



**EFFECT OF ASHWAGANDHA (WITHANIASOMNIFERA), ARJUNA (TERMINALIA ARJUNA) AND AMLA (PHYLLANTHUSEMBLICA) ON HEART FUNCTIONING**

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**ABSTRACT**

*The herbs commonly used in the manufacture of Ayurvedic medicines are highly nutritive with lots of healing properties. Ayurvedic medicines are said to have no side effects. There are certain ayurvedic medicines that are assumed to have cardio tonic properties. These medicines work by altering different functions or attributes of the heart. These changes can be measured and proved using and electrocardiograph. This research is based on the cardiogenic effect of Ashwagandha (Withaniasomnifera), Arjuna (Terminalia arjuna) and Amla (Phyllanthusemblica). The effect will be measured using electrocardiograms taken over a period of 2 months. The Parameters in consideration would be Heartrate and the Amplitude of the ECG signal. There are 5 subjects in consideration. 3 of the subjects will consume one ayurvedic product each. The fourth subject consumed a mixture of all three Ayurvedic product. And subject 5 did not consume any product.*

*The research shows how different product affected the heart functioning. The information about heart is extracted from the ECG of subjects.*

**KEYWORDS:** Ashwagandha, Arjuna, Amla, ECG, heartrate, amplitude, heart

## **1.Introduction**

Coronary heart disease is the most common type of heart disease, killing over 370,000 people annually. One solution is the use of Allopathy. Allopathy as the name suggests comes with side effects. So it is insincere to cause harm to body while treating it. The best alternate solution is the usage of Ayurvedic medicines. Ayurveda works according to the Doshas and all of these Doshas have their own diseases and healthy conditions. The medical fraternity agreed that India's ancient stream of medicine has some miracle cures for cardio-vascular diseases. Cardiovascular problems have been dealt with at length in Ayurveda, which describes 'Hridaya' (heart) as a body organ governing emotions and circulating blood to keep a person alive and healthy. Heart disease is the number one cause of death in both men and women. Coronary heart disease is the most common type of heart disease, killing over 370,000 people annually.[1]

The main aim of this research is to explore the effects of Ashwagandha (*Withaniasomnifera*), Arjuna (*Terminalia arjuna*) and Amla(*Phyllanthusemblica*) on the heart. The widespread use of herbal remedies and healthcare preparations, as those described in ancient texts such as the Vedas and the Bible, and obtained from commonly used traditional herbs and medicinal plants, has been traced to the occurrence of natural products with medicinal properties.[2] Medicinal and aromatic plants (MAPs) are produced and offered in a wide variety of products, from crude materials to processed and packaged products like pharmaceuticals, herbal remedies, teas, spirits, cosmetics, sweets, dietary supplements, varnishes and insecticides.[3-5]

### ***1.1Cardiovascular diseases in India***

India has seen a rapid transition in its disease burden over the past couple of decades. The load of communicable and non- communicable diseases (NCDs) is projected to get reversed in 2020 from its distribution in 1990s. India is undergoing an epidemiological transition and is on the threshold of an epidemic of cardiovascular disease. Demographic projections suggest a major increase in cardiovascular disease mortality as life expectancy increases and the age structure of the growing population changes. CVDs are expected to be the fastest growing chronic illnesses

between 2005 and 2015, growing at 9.2% annually. A more worrying fact is that the incidences of CVDs have gone up significantly for people between the ages 25 and 69 to 24.8%, which means losing more productive people to these diseases. [3]. the key challenges being faced in cardiac care in India are lower availability, accessibility, and affordability of effective and efficient treatment.

### ***1.2 Ayurveda for cardiac diseases (Rhidroga)***

Ayurvedic herbs stimulate the function of specific organs in the body, possibly by altering hormones, affecting immunity and neurotransmitters, and conveying antioxidant properties [6]. Cardiovascular problems have been dealt in detail in Ayurveda, which describes Hridaya (heart) as a body organ governing emotions and circulating blood to keep a person alive and healthy. Heart Disease (Hrudroga) is a global phenomenon. It is now becoming a major health problem even in developing countries [7].

