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Systematic review and Phytochemical Evaluation of Siddha formulation Vasantha Kusmakaram tablets by Preliminary phytochemical analysis

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Abstract

Siddha system of medicine is a contemporary art of healing through rejuvenation and prevention and further this system is in practice since several thousand years before in the southern region of India. Due to its versatility siddha system gains the popularity and attains greater hikes now in recent time and it has been practiced throughout the world. When conventional medicine fails to treat chronic diseases and conditions such as diabetes efficaciously and without adverse events, many people seek unconventional therapies including herbal medicine. Several siddha preparation as documented in the Vedic literature is still not explored much one such novel formulation is *Vasantha Kusmakaram* tablets (VKM) which comprises of the unique blend of herbs such as *Myrtus caryophyllus*, *Piper longum*, *Saussurea lappa*, *Anacyclus pyrethrum*, *Glychyrrhiza glabra*, *Crocus sativus*, *Camphora officinarum*, *Zingiber officinale*. The main aim of the present investigation is to carry out the phytochemical evaluation of the formulation VKM by qualitative phytochemical analysis. The results of phytochemical evaluation of the formulation VKM reveals the presence of bioactive phytocomponents such as steroids, triterpenoids, phenol, tanins and saponins. It is evident through various research outcome that most of the bioactive components like steroids, triterpenoids, phenol, tanins and saponins effective in controlling diabetes mellitus (DM). Hence it may conclude from the results of the present investigation that the siddha formulation VKM may be effective in management of DM due its potential therapeutic agents present in it.

Keywords: Siddha, Herbal medicine, *Vasantha Kusmakaram* tablets, Diabetes mellitus, Bioactive phytocomponents.

1. Introduction

Herbal therapy has increased in popularity in the past two decades among patients seeking alternative treatments to conventional Western allopathic medicine. Most patients seek alternatives because conventional therapy has failed to help them sufficiently or because they feel there are fewer side effects with the natural products. The recent increase in the use of alternative medicine has led to more research regarding alternatives and requires education of physicians on the subject to enable them to better inform and care for their patients.

The use of herbal medicinal products and supplements has increased tremendously over the past three decades with not less than 80% of people worldwide relying on them for some part of primary healthcare. Although therapies involving these agents have shown promising potential with the efficacy of a good number of herbal products clearly established, many of them remain untested and their use are either poorly monitored or not even monitored at all [1]. Several estimates on the current level of diabetes and its projected cases in the next few decades have been made in recent years. According to the World Health Organization's (WHO), there were 422 million cases in 2014 with 8.5% prevalence that rose from 4.7% in 1980. Similarly, the major risk factor of diabetes has been recognized as obesity which prevalence in 2014 was 600 million; while the number of adults (18 years and older) reported as overweight were more than 1.9 billion [2].

Traditional medicine is used to maintain people's health, as well as to prevent, diagnose, improve or treat physical and mental illnesses all over the world [3, 4]. Medicinal plants are believed to be with healing powers, and people have used them for many centuries. Aimed to modern drug discovery, traditional medicinal plants have been studied and developed which is followed the ethno botanical lead of indigenous cures used by traditional medical systems [5-7]. Traditional medicinal knowledge, especially using medicinal plants in the developing countries, has been in existence and use, and has been a part of therapeutic practices [8]. Therefore, the investigation of plants and their uses (especially medicinal purposes) is one of the most primary human concerns and has been practiced in the world [9-14].The main aim of the present investigation is to carry out the phytochemical evaluation of the formulation VKM by qualitative phytochemical analysis.

