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Phytochemical And Physico-Chemical Analysis Of Siddha Herbal Preparation Pramega Prayogam

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Abstract

World health organization prominence the necessity of quality and safety of herbal drugs and also it proposes guidelines for its standardization. Standardization assures the identity, determination of quality and purity of herbal formulation through its active or marker compounds. Phytochemical and physicochemical analysis of the polyherbal Siddha preparation, 'Pramega Prayogam chooranam' being used to treat renal calculi (Kalladaippu), Peptic ulcer (Gunmam), All types of leucorrhoea (All types of pramegangal) and etc. The powder of this formulation was subjected to physicochemical study such as Loss on drying, Total ash, Water soluble, Alcohol soluble, pH and preliminary phytochemical screening of the extracts of Pramega Prayoga chooranam. These analytical specifications of standardization useful for further research works.

Keywords: Pramega Prayogam, Siddha, Standardization, Physicochemical, Phytochemical.

Introduction

Siddha system of medicine is the oldest holistic management system with meticulously documented medicines and being practiced by a large population in south India [(1)]. Siddha system attains greater popularity due to their versatile preparations. However, most of the Siddha formulations are herbal and poly herbal components. However, the health benefits of herb and spice extracts have been discussed for centuries. They have been used in many branches of industry such as medicine, pharmacy, cosmetology, and food production [(2)]. The development of this traditional system of medicine with perspectives of safety, efficacy and quality will help not only to preserve the traditional heritage but also to rationalize the use of natural products in healthcare. According to, WHO guidelines, herbal products need to be standardized with respect to safety before releasing into the market. Herbal drugs have been found wide spread in many countries not only because they are easily available and are cheaper but also, they are safer than synthetic drugs. This has to be proved by standardization. The subject of herbal drugs to standardization is massively wide and deep [(1)]. Standardization of herbs usually refers to the chemical analysis of the characteristic bioactive and main components for identification or comparison of species [(2)]. India can emerge as the major country and play the lead role in production of standardized, therapeutically effective herbal formulations. This can be achieved only if the herbal products are evaluated and analyzed using sophisticated modern techniques of standardization. As per the estimate of WHO, more than 80% of global population uses plants or their products has the primary source of medicinal agents. The WHO has appreciated the importance of medicinal plants for public health care in developing nations and has evolved guidelines to support the member states in their efforts to formulate national policy on traditional medicines and to study. The formulation was evaluated for its physicochemical study such as ash values, extractive value and phytochemical analysis [(1)].

Materials and methods:

Preparation of the pramega prayogam chooranam:

Nerunjil mul (*Tribulus terrestris*), Karunjeeragam (*Nigella sativa*), Sarkarai (*Sacchrum officinarum*) were authenticated by botanists, Gunapadam, Government Siddha Medical college, Chennai. The ingredients are roasted and powdered based on Siddha literature Agathiyar Pallu, Pg.no: 165. The powdered drug again purified by steam cooking [4]. Then, mixed thoroughly and stored in airtight container.

Fig.1. Sample chooranam

1.**Physico- chemical parameters** [5,6]

Percentage Loss on Drying

Test drug was accurately weighed in evaporating dish. The sample was dried at 105ºC for 5 hours and then weighed.

Percentage loss in drying = Loss of weight of sample/ Wt of the sample X 100 [2]

Determination of Total Ash

Test drug was accurately weighed in silica dish and incinerated at the furnace a temperature 400ºC until it turns white in color which indicates absence of carbon. Percentage of total ash will be calculated with reference to the weight of air-dried drug.

Total Ash = Weight of Ash/ Weight of the Crude drug taken X 100 [2]

Determination of Acid Insoluble Ash

The ash obtained by total ash test will be boiled with 25 ml of dilute hydrochloric acid for 6mins. Then the insoluble matter is collected in crucible and will be washed with hot water and ignited to constant weight. Percentage of acid insoluble ash will be calculated with reference to the weight of air-dried ash.

Acid insoluble Ash = Weight of Ash/Wt of the Crude drug taken X 100 [2]

Determination of Alcohol Soluble Extractive

Test sample was macerated with 100 ml of Alcohol in a closed flask for twenty-four hours, shaking frequently during six hours and allowing it to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105ºC, to constant weight and weigh. Calculate the percentage of alcohol-soluble extractive with reference to the air-dried drug.

Alcohol sol extract = Weight of Extract/ Wt of the Sample taken X 100

Determination of Water -Soluble Extractive

Test sample was macerated with 100 ml of chloroform water in a closed flask for twenty-four hours, shaking frequently during six hours and allowing it to stand and for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tared flat bottomed shallow dish, and dry at 105ºC, to constant weight and weigh. Calculate the percentage of water-soluble extractive with reference to the air-dried drug.

Water soluble extract = Weight of Extract