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## Comparative Study of Basic Physiochemical Parameters on “*Arjuna Ksheera Paaka*” and It’s Powdered Form

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### ABSTRACT

Ayurveda medicine originated in India more than 2000 years ago but even today, it can fulfill the requirements of modern health issues including non-communicable diseases. Among the non-communicable diseases; heart diseases (*Hridroga*) have become a major problem in today’s society. For *Hridroga*, *Acharyas* of Ayurveda have prescribed various remedies. *Arjuna Ksheera Paaka* is one of the popular remedy form of decoction (hot infusion), was mentioned for treatment of *Hridroga* and it include *Arjuna* (*Arjuna terminalia*) as an ingredient. *Arjuna Ksheera Paaka* can be prepared as a powder form as an experiment by concerning of easy applicability for patients with their busy lifestyle. Therefore this study was conducted to compare the physio-chemical parameters of *Arjuna Ksheera Paaka* and it's powdered form using analyzing methods under modern technology. The decoction (*Kashaya*) form of *Arjuna Ksheera Paaka* was prepared according to the method described in Ayurveda Pharmacopeia and converted it into powdered form using freeze drying method. Then both preparations have been chemically analyzed separately. Results shown both preparations were positive for Proteins, Carbohydrates, Phenols, Tannins, Flavonoids and Alkaloids. Evaluated pH values shown that it was nearly similar in both preparations. Saponin test was positive in both forms but powdered form has given lower intensity as compared to *Arjuna Ksheera Paaka*. By comparing the chemical properties of these two medicinal forms are including similar chemical compounds, it can be concluded both preparations are exactly similar in biologically active chemical constituents that can be use in medicinal purposes.

### KEYWORDS

*Arjuna*, Value added product, Heart disease, Phytochemicals



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## INTRODUCTION

Ayurveda medicine originated in India more than 2000 years ago and accomplishes great duty by providing solutions for major health problems of human being. Though it is a science about 2000 years old, even today it can fulfill the requirements of modern health issues like non-communicable diseases which have been a major problem of these days. Among them heart diseases (*Hrid roga*) are more perilous disease. Heart diseases vary from its origin, signs and symptoms and these symptoms refer to various types of conditions that can affect heart function according to the modern medical knowledge. As of 2012, it is the most common cause of death in the world and a major cause of hospital admissions<sup>1</sup>.

*Hrid roga* existed among the human beings since the prehistoric times. Identity of *Hrid roga* was established from the Vedic period (2400 B.C). As the name indicates *Hrid roga* is the disease of *Hridaya* which is considered to be heart in this context. Definition of heart diseases, etiology, pathogenesis and management has been described in *Charaka Samhita*<sup>2</sup>. According to *Sushruta Samhita* any condition which produces disturbances in the heart is called as *Hridroga*<sup>3</sup>. *Acharya Sushruta* has maintained different type of *Ruja* (pain)

according to *Doshik* involvement<sup>4</sup>. In *Samhita Grantha* mentioned five types of heart diseases due to imbalance of *Tridosha*<sup>5</sup> and for these types of *Hrid roga*, *Acharyas* of Ayurveda have prescribed various remedies to pacify the vitiated *Dosha* in *Hrid roga*.

Among those remedies *Acharyas* of Ayurveda considered *Arjuna* (*Terminalia arjuna*) has specific pharmacodynamic properties to pacify heart diseases. *Arjuna Ksheera Paaka* is one of a decoction mentioned for *Hridroga* including *Arjuna* as the main ingredient. *Ksheera Paaka* (medicated milk preparations) According to Ayurveda pharmaceutical texts *Ksheera Paaka* (medicated milk preparations) could not be kept longer period, it has to be consumed within 24 hours period. Therefore, its stability period is short/ lesser than other Ayurveda pharmaceutical products. Hence it is a need to develop this valuable preparation as a value added product to expand the stability period to avoid the spoilage of the product. Therefore this study has been carried out to develop this herbal product a value added product.

## MATERIALS AND METHODS

### Preparation of *Arjuna Ksheera Paaka*



*Arjuna Ksheera Paaka* and its powdered form was prepared at Pharmacy of Institute of Indigenous Medicine, University of Colombo, Rajagiriya. *Terminalia arjuna* stem bark was collected from Kirimetiya area of Wennappuwa, Puttalam District, Sri Lanka (04.06.2017), stem bark was cut into small pieces (2") and these particles were shade dried for 3 days. Fresh Cow's milk was collected from the agent of National Livestock Development Board (NLDB), Rajagiriya, Sri Lanka (17.6.2017).

#### **Method of preparation of *Arjuna Ksheera Paaka***

*Arjuna Ksheera Paaka* was prepared as a method mentioned in Ayurveda Pharmacopeia<sup>6</sup>. Sixty grams (60 g) of dried *Arjuna* stem bark, 480 ml of Cow's milk and 1920 ml of fresh water was put together into a earthen pot and boiled under moderate fire to reduced until remaining the volume of milk (480 ml). Then this *Ksheera Paaka* has been used for further chemical analysis.

