded that Balarishtam has very good antioxidant activity which could be one of the curative properties of this medicine. Further work to understand the mechanism of action is needed.

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Source of Support: Nil, **Conflict of Interest:** None.