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PHYTOCHEMICAL ANALYSIS (QUALITATIVE) OF *BALABILVASHUNTI* DECOCTION

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ABSTRACT

The medicinal plants are useful for preventing as well as curing of human diseases, because of the presence of phytochemical constituents. Each and every part of the herbs is fully utilized for the different pharmacological action they may produce and made into a range of herbal preparations. The *Balabilvashunti* decoction is an herbal preparation consists of three ingredients of Rhizome of *Zingiber officinale* and roots of *Sida alnifolia* and *Aegle marmelos*. The aim of this study was to analyze the presence or absence of different phytochemicals in the *Balabilvashunti* decoction. The decoction was prepared as per the method mentioned in *Sharangadhara Samhitha* and obtains the extracts. The extract was subjected to qualitative phytochemical screening using standard procedures. The results revealed the presence of Alkaloids, Flavonoids, Saponins, Tanins and Phenolic Compounds, Terpenoids and Steroids in *Balabilvashunti* decoction. The presence of various metabolites was believed to exhibit the Anti-inflammatory action, Neuro protective nature (Anti-cholinesterase and Anti-oxidative), Anti hyperglycemic effect, Pain killers, Anti-spasmodic and confirmed their antimicrobial efficacy against selected pathogens etc. The results confirmed that *Balabilvashunti* decoction is a rich source of valuable primary and secondary metabolites which make it one of the most valuable herbal preparations in management of various diseases as mentioned in authentic Ayurveda texts.

Keywords: *Balabilvashunti* Decoction, Traditional medicine, Phytochemicals

INTRODUCTION: Sri Lanka has a rich history of its own Sri Lankan medical system consisting of *Ayurveda*, *Unani*, *Siddha* and *Deshiya Chikitsa*, where these plant resources are used as remedies for the diseases. *Ayurveda* and *Deshiya Chikithsa* systems use mainly plant and herbal preparations for the treatment of diseases- the former uses about 2000 species, the latter about 500[1]. The plants are used singly or as mixtures. The term "herbal drug" determines the part/parts of a plant (leaves, flowers, seeds, roots, barks, stems, and etc.) used for preparing medicines. Each and every part of the herbs are fully utilized for the different pharmacological action they may produce and made into a range of herbal preparations including *Kwatha* (Decoction), *Phanta* (Hot infusion), *Hima* (cold Infusion), *Arka* (Liquid Extract), *Churna* (Powders), *Guggul* (Resins and balsams), *Thaila* (Medicated oil) and etc.

Nearly 80% of the world's population relies on traditional medicines for primary health care, most of which involve the use of plant extracts. 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[2].

Balabilvashunti decoction is a well-known poly herbal formulation composed of rhizome of *Zingiber officinale*, roots of *Sida alnifolia* and roots of *Aegle marmelos*

composed in equal proportions. *Balabilvashunti* decoction is one among the medicinal herbal formulation mostly preferred by medical practitioners. Authentic Ayurveda texts like *Deshiya Chikithsa Samgrahaya*[3], *Deshiya Aushadha Samgrahaya*[4], *Sarasankshepaya*[5] and *Kashaya sagaraya*[6] have mentioned it along with the therapeutic indications.

Due to the scientific advancement today, more and more pharmacologically active ingredients of the herbal medicines as well as their usefulness in drug therapy have been identified. Basically, it is the phytochemical constituents in the herbals which lead to the desired healing effect, such as Alkaloids, Flavonoids, Saponins, Tanins and Phenolic Compounds, Cardiac glycosides, Carbohydrates, Amino Acids, Anthraquinone glycosides, Terpenoids and Steroids. A single herb may even contain more than one of the aforementioned phytochemical constituents, which works synergistically with each other in producing pharmacological action. Phytochemicals play a vital role against number of diseases such as asthma, arthritis, cancer etc. unlike pharmaceutical chemicals these phytochemicals do not have any side effects. Since the phytochemicals cure diseases without causing any harm to human beings these can also be considered as "man- friendly medicines".

Phytochemists study phytochemicals by first extracting and isolating compounds from the origin plant, followed by defining their structure for testing in laboratory model systems, such as cell cultures, in vitro experiments, or in vivo studies using laboratory animals. Challenges in that field include isolating specific compounds and determining their structures, which are often complex and identifying what specific phytochemical is primarily responsible for any given biological activity.

