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HYPOGLYCEMIC AND ANTI-DYSLIPIDEMIC EFFECT OF PHALATRIKADI KWATHA

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ABSTRACT

It is indeed an excellent combination of six drugs with multi-dimensional actions. This formulation has been mentioned in the context of Prameha (Diabetes) Chikitsa in Charak Samhita. All the drugs present in this are having Pramehaghna properties as well as having Kaphahara, Pittahara & Medohara properties. Thus this is not only helpful in Samprapti Vighatan of Prameha but also an important formulation for predominant medoj vikara. The kwatha contains Triphala (Haritaki, Bibhitaki, Amalaki), Daruharidra, Indrayaan mula & Musta and was prescribed along with honey and turmeric powder to get relief from Prameha. The Kwatha kalpana is widely accepted for therapeutic purposes due to feasibility in preparation and convenience of administration. Therefore for establishing the rationality of its usage, present article has been drafted. Evaluation of Phalatrikadi kwath was done on the basis of pharmaceutical and analytical studies.

KEYWORDS: Prameha, Diabetes.

INTRODUCTION

Phalatrikadi kwatha is mentioned in charaka samhita as an effective treatment in Prameha[1] The formulation Phalatrikadi kwatha consists of Amalaki, Hareetaki, Bibheetaki, Daruharidra, Indrayana and Musta. Phalatrikadi kwatha acts as lekhaniya, kaphahara & medohara. Amalaki and Indravaruni present in the formulation have a premehaghna property.

Amalaki, Musta and Bibhitaki have balya, rasayana and dhatu vardhaka property,[2] thus helps in rejuvenation of the cells and rectifying the kha-vaigunya in the roga adhisthaana. Amalaki, Hareetaki, Bibheetaki present in the formulation are tridosha hara, thus helps in samprapti vighatana. The kaphahara property of all the above 6 drugs, help in kaphameda harana, thus helps in removing margavarana. Amalaki, Hareetaki, Bibheetaki, Daruharidra have rukshaguna[3] thus is kapha, medohara helping in the samprapti vightana. Hareetaki, Bibheetaki, Daruharidra, Indravaruni have ushna virya[4] and thus helps in vata-kaphaharana and reversal of samprapti.

Haritaki and daruharidra have chakshushya property. The complications of diabetes like retinopathy, if any present can be helped by the formulation. Indrayana has a rechaka property[5] thus helping in the sroto shodhana and in turn helpful in medo roga and sthula patients.

Pharmaceutical study

Drugs for the preparation of Phalatrikadi kwath was collected from the local drug house. The raw samples were collected separately, packed in the polythene bags and labelled with name, part, place and date of collection. Samples of the raw drugs were shaded dried and subjected to pharmacognostical study for confirmation. Phalatrikadi kwath was prepared as per the reference of Charak Samhita, Prameha Chikitsa (6/40). The ratio of the ingredients has been shown in (Table no.1). The drugs were powdered individually in disintegrator and passed through mess (no.8). Then required amount of potable drinking water was mixed with coarse powder in a stainless steel pot and kept for overnight soaking (12hr). Next day, kwatha was prepared by applying constant mild heat until the volume reduced to 1/8th of the initial quantity. After desirable reduction of the volume, the kwatha was filtered through four folded cotton cloth and collected in a separate pot. The residue remained above cloth was discarded.

Ingredients

Sr. No.	Drug	Botanical name	Part used
1	Haritaki	Terminalia chebula	Bark
2	Bibhitaki	Terminalia Bellarica	Bark
3	Amalaki	Emblica officinalis	Bark
4	Daruharidra	Berberis aristata	Bark
5	Indrayaan mula	Citrullus colocynthis	Bark
6	Musta	Cyper rotundus	Bark

Method of preparation

- The above said ingredients are taken in equal pro-portions and pounded so as to get their coarse powder.
- 1 part of the powder is boiled with 16 parts of water and reduced to 1/4th quantity
- The contents are filtered off and the liquid portion separated
- This decoction should be consumed hot and fresh
- Every time it should be prepared fresh

Dose (adult)

20 ml BD before half an hour of meal.

How to use?

During administration, the decoctions should be brought to a temperature fit for consumption. To this, paste of Haridra (Curcuma longa – turmeric) 3-5 grams and Honey – 1 spoon is added and mixed thoroughly.

Analytical study

A. **Organoleptic characteristics:** Colour, odour, taste and appearance of kwatha was observed.
B. **Physiochemical analysis:** Loss on drying, ash value, water soluble ash, acid insoluble ash, pH value, specific gravity, Total solid content, total dissolved solid, suspended solid was carried out for raw materials.
C. **Quantitative test:** Tannin 32.54%

Mode of action of drug

- This preliminary medication is demonstrated in a wide range of diseases viz. Prameha, medoroga, sthaulya, yukrit vikar etc.[6] Prameha is brought about by vitiation of all the three doshas i.e. Vata, Pitta and Kapha along with ten dushyas (Meda, Rakta, Sukra, Jala, Vasa, Lasika, Majja, Rasa, Oja and Mamsa).
- In its clinical component there is increment in sum of urination as well as recurrence of strange urination. The main cause for Prameha is inactive way of living and anomalous food propensities.[7] which is responsible for the development of Ama in the body. This Ama lessens the stomach related digestive fire and vitiates all the three Doshas in the body.