### ***1.3 Causes***

The predisposing factors are heredity, high blood pressure, diabetes, high serum cholesterol and smoking<sup>5</sup>. Improper diet and stressful life styles lead to thickening of arteries (Dhamanipraticaya) or hardening of arteries (Dhamanikathinaya) resulting in angio-obstruction (Vatadosa) and angina (Ruja).

## **2. Material and methods**

**2.1 Drugs:** Ashwagandha (Withaniasomnifera), Arjuna (Terminalia arjuna) and Amla (Phyllanthusemblica).

### ***2.2 Methods:***

Ashwagandha (Withaniasomnifera): With boiled milk

Arjuna (Terminalia arjuna) : With a cup of toned milk

Amla (Phyllanthusemblica): With water

**2.3 Dosage:** The subjects will be consuming the Ayurvedic products for the period of two months

Subject one will be consuming 1 to 2 g of the Ashwagandha root, boiled in milk or water for 15-20 minutes taken 3 times daily.

Subject Two will be consuming 2-3 teaspoons of Amla powder with a glass of water and consume daily.

Subject Three will consume a cup of toned milk (without fat) mixed with a teaspoonful of Arjuna bark powder, taken every morning and evening.

Subject Four will be consuming mixture of all three.

Subject Five will not consume any of the three products.

### **3.ECG parameters**

We focus on two parameters. The Heart rate and The amplitude or strength of the ECG signal.

Heart Rate: Q-T interval

Amplitude: QRS complex

### **4.Hypothesis**

ASWAGANDHA: According to previous studies, Ashwagandha affects the heart rate. It is said to decrease the heart rate.

ARJUNA: Arjuna is said to be very beneficial for the heart. We expect in our experiment that it will increase the amplitude of the ECG signal. We also expect it to decrease the heart e=rate.

AMLA: Amla is proved to increase the amplitude of the ECG signal and to decrease the heart rate.

MIXTURE: A mixture of Ashwagandha, Arjuna and Amla would alter the ECG signal in different ways. But we assume that it will help in the betterment of heart working. So we will see an improvement in the ECG signal.

NO PRODUCT: we expect any changes in the ECG of the subject consuming no product.

### **5.Research work**

Each of the four students consumed a specific amount of certain Ayurvedic products and their mixtures for a time period of two months. The fifth student did no consume any product but did take part in the procedure. Also the ECG of the students were measured and saved during the process of consuming the products. The time interval between taking each ECG measurement was 1 month. After measuring and storing the ECG of all the students for 3 months, the ECGs were analyzed. The analysis was based on two important features of the heart:

The Amplitude

The Heart rate

Analysis done was based on if the above mentioned decrease in magnitude or increase. Then the measured magnitudes heart rates and amplitude were compared with the heart rate and the amplitude of healthy heart.

The three months specify the following information:

Month 1: March- No effect of Ayurvedic Products.

Month 2: April.- Intermediate effect of Ayurvedic products.

Month 3: May- Final effect of Ayurvedic products.

The ECG of the four subjects were saved and are as follows:

### ***5.1 Subject 1***

Product: ASHWAGANDHA.

Month 1: MARCH

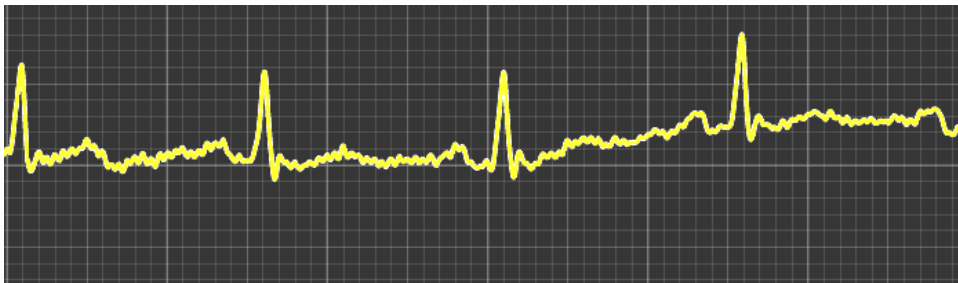


Figure 1: ECG of subject 1 before consuming Ashwagandha

The subject 1 was supposed to consume Ashwagandha for a period of 2 months. The ECG of subject 1 was recorded before the consumption of the product. The information about heart rate and amplitude were found out from the ECG. The heart rate was found out to be 100 beats/minutes and the amplitude of the ECG signal was found out to be 0.62mV.

