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## Characterization of Modified Arjunarishta

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### Abstract

Arjunarishta is an Ayurvedic formulation used to treat cardio vascular diseases. It is modified through non-fermentation method in order to make alcohol free. It is on required to carry out characterization analysis prior to cardio therapeutic studies. The Organoleptic and Phytochemical analysis was performed by well known test protocol available in the literature. Phytochemical investigation reveals the presence of Tannins, Flavonoids, Saponins, Alkaloids, Glycosides, Cardiac glycosides and Terpenoids. The generated results of both physical and phytochemical analysis have provided the base for further studies of cardio therapeutic activity.

**Keywords:** Arjunarishta, cardio vascular diseases, Phytochemical analysis.

### Introduction

Characterization of Ayurvedic formulations is essential in order to assess the quality of drugs, based on the concentration of their active principles, physical and chemical standards. Arjunarishta is an important Ayurvedic formulation used for both prevention and treatment of cardiovascular diseases for long time. It is modified in order to make alcohol free. As Arjunarishta is fermented product, it contains certain quantity of alcohol which is slightly lethal to liver. The Modified Arjunarishta is prepared without fermentation process is lacking alcohol which is much safer to use. The cardio tonic of Modified Arjunarishta is very essential for the preliminary analysis of physical and phytochemical evaluation. This article reports on standardization of a Modified Arjunarishta formulation used to treat cardio vascular diseases. The Modified Arjunarishta is a triherbal formulation has been standardized on the basis of organoleptic properties, physical characteristics, and physico-chemical properties.

The quality assessment of herbal formulations is of paramount importance in accordance to justify their acceptability in modern system of medical application. One of the major problems faced by the herbal industry is the lack of rigid quality control profiles for herbal materials and their formulations. Regulatory bodies have laid down the standardization procedures and specifications for ayurvedic preparations. In India, the department of AYUSH, Government of India, launched a central scheme to develop a standard procedures for the manufacturing process to develop pharmacopeial standards for ayurvedic preparations (Kalaiselvan V and et al., 2010). The World Health Organization has appreciated the importance of medicinal plants for public health care in developing nations and has generated guidelines to support the member states in their efforts to formulate national policies on traditional medicine and to study their potential usefulness including evaluation, safety, and efficacy (De La Sante , 1992). In such a way, it has become extremely important to make an effort towards standardization of the Modified Arjunarishta to

treat Cardio vascular diseases especially myocardial infarction. Myocardial ischemia occurs during myocardial oxygen demand exceeds oxygen supply and as a result it causes in-cell injury known as myocardial infarction, that is one of the most destructive manifestations of cardiovascular disease (Mohanty and et al., 2004). The generation of toxins such as superoxide radical, hydrogen peroxide and hydroxyl radical lead to the damage of myocardial cells (Vaage & Valen 1993).

Use of herbs for the treatment of cardiovascular diseases in Ayurveda and other indigenous systems of medicine has given a novel lead to understanding the pathophysiology of these diseases.

## Materials and Methods

### Collection and Authentication:

The selected plant parts for the proposed study are *Terminalia arjuna* bark, *Mudhuca longifolia* flower, and *Vitis venifera* fruit were collected from Villivakkam, Chennai, K.G. Kandigai, Tiruttani and from Ayurvedic shop respectively during September 2015. It was identified and authenticated by Mr. K.N. Sunilkumar, Research officer (Pharmacognosy) from Siddha Central Research Institute, Chennai.

### Preparation

The identified plant powers mixed with 32 part of sterile water and allowed to boil. The boiling is continued still the liquid level reduced to one part through evaporation. The extract is filtered through filter paper. The filtrate is transferred in to air tight sterile container and stored in refrigerator 2-8C. Standardisation of formulation as per AYUSH Guidelines (Lohar, 2007)

### Organoleptic evaluation

The organoleptic characters of the samples were evaluated based on the method described by Siddiqui et al., 1995. Organoleptic evaluation refers to evaluation of the formulation by colour, odour, taste and texture etc.

### Total solid content:

10ml of formulation was taken in petri dish which was previously weighed and allowed to evaporate. So that only solid content remains in the dish and rest of the fluid gets evaporated. Then it weighed again and the solid content of the formulation calculated.

### pH :

pH meter was used to check the pH of the formulation that is calibrated prior to use.

### Viscosity:

Viscosity of the Modified Arjunarishta was determined using Brookfield viscometer.

### Phytochemical Analysis

The formulation was subjected to preliminary phytochemical screening for the identification of phytochemical constituents (Pulok., 2005, Houghton et al., 1998, Overton., 1963)

### Test for Saponin

Emulsion test: The formulation was shaken in a graduated cylinder for about 15 minutes. Formation of foam in the sample indicates the presence of saponin.

### Test for Tannins and Phenol

Ferric chloride test: the sample was placed separately and warmed. To that 2ml of ferric chloride solution was added. Formation of green is colour due to the presence of phenolic compounds.