Numerous research works have conducted for phytochemical analysis on most of the medicinal herbs as a single herb. But very few research works were conducted on phytochemical analysis on compound preparation of Ayurveda medicine like decoctions (*Kashaya*), pills (*Guli*), pastes (*Kalka*), Powders (*Churna*) etc. which are mostly used in Traditional medical practices. So there is a special requirement to identify the presence of phytochemical in compound Ayurveda medical formula to prove their medicinal values scientifically. As water extraction being the easiest way of phytochemical screening and easy availability as well as without having any controversial ingredients and widely prescribed for various ailments, the *Balabilvashunti* decoction has been selected as the research drug in this research.

MATERIALS AND METHODS

- Raw materials were collected from Colombo city (6∘ 55'54.98" N x 79∘ 50' 52.01" E) Western province, Sri Lanka, and authenticated by the National Herbarium of *Peradeniya,* Sri Lanka. (Annexure-01)
- Prepared the *Balabilvashunti* decoction in the Institute pharmacy as the method mentioned in the *Sharangadhara Samhitha*[7] under the supervision of the supervisor of the *Dravya guna vignana* department.
- One *pala* (60g) of coarsely powdered drugs was boiled with 16 parts (3840ml) of water in an earthen pot, over a mild fire till the liquid was reduced to 1/8 (480ml) of the original quantity.
- The decoction was filtered using muslin cloth. The filtrate was then evaporated under reduced pressure and dried us-

ing a rotary evaporator at 40° C. Finally the crude was taken into vials, labeled and was stored in a freezer at - 4° C in the refrigerator, till further use.

- Prepared the Aqueous solution (test Solution) by 1g of the test sample was dissolved in 100ml of distilled water and 10 mg/ml aqueous solution was prepared.
- Phytochemical screening was conducted as described by Harbone Plant Analysis Method[8]

Tests for Alkaloids: Three tests for Alkaloids such as Mayer's test, Hager's test, and Wagner's test were performed.

Mayer's Test: Few drops of the Mayer's reagent were added to the 2 ml of Test Solution. The appearance of pale yellow/ white colour precipitate proves the presence of alkaloids.

Hager's Test: Few drops of the Hager's reagent were added to the 2 ml of Test Solution. The appearance of pale yellow precipitate proves that alkaloids are present.

Wagner's test: Few drops of the Wagner's reagent were added to the 2ml of Test Solution. The appearance of brown colour precipitate proves that alkaloids are present.

Tests for Tanins and phenolic compounds: Ferric chloride test and Lead Acetate test were performed to prove the presence of Tanins and phenolic compounds.

Ferric Chloride Test: Few drops of 10% $Fecl_3$ were added to 2 ml of Test Solution. A deep blue/ dark green precipitate proves the presence of Tanins and phenolic compounds.

Lead Acetate Test: Few drops of 10% w/v Lead Acetate solution were added to 2 ml of Test Solution. A bulky white precipitate proves the presence of Tanins and phenolic compounds.

Tests for Flavonoids: Ammonia test and Lead Acetate test were performed to prove the presence of Flavonoids

Ammonia Test: To 2ml of Test Solution, 2ml of dilute Ammonia (10%) and a few drops of conc.H_2SO_4 were added. A yellow orange colour comes and disappear after sometimes indicates presence of Flavonoids.

Lead Acetate Test: Few drops of 10% w/v Lead Acetate solution are added to 2 ml of Test Solution. Bulky white precipitate proves the presence of Flavonoids.

Tests for Amino Acids

Ninhydrine Test: 1ml Ninhydrine solution was added to 2 ml of Test Solution and then heated for 2 minutes in a water bath. If a blue or violet colour solution is obtained confirm the presence of Amino acids.

Tests for Cardiac Glycosides:

Keller kiliani Test: A few drops of Glacial Acetic Acid and a few drops of conc. H_2SO_4 and trace amount of $Fecl_3$ were added to 2 ml of Test Solution. Upper layer turns to greenish colour with reddish brown colour ring at the interface. This test proves the presence of Glycosides.

Tests for Saponins:

Foam Test: 5 ml Aqueous solution (test solution), was shaken vigorously until form a stable persistent foam, confirm the Saponins.

Tests for Terpinoids and Steroid:

Salkowski Test: To 2ml of aqueous solution (test solution), 1ml of conc. H_2SO_4 was added. Red colour in lower layer indicates presence of steroids and yellow colour lower layer indicates the triterpenoids. Each test was done in triplicate to confirm the findings.

OBSERVATIONS AND RESULTS

The results of phytochemical analysis of water extracts of *Balabilvashunti* decoc-

tion were confirmed by triplicate and compared with the blank/test sample. The results showed a remarkable variation in each test.