Month 2: APRIL



Figure 2: ECG of subject 1 after consuming Ashwagandha for 1 month

The ECG of subject 1 was recorded again after the consumption of Ashwagandha for 1 month.. The information about heart rate and amplitude were found out from the ECG. The heart rate was found out to be 99 beats/minutes and the amplitude of the ECG signal was found out to be 0.6mV.

### Month 3: MAY

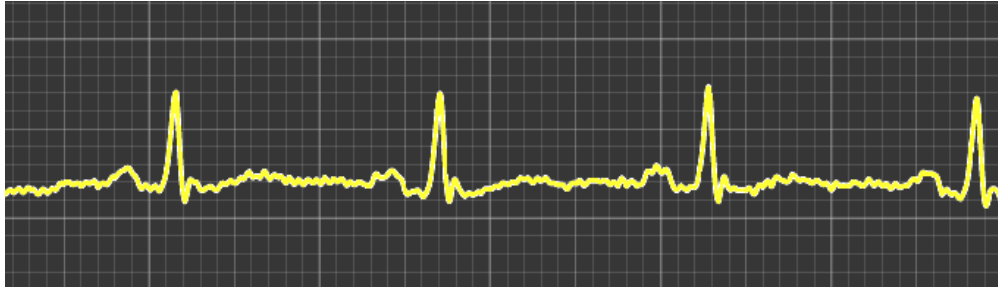


Figure 3: ECG of subject 1 after consuming Ashwagandha for 2 months

The ECG of subject 1 was recorded again after the consumption of Ashwagandha for 2 months.. The information about heart rate and amplitude were found out from the ECG. The heart rate was found out to be 95 beats/minutes and the amplitude of the ECG signal was found out to be 0.62 mV.

Similarly the research for other subjects was carried out and the ECG war recorded.

### **5.2 Subject 2**

Product: ARJUNA

#### Month 1: MARCH

. The heart rate was found out to be 112 beats/minutes and the amplitude of the ECG signal was found out to be 0.6mV.

#### Month 2: APRIL

The heart rate was found out to be 98 beats/minutes and the amplitude of the ECG signal was found out to be 0.8 mV.

#### Month 3: MAY

The heart rate was found out to be 94 beats/minutes and the amplitude of the ECG signal was found out to be 0.85mV.

### **5.3 Subject 3**

Product: AMLA.

#### Month 1: MARCH

The heart rate was found out to be 112 beats/minutes and the amplitude of the ECG signal was found out to be 0.75mV.

Month 2: APRIL

The heart rate was found out to be 99 beats/minutes and the amplitude of the ECG signal was found out to be 0.85mV.

Month 3: MAY

The heart rate was found out to be 98 beats/minutes and the amplitude of the ECG signal was found out to be 1.25mV.

**5.4 Student 4**

Product: MIXTURE OF ASHWAGANDHAARJUNA&AMLA

Month 1: MARCH

The heart rate was found out to be 100 beats/minutes and the amplitude of the ECG signal was found out to be 0.6mV.

Month 2: APRIL

The heart rate was found out to be 95 beats/minutes and the amplitude of the ECG signal was found out to be 0.65mV.

Month 3: MAY

The heart rate was found out to be 85 beats/minute and the amplitude of the ECG signal was found out to be 0.62mV.

**5.5 Student 5:**

Product: No product

Month 1: MARCH

The heart rate was found out to be 102 beats/minute and the amplitude of the ECG signal was found out to be 0.8mV.