#### **Preparation of powdered form of *Arjuna Ksheera Paaka***

Certain amount of the above *Kashaya* (240 ml) used to prepare the powdered form. It has been divided into small portions (25 ml). Powdered form of *Arjuna Ksheera Paaka* was obtained by freeze dryer (LABANCO FreeZone, CHECH Republic, serial no:

130677529) after following the freeze drying method for 5days.

#### **Basic Chemical analysis**

Prepared *Arjuna Ksheera Paaka* (hot infusion) 30ml was taken as it is for the chemical analysis. Five gram of powdered form of *Arjuna Ksheera Paaka* was dissolved in 30ml of distilled water and prepared the samples for phyto-chemical study. Those samples were subjected to phytochemical analysis using the methods described by *Rajan et.al*, (2011)<sup>7</sup>.

#### **Test for Proteins**

##### *Ninhydrin test*

Solution of Ninhydrin (0.2%) 2ml was mixed with 2ml of crude extract and boiled for few minutes. The reaction has been shown the solution colour change to violet (observed for purple/bluish colour) that suggesting the presence of amino acids and proteins.

#### **Test for Carbohydrates**

##### *Benedict's test*

Crude extract was mixed with Benedict's reagent (2ml) and boiled for few minutes, it was formed reddish brown precipitated which indicated the presence of the carbohydrates.

#### **Iodine test**

A dark blue or purple colour indicated after crude extract was mixed with 2ml of iodine



solution. This designated the presence of carbohydrates.

### Test for Phenols and Tannins

Prepared crude extract was mixed with 2ml of 2% solution of FeCl<sub>3</sub>, the results indicated from blue-green or black colouration indicated the presence of phenols and tannins.

### Test for Flavonoids

#### Alkaline reagent test

2ml of 2% solution of NaOH was mixed with crude extract and that intense yellow colour turned colourless on addition of few drops of diluted acid which indicated the presence of flavonoids.

### Test for Saponins

#### Foam test

Distilled water, 5ml, was mixed with crude extract in a test tube and it was shaken strongly. The configuration of stable foam was taken as an indication for the presence of saponins.

### Test for Alkaloids

Crude extract of *Arjuna Ksheera Paaka* was mixed with 2ml of 1% HCl and then heated gently then added Mayer's (1ml) and Wagner's reagents to the mixture. Turbidity of the resultant precipitate was taken as evidence for the presence of alkaloids.

### Determination of pH value

Samples were prepared accordingly *Arjuna Ksheera Paaka* 20ml of hot infusion and 5g of powdered sample was dissolved in 20ml of Distilled water. They are separately introduced to the pH meter (EUTECH Instrument, Ph700, Singapore) to observe the values.

## RESULTS

Qualitative phytochemical analysis of *Arjuna Ksheera Paaka* and its powdered form is shown in Table 1.

**Table 1** Qualitative phytochemical analysis of *Arjuna Ksheera Paaka* and its powdered form

Phytochemica compound	Name of the test	<i>Arjuna Ksheera Paaka</i>	Powdered form of <i>Arjuna Ksheera Paaka</i>
Flavonoids	Alkaline reagent test	+++	+++
Alkaloids	Dragondroff test	+++	+++
	Mayer's test	+++	+++
	Wagner's test	+++	+++
Saponins	Foam test	++	+
Carbohydrates	Benedict test	+++	+++
	Iodine test	++	++
Tannin and phenols	Ferric chloride test	+++	+++
Protein and amino acids	Ninhydrin test	+++	+++

(+) indicates the presence of compound (-) indicates the absence of compound  
Number of (+) & (-) indicates intensity of the chemical constituents



According to the results both liquid and powdered form of *Arjuna Ksheera Paaka* showed similar pH values at the room temperature of 26.1°C as shown in Table 2.

**Table 2** pH values of *Arjuna Ksheera Paaka* and its powder form

	<i>Arjuna Ksheera Paaka</i>	Powdered form of <i>Arjuna Ksheera Paaka</i>
pH value	5.8	5.76

## DISCUSSION

*Arjuna Ksheera Paaka* and its powdered form were analyzed to compare their qualitative phytochemicals. Flavonoids were presented on both products with Alkaline reagent test. Dragendorff test, Mayer's test and Wagner's test all were positive in both *Ksheera Paaka* and its powdered form as a result of presence of alkaloids. Tests for carbohydrates were also given positive results with both products.

Test for saponin using the foam test was given much different result. Both forms were positive for Saponins but the powdered form has been shown low intensity than the liquid form. Analysis of *Arjuna Ksheera Paaka* and its powdered form for Tannins and phenols they were shown similar positive results in both samples. The results of protein test were also positive with both the products.

Under the room temperature of 26.1°C two pH values were very similar for both the products as mentioned here for *Arjuna Ksheera Paaka* and powdered form 5.8 and 5.76 respectively.

## CONCLUSION

It can be concluded that two medicinal forms present similar chemical compounds. Therefore, this product can be developed as value added product to increase the stability period of the liquid form of preparation can be converted into a powdered form due to its similar chemical constituents in both decoction and powder form. Further studies have to be conducted to confirm the efficacy of these products.



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