Alkaloids : The presence of Alkaloids was confirmed by two tests, i.e. Hager's test and Wagner's test, but not confirm by Mayer's Test. (Figure No. 1, 2 &3)

Tanins and Phenolic Compounds: The presence of Tanins and Phenolic Compounds was confirmed by Lead Acetate Test but not by Fecl3 Test (Figure No.4 &5)

Flavonoids : The presence of Flavonoids was confirmed by Lead Acetate Test but not by Ammonia Test. (Figure No. 6 & 7)

Saponins: The presence of Saponins was confirmed by Foam Test. (Figure No.8)

Terpenoids and Steroids : The presence of Terpenoids and Steroids was confirmed by Salkowski Test. (Figure No.9)

Amino Acids, Carbohydrates, Anthraquinone glycosides and Cardiac glycosides: The presence of other phytochemicals i.e. Amino Acids, Carbohydrates, Anthraquinone glycosides and Cardiac glycosides was not confirmed by any test. (Figure No. 10, 11, 12 & 13)

DISCUSSION: The *Balabilvashunti* decoction can be used in various therapeutic indications such as *Jwara, Gulma, Arshas, Vata Roga, Aruchi, Vamana, Hikka, Shiro Roga, Prameha, Thoda, Suptha Vata, Guda Vata, Mahavata, Garba* etc. as mentioned in various Ayurvedic text books.

Considering the ingredients of the decoction *Bala, Bilva* and *Shunti*, significantly contribute in the above mentioned therapeutic indications as mentioned below. *Bala (Sida alnifolia)* can be used in many *vata* diseases like *Pakshaghata, Ardhita, Gudrasi and Shirasula, Manyasthamba, Raktarshas, Raktapitta, Hrda Daurbalya, Mutra Kruchcha, Shukrameha, Swetapradara, Jwaraghna, Ojowardhaka, Balya*[9]. *Bilva* (*Aegle marmelos*) used in constipation, *Ajeerana, Amajwara, Vamana, Kamala, Hrdayadaurbalya, Daha, Amashula, Atheesara, Agnimandya, Pravahikagrahani*[10]. *Shunti (Zingiber officinale)* used in indications such as *Aruchi, Hrullasa, Adhmana, Ajeerana, Koshtavatha, Vamana, Agnimandya, Peenasa, Swasa, Kasa, Hikka*[11].

Basically, it is the phytochemical constituents in the herbals which lead to the desired healing effect. According to the test results proved the presence of Alkaloids, Flavonoids, Saponins, Tanins and Phenolic Compounds, Terpenoids and Steroids. Phytochemical constituents work synergistically with each other in producing pharmacological actions. They are primarily responsible for any biological activity and therapeutic indications. This is how each and every single herb in the decoction contributes in management of various diseases as mentioned in Ayurveda authentic texts.

Further to these observations various research works proved the presence of various phytochemicals in these single herbs.

A research work on *Zingiber officinale Roscoe* proved the presence of Steroids, Triterpenoids, Cardiac Glycosides, Alkaloids, Saponins, Flavonoids, Polyphenols, Tanins, Carbohydrates, Amino Acids, Proteins[12]. Another research work conducted by Shipra Bhargawa and others shows that the presence of Steroids, Terpenoids, Alkaloids, Saponins, Flavonoids, Tanins, Phlobotannins in *Zingiber officinale Roscoe*[13]. Flavonoids, Alkaloids and Terpenoids phytochemicals were found in *Aegle marmelos* extract[14]. Another re-

search work reported to have number of coumarins, alkaloids, steroids, and essential oils. Roots and fruits contain coumarins such as scoparone, scopoletin, umbelliferonemarmesin and skimming Fruits in addition contain xanthotoxol, imperatorin and, alloimperatorin and alkaloids like aegelinemarmelline. It also contains polysaccharides like galactose, arabinose, uronic acid and L-rahaminose which may obtain after hydrolysis[15]. Phytochemical Analysis of various species of *Sida* plants were observed in the research work conducted by M. D. Ajitha bai and others[16].

Most of the research works confirmed that the presence of various subtypes of same phytochemical based on their structural or chemical differences. For example Alkaloids have been classified into a total of 27 structural types, with 22 of these types found in higher plants[17]. Over a 25 year period, one phytochemical survey evaluated more than 4000 species of higher plants. As a result, approximately 500 alkaloids were identified, including 200 new alkaloids[18]. Plants may possess both kinds of phenolic compounds in free form as well as bound phenolics as complex molecules. The presence of bioactive compounds significantly varies according to agro-climatic conditions[19]. Flavonoids can be classified into different groups, such as anthocyanidins, chalcones, flavonols, flavanones, flavan-3-ols, flavanonols, flavones, and isoflavonoids. Furthermore, flavonoids can be found in plants in glycoside-bound and free aglycone forms. The glycoside-bound form is the most common flavone and flavonol form consumed in the diet. This may be the reason for getting the variations of test results of this study.