Month 2: APRIL

The heart rate was found out to be 99 beats/minute and the amplitude of the ECG signal was found out to be 0.6mV.

Month 3: MAY

The heart rate was found out to be 100 beats/minute and the amplitude of the ECG signal was found out to be 0.6 mV.

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## 6. RESULT & CONCLUSION

By the following graphs we can see that:

Ashwagandha, Arjuna and Amla all decreased the heart rate. Similarly, the mixture of all three products decreased the heart rate and brought the heart rate to a good rate. The heart rate without consuming product showed no major change. All the products helped the heart in better functioning as we can see that all heart rates after consuming the ayurvedic products were in the range of good heart rate.

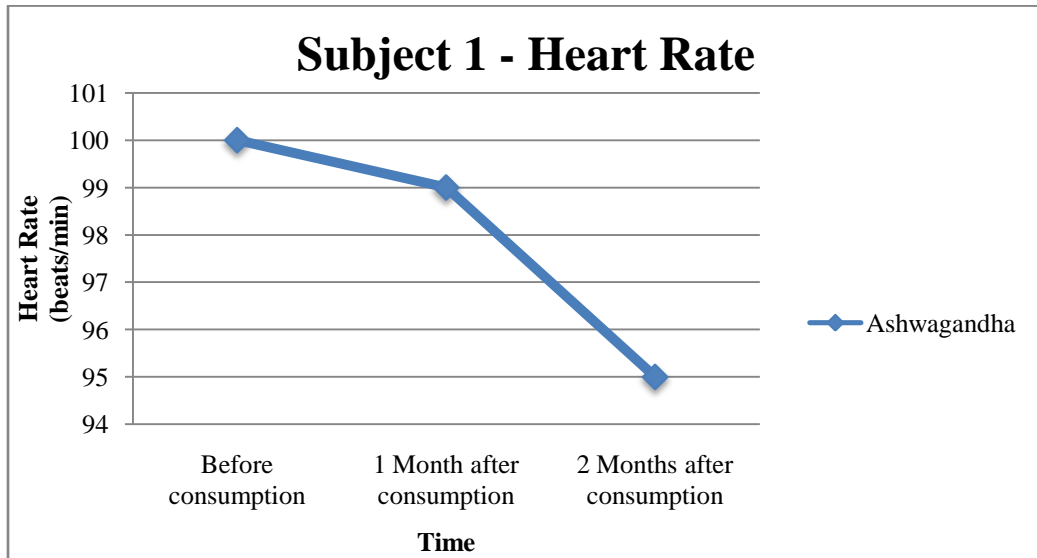


Figure 4: Graph of change in heart rate after consuming Ashwagandha

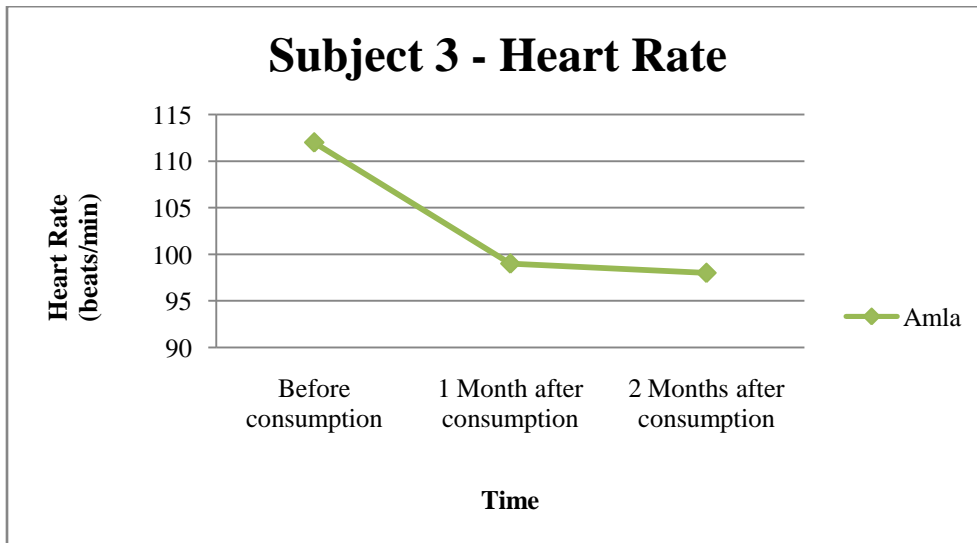


Figure 5: Graph of change in heart rate after consuming Amla