### Test for flavonoids

Shinoda test: Few volume of sample mixed thoroughly with ethanol, and filtered. To this solution a tiny piece of magnesium metal and con. HCl were added and heated. Formation of magenta colour indicates the presence of flavonoids.

### Test for Alkaloids

Mayer's test: A small amount of herbal formulation was taken separately and 2ml of dil.HCl was added, mixed and filtered. To the filtrate 2 drops of Mayer's reagent were added. Formation of cream coloured precipitate in the reaction tube is due to the presence of Alkaloids.

### Test for glycosides

Anthrone test: Trace volume of sample was added to two drops of alcohol in a watch glass. An equal amount of anthrone was added. This reaction content is mixed thoroughly and dried. Then one drop of con.H<sub>2</sub>SO<sub>4</sub> was added, separated in a thin film with a glass rod in watch glass and heated over a hot bath. Presence of dark green color indicates glycosides in sample.

**Test for cardiac glycosides**

Legals test: The herbal formulation was hydrolysed for certain hours in a water bath. The hydrolysed was added with 2ml of pyridine, sodium nitro prusside solution and was made alkaline with NaOH solution. Presence of orange colour indicates the presence of cardiac glycosides in sample.

**Test for Terpenoids**

Salkowski's test: It also said as Noller's test. 1 ml of sample taken separately in a test tube and a bit of tin foil and 0.5ml of thionyl chloride was added. It was heated gently. Formation of pink colour indicates the presence of Terpenoids.

**Results****Organoleptic characteristics**

Parameter	Description
Colour	Brown
Odour	Aroma
Taste	Astringent
Appearance	Clear

**Physical properties**

Parameters	Observed values
pH	6.5
Specific gravity	1.05
Total solid content (%W/W)	72
Viscosity	0.67

**Phytochemical characteristics**

Tests	Result
Saponins	+++
Phenol	+++
Tannins	+++
Flavonoids	+++
Alkaloids	+
Glycosides	++
Cardiac glycosides	++
Terpenoids	+

-: not detected; +: Present in low concentration; ++: Moderate concentration; +++: High concentration

**Discussion**

Phytochemical analysis conducted on the Modified Arjunarishta revealed the presence of constituents which are known to exhibit medicinal as well as physiological activities (Sofowra, A. 1993). Analysis of

this formulation revealed the presence of phytochemicals such as phenols, tannins, flavonoids, saponins, glycosides, terpenoids, and alkaloids. The phenolic compounds are one of the largest and even most ubiquitous such as plant metabolites (Singh R and et al., 2007).

The presence of flavonoids and tannins in Arjunarista is likely to be responsible for the free radical scavenging effects observed. Flavonoids and tannins are phenolic compounds is a major group of compounds that act as primary antioxidants or free radical scavengers (Polterait O, 1997). They possess biological properties like antiapoptosis, antiaging, anticarcinogen, antiinflammation, antiatherosclerosis, cardiovascular protection and improvement of endothelial function, as well as inhibition of angiogenesis and cell proliferation activities (Han X and et al., 2007). Several studies have described the antioxidant properties of ayurvedic plants which are rich in phenolic compounds (Brown, J.E., Rice-Evans, C.A. 1998) (Krings U., Berger R.G. 2001). Natural antioxidant mainly obtained from plants in the form of phenolic compounds which include flavonoid, phenolic acids, tocopherols etc. (Ali, S.S.and et al., 2008). Tannins bind with proline rich protein and interfere with protein synthesis. Flavonoids are hydroxylated phenolic substances that well known to be synthesized by plants in response to microbial infection and they have been found to be antimicrobial substances against wide array of microorganisms in-vitro. Their potential property is probably due to their ability to complex with extracellular and soluble proteins and to complex with bacterial cell wall (Marjorie, C. 1996). The Ayurvedic formulation was also revealed to contain saponins which are known to produce inhibitory effect during inflammation (Marjorie, C. 1996). Certain characteristics of saponins include formation of foams in aqueous solutions, hemolytic activity, cholesterol binding properties and bitterness (Sodipo, O.A and et al., 2000) (Okwu, D.E. 2004). Alkaloids have been associated with clinical uses for centuries and one of their common biological properties is their cytotoxicity (Nobori, T., 1994). Many research scholars have reported the analgesic (Antherden, L.M. 1969) (Harborne, J.B. 1973) antispasmodic and antibacterial (Stray, F. 1998) (Okwu, D.E., Okwu, M.E. 2004) properties of alkaloids. The output of this study suggest that identified phytochemical compounds may be the bioactive constituents and these Modified Arjunarishta are proving to be an increasingly valuable reservoir of bioactive compounds of substantial medicinal merit.

## Conclusion

The results revealed the presence of medicinally important constituents in the Modified Arjunarishta formulation studied. Many evidences obtained in the previous analysis that confirmed the identified phytochemicals to be bioactive. Many studies proved the occurrence of these potential phytochemicals contribute medicinal as well as physiological properties to the Modified Arjunarishta formulation studied in the treatment of different ailments particularly Cardio vascular diseases. The further work should be carried out to study the activity against

cardiovascular diseases in an in-vivo model to bring medical practice.

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