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. Based on the results obtained by the present research work concludes that the water extracts of *Balabilvashunti* Decoction are rich in some phytochemical constituents. The presence Tanins, Saponins, Flavonoids, Alkaloids, Terpenoids and Steroids were believed to exhibit the Anti-inflammatory, Neuro-protective (Anti-cholinesterase and Anti-oxidative), Anti hyperglycemic effect, Pain killers, Anti-spasmodic and confirmed their antimicrobial efficacy against selected pathogens. The authors are suggested to do further research works like antioxidative, anti-microbial and anti- inflammatory studies to prove these effects.

REFERENCES

1. Weragoda PB, The traditional system on medicine in Sri Lanka, An Abstract J Ethnophamacol. 1980 Mar;2(1):71-73

2. Sandhya B and others, 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

3. Pranacahrya panditha Aryadasa Kumarasinghe, *Deshiya Chikithsa Samgrahaya, Gulma Chikithsa*, 1984 Part I, P 725

4. *Ayurveda* Pharmacopeia, *Kwathatharala saraya:* Colombo, Sri Lanka, Department of Ayurveda, 2006, Volume I, Part I, P 95.

5. Raja guru shri Chandra, Sarasankshepaya, Ayrveda Department Colombo, Dr Aryadasa kumarasighe, P 279

6. Kodikara SS, *Kashaya sagaraya, Gulma Roga Kashaya*, Colombo, Sri

Lanka,department of Ayurved,1983,Part I, P 260
7. Prof. Murthy KRS, Quatha Kalpana. Sharangadhara Samhitha (A treatise on Ayurveda), Varanasi. Chaukhambha Orientalia publishers, Reprint 2017, Madhyama Kanda, P.56 and P. Nagodavithana, Shri Sharangadhara Samhitha, First Edition:2001-5, P. 91
8. Harbone, J.B. (1998) phytochemical methods, A Guide to modern techniques of plant analysis, Chapman and Hall, London, UK.
9. Jayaweera D.MA, Medicinal Plants (Indigenous and Exotic) Used in Ceylon, The National Science Council of Sri Lanka, Colombo, Part IV (1982) and *Ayurveda Aushadha Samgrahaya*, *Ayurveda* Department, Part 3, P 264-265
10. Compendium of Medicinal Plants, Ayurved department,Vol2,2002,P233-235
11. Compendium of Medicinal Plants, Ayurved department,Vol1,2001,P 105-106
12. Sarda.P.D and others, *Zingiber officinale*; Phytochemical Analysis And Evaluation of Antimicrobial Activity in Combination with Commercial Antibiotics Research Article , International Journal of current research, Vol 9, Issue, 10, pp.59107-59111, 31October (2017)
13. Shipra Bhargawa and others, *Zingiber officinale*: Chemical and phyto-chemical screening and evaluation of its antimicrobial activities, Journal of chemical and Pharmaceutical Research, 2012, 4(1):360-364
14. Anjay Kumar Gupta and others, Phytochemical Analysis and Antioxidant property of *Aegle marmelos* Extracts, International Journal of Current Microbiology and Applied Sciences, ISSN:2319-7706 Volume 4Number 9 (2015) pp.826-830
15. Pushpendra K and others, *Aegle marmelos*: A Review on its Medicinal Properties, International Journal of Pharmaceutical and Phytopharmacological Research. 2012, 1(5):332-341
16. Ajitha bai MD and others, Research Article: The use of *Sida* plants in the preparation of Nayapayam Kashayam, IJRAP 3(1), Jan-Feb 2012: pp.99-104
17. Cordell, G. A., Quinn-Beattie, M. L., Farnsworth, N. R., Phytotherapy Research 2001, 15, 183 - 205.
18. Webb, L. J., Whitelock, D., Brereton, J. L. G.,, In The Last of the Lands, ed.; Eds. Jacaranda Press: 1989; 82 - 90.
19. Klepacka, J., Gujska, E., Michalak J., Phenolic compounds as cultivar and variety distinguishing factors in some plant products. Plant Food Hum. Nutr, 66 (1) (2011), pp. 64-69

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