Similarly, the changes in heart rate and amplitudes have been observed in other subjects also. As we assumed that different products affected the heart rate and amplitude in different ways. By the following graph we can see that:

Ashwagandha did not affect the amplitude much whereas Arjuna and Amla increased the amplitude. Similarly, the mixture of all three products did not alter the heart rate much. The amplitude without consuming product showed no major change.

All the products helped the heart in better functioning as we can see that all amplitude values after consuming the ayurvedic products were in the range of good amplitude of ECG wave.

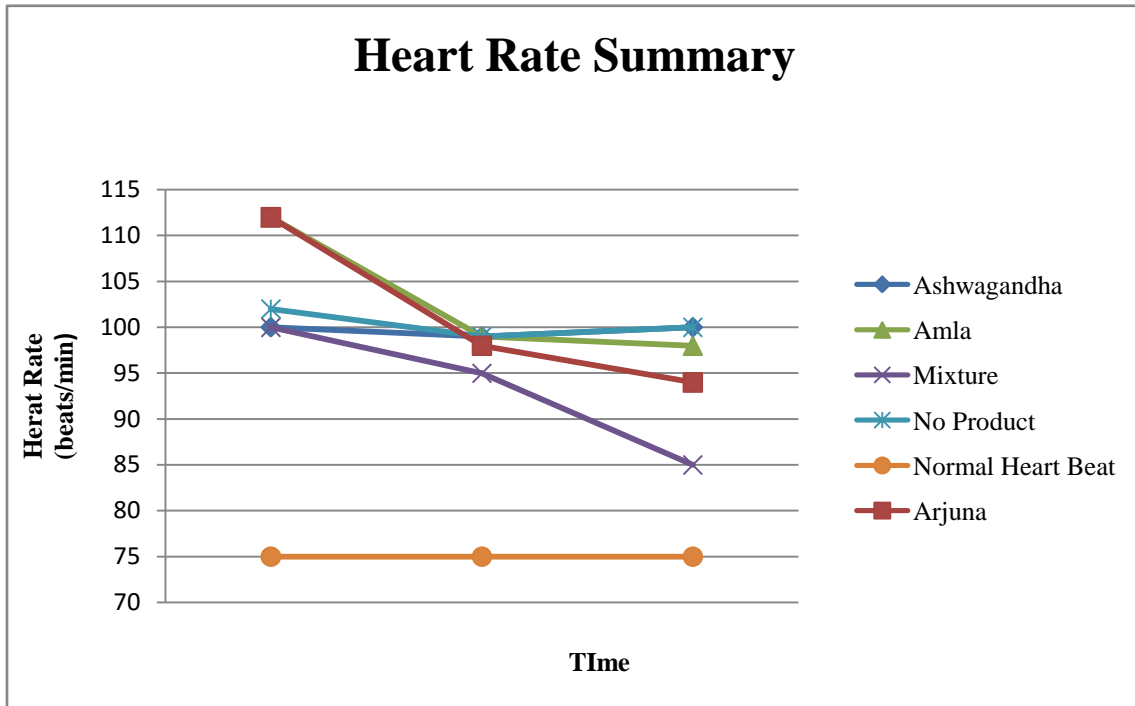


Figure 6: Graph of change in heart rate of all subjects

Also, Ashwagandha did not affect the amplitude much whereas Arjuna and Amla increased the amplitude. Similarly, the mixture of all three products did not alter the heart rate much. The amplitude without consuming product showed no major change.