2. Materials and Methods

2.1. Ingredients

The formulation *Vasantha Kusmakaram* tablet comprises of the following ingredients

1.	Lingam	- Mercuric Sulphide
2.	Vengaram	- Borax
3.	Lavangam	- *Myrtus caryophyllus*
4.	Thippili	- *Piper longum*
5.	Kostam	- *Saussurea lappa*
6.	Akkirakaram	- *Anacyclus pyrethram*
7.	Adhimathuram	- *Glychyrrhiza glabra*
8.	Korosanai	- Purified Ox bile
9.	Kunguma Poo	- *Crocus sativus*
10.	Pachai Karpooram	- *Camphora officinarum*
11.	Ginger	- *Zingiber officinale*
12.	Cow's milk	- Quantity sufficient

2.2. Preparation of *Vasantha Kusmakaram* Tablet [15]

Each ingredient was purified well as per literature. Followed by this each ingredients were powdered in kalvam with Ginger juice for 2 days, and then with cow's milk for 2 days. Finally each tablet of 100mg were made and allowed for shade dry.

2.3. Preliminary phytochemical Evaluation [16]

Test drug VKM was subjected to class of preliminary phytochemical screening of the following components.

Test for Alkaloid- Mayer's reagent

To the test drug about 2ml of Mayer's reagent was added and was observed for the presence of alkaloids. Appearance of dull white precipitate indicates the presence of alkaloids.

Test for flavonoid

To 0.1ml of the test sample about 5 ml of dilute ammonia solution was added followed by addition of few drops of conc. Sulfuric acid. Appearance of yellow color indicates the presence of Flavonoids.

Test for Glycosides -Borntrager's Test

Test drug is hydrolysed with concentrated hydrochloric acid for 2 hours on a water bath, filtered and the hydrolysate is subjected to the following tests.

To 2 ml of filtered hydrolysate, 3 ml of Choloroform is added and shaken, choloroform layer is separated and 10% ammonia solution is added to it. Pink colour indicates presence of glycosides.

Test for Triterepnoids

To the test solution 2ml chloroform was added with few drops of conc. Sulphuric acid (3ml) at the side of the test tube. An interface with a reddish brown coloration is formed if terpenoids constituent is present.

Test for Steroids - Salkowski test

To the test solution 2ml of chloroform was added with few drops of conc. Sulphuric acid (3ml), and shaken well. The upper layer in the test tube was turns into red and sulphuric acid layer showed yellow with green fluorescence. It showed the presence of steroids.

Test for Carbohydrates - Benedict's test

To 0.5 ml of test drug about 0.5 ml of Benedict's reagent is added. The mixture is heated on a boiling water bath for 2 minutes. A characteristic coloured precipitate indicates the presence of sugar.

Test – Phenol- Lead acetate test

The test sample is dissolved in distilled water and to this 3 ml of 10% lead acetate solution is added. A bulky white precipitate indicates the presence of phenolic compounds.

Test for tannins

About 0.5ml of test sample is boiled in 20 mL of distilled water in a test tube and then filtered. The filtration method used here is the normal method, which includes a conical flask and filter paper. The 0.1% FeCl3 is added to the filtered samples and observed for brownish green or a blue black coloration, which shows the presence of tannins

Test for Saponins

The test drugs were shaken with water vigorously for 10 mins, copious lather formation indicates the presence of saponins.

Test for Proteins (Biuret Test)

Biuret test: Equal volume of 5% solution of sodium hydroxide and 1% copper sulphate were added. Appearance of pink or purple colour indicates the presence of proteins and free amino acids.

Test of Coumarins

1 ml of extract, 1 ml of 10% sodium hydroxide was added. The presence of coumarins is indicated by the formation of yellow color.

Test for Quinones

The test samples were treated separately with Alc, KOH solution. Appearance of colors ranging from red to blue indicates the presence of Quinones.

Test for Anthocyanin

About 0.2 ml of the extract was weighed in separate test tube, 1ml of 2N Sodium hydroxide was added, and heated for 5 minutes at 100 ± 2°C. Observed for the formation of bluish green color which indicates the presence of anthocyanin.

Test for Betacyanin

To 2 ml of the test sample, 1 ml of 2N sodium hydroxide was added and heated for 5 min at 100°C. Formation of yellow colour indicates the presence of betacyanin.

3. Results

3.1. Qualitative Phytochemical evaluation of VKM

The result of the qualitative phytochemical analysis indicates that the formulation VKM shows the presence of biologically significant phytochemicals such as steroids, triterpenoids, phenol, tannins, saponins and carbohydrates. The results were tabulated in Table 01.