- As per modern perspective its pathogenesis can be understood by 2 ways- one is insulin resistance and another is pancreatic beta cell destruction.[8] These factors causes, target tissue imperfection and affidavit of amyloid body as the primary driver of the whole pathogenesis.[9]
- These amyloid bodies attaches on the tissues and disturb their functions by covering the channels and causes insulin resistance[10] These amyloid bodies are also responsible for apoptosis of the islet cells mainly by two components - firstly by calcium deregulation and secondly by mitochondrial brokenness in the beta cells.
- Medoroga (Dyslipidaemias) and sthoulya (Obesity) are the body pathological conditions which occur due to vitiated doshas specially vata and kapha and main dushya are rasa and meda itself.[11]
- This phalatrikadi kwatha regulates the functions of liver thus indirectly influences the synthesis of lipoproteins. These lipoproteins are being classified as High, Low, Very low density etc.
- These high and low density lipoproteins are responsible for different good and bad metabolic activities in the body respectively like enhancing immunity and causing atherosclerotic changes respectively.
- Several Past studies report that Triphala exerts similar actions as of other oral hypoglycaemic drugs by inhibiting various digestive enzymes and may decrease absorption of glucose through inhibition of glycolytic enzymes, thereby reducing blood glucose levels.
- It reduces blood glucose level, thus directly and indirectly controls the different hepatic metabolism and helps in the production of good cholesterol and controls the bad cholesterol production.
- The maximum reduction in serum glucose levels was seen in methanolic extract of Berberis aristata. Hence the methanolic extract of Berberis aristata had a beneficial effect on carbohydrate metabolism in dysmetabolic conditions.[12]
- Citrullus colocynthis fruit also has a considerable effect on reduction in the mean serum level of glucose in patients with the T2DM. The hypoglycaemic effect of C. colocynthis has been reported by several other experimental studies.[13-14]
- Oral administration of extract of Cyperus rotundus (in the dose of 500 mg/kg/day) for seven consecutive days significantly lowered the blood glucose levels in the experimental

studies.[15] This hypoglycemic activity can be attributed to its antioxidant activity as it showed the strong DPPH radical scavenging action in vitro.

- Physiochemical examination of phalatrikadi kwatha showed that its pH is good for early retention in stomach as it stays acidic. Additionally, the subjective test uncovers that the Kwatha contains tannins, steroids and Alkaloids in abundant quantity.

DISCUSSION

Kwatha is an aqueous solution containing the properties of substances that have been processed in it. The purpose of herbal decoction is to extract the water soluble constituents of herbs by boiling. Quantum of heat and duration of heating are prime concern for preparation of decoction. Soaking of raw materials results in the softening of drug due to diffusion of liquid (Because of osmosis). Due to the presence of hydroxyl group, the raw materials swell, which results in the increased diffusion pressure inside the cell wall. There by ultimately blurting of the cell wall. Continuous heating and agitation during the preparation of decoction enhances the extraction process by weakening the bonds and there by separating the hydrophobic substances from hydrophilic substances. The water diffuses into the raw material, dissolves the water soluble constituents & discharges it to the liquid media due to collapse of the cell wall. Thus transfer of water soluble principal into the solvent (Water) is achieved.

Total Ash value of the kwatha was 4.12% shows the presence of inorganic matter in the drugs. Water soluble ash was very less that is 0.98% which shows that drugs were well good for preparation of the kwatha. Total solid content was 9.08% in which 5.18% was dissolved and 3.9% was suspended which reveals that the kwatha was well prepared. Specific gravity was 1.0412 and pH was 4.40±0.01 which is favourable for early absorption in the stomach as it remains acidic. Qualitative analysis reveals that Tannins, Steroids, terpenoids were found abundantly. In this flavonoid & carbohydrates were found in moderate amount, which are of considerable attention as health promoting component in various plants food. There are several studies which explain its nutra-ceutical properties too. The condensed tannin extracts showed promising anti-diabetic effects as well as anti-dyslipidemic effect. On quantitative test abundant (32.54%) Tannin was found. Organoleptic characters of the Phalatrikadi kwatha reveals that the colour of the kwatha was greenish dark brown, odour was characteristic and taste was sour astringent which was palliable for internal use.

CONCLUSION

The action of Phalatrikadi kwatha is mainly on the liver as it significantly shows hepatic metabolism correction and hepatic rejuvenation. Once the functioning of liver is corrected, the synthesis of cholesterol may be checked and excretion of cholesterol may be increased by stimulating the bile production. This is how the deleterious substances are brought from the peripheral tissues to the intestine. Faecal fat is largely endogenous, containing to appear in the faeces, though all the fatty materials has been excluded from the diet.

This is drug of choice for Prameha (Purvaroopa of Prameha are the symptoms of Medovaha Sroto Dushti). The contents of drug have Dyslipidemia correction properties which are scientifically proved. Musta (Cyperus Rotundus) have Kaphahara, Agnideepana, Aampachana properties which make it an excellent Medohara drug. The bioactive compounds present in Musta have potential to correct dyslipidemia and compare effectively with the standard clinically used agent for dyslipidemia (Simvastatin). It is found to be effective in reducing the extent of lipid peroxidation thus significantly improves the lipid profile. This potential is due to phenolic groups present in this. Indrayana is a potent purgative drug with Tikta Rasa, Laghu Guna and Kaphahara properties. In several clinical studies, it was reported that the presence of high amounts of saponins in Indrayana contribute to the reduction of cholesterol levels by reducing the absorption of cholesterol.

Daruharidra (Berberis aristata) has same qualities like Haridra, it is having Ruksha, Ushna guna and Tikta rasa, and hence it reduces total cholesterol, triglycerides and LDL cholesterol and increases HDL cholesterol. Triphala is amongst one of the best drug for prameha, Sthaulya and medoroga etc. It is proven remedy for enhancing Agni thus contributing into the normalcy of the metabolic functions.

On account of this scientific discussion it can be concluded that the Phaltrkadi Kwath is rich in functional component. More amount of tannin was also found. Thus it can be concluded that the Phalatrikadi Kwath is a good antidiabetic and anti-dyslipidemic drug.

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