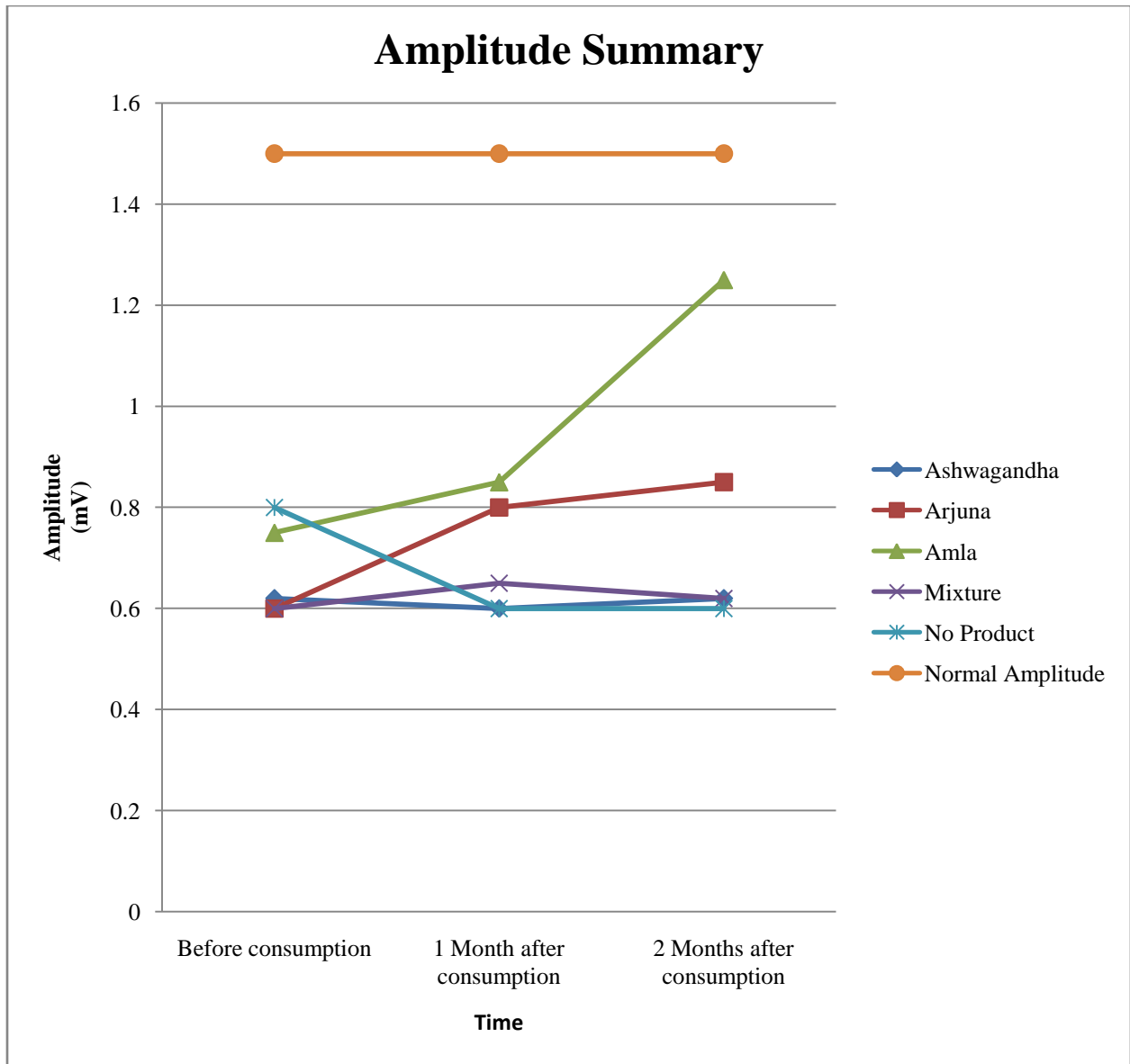


Figure 7: Graph of change in amplitude of all subjects

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