Table 1: Preliminary phytochemical analysis of *Vasantha Kusmakaram* Tablets

S.No	Test	Observation
1	Alkaloids	-
2	Flavanoids	-
3	Glycosides	-
4	Steroids	+
5	Triterpenoids	+
6	Coumarin	-
7	Phenol	+
8	Tannin	+
9	Protein	-
10	Saponins	+
11	Sugar	+
12	Anthocyanin	-
13	Betacyanin	-

+ -> Presence and - -> Absence

4. Discussion

Diabetes mellitus occurs either when the pancreas does not produce enough insulin or when the body cannot effectively utilize the insulin that is produced [17]. Excessive blood glucose, which is often seen as the main characteristic of DM, is sometimes accompanied by lipids and protein metabolism disorder [18]. With the rapid development of society and changes in people's lifestyle, DM has become the third biggest threat to human health after cardiovascular and neoplastic diseases, according to the World Health Organization (WHO) [19]. There are two types of diabetes: type 1diabetes (insulin-dependent) and type 2 diabetes (non-insulin-dependent). The most common form is type 2 diabetes mellitus (T2DM), which up to 90% of diagnosed DM patients have [20].

Plants are capable of synthesizing secondary metabolites which can be used for the new drugs discovery and development. Medicinal plant extracts are potential source for the development of new agents effective against infections currently difficult to treat. Terpenoids play important roles. As such, the fragrances of herbs, spices, flowers and fruits are attributed to the essential oils which are dominated by monoterpenes. The various roles played by monoterpenes as signaling molecules in plant metabolism, plant-plant and plant-animal interactions have been extensively reviewed [21-23]. The monoterpenes are also among the best exploited group of compounds by mankind.

Saponins have been implicated in regulation of energy metabolism through activation of AMPK. In addition, most of the signaling pathways (JAK2/STAT3, MAPK, PI3K and AMPK) being modulated by leptin are also modulated by saponins. Several studies on the effect of saponins on leptin have been documented [24].Phytosterol is a bioactive natural product present in plants that has a structure similar to cholesterol. Sterol has a variety of pharmacological properties, including anti-osteoarthritic, anti-mutagenic, anti-inflammatory activity, and anti-tumor properties [25].
Phenolic compounds constitute a group of secondary metabolites which have important functions in plants. Besides the beneficial effects on the plant host, phenolic metabolites (polyphenols) exhibit a series of biological properties that influence the human in a health-promoting manner. Evidence suggests that people can benefit from plant phenolics obtained either by the diet or through skin application, because they can alleviate symptoms and inhibit the development of various skin disorders [26]. Phenolic compounds are secondary metabolites, which are produced in the shikimic acid of plants and pentose phosphate through phenylpropanoid metabolization [27]. They contain benzene rings, with one or more hydroxyl substituent's, and range from simple phenolic molecules to highly polymerized compounds [28].Review on bioactive principles have greatly revealed that phytotherapeutics present in the formulation VKM such as steroids, triterpenoids, phenol, tanins and saponins have known to possess the inbuilt capacity of treating diabetes mellitus at molecular level.

5. Conclusion

As the global use of herbal medicinal products continues to grow and many more new products are introduced into the market, public health issues, and concerns surrounding their safety are also increasingly recognized. It is very difficult for the people from lower economic zone to afford the allopathic medicine due to its high cost. Further chronic usage of modern medicine seems to be imparting potential adverse events. Increasing resistance towards the modern medicine is also one of the most common factor contributes to usage of allopathic drugs. It is estimated that up to four billion people (representing 80% of the world's population) living in the developing world rely on herbal medicinal products as a primary source of healthcare and traditional medical practice which involves the use of herbs is viewed as an integral part of the culture in those communities. Siddha preparations being safe and reliable have highest range of acceptance among the people belongs to developing countries. Further herbomineral preparation like Vasantha Kusmakaram tablets possess significant amount of bioactive phytocomponents like steroids, triterpenoids, phenol, tanins and saponins may be effective in managing metabolic disorders like diabetes mellitus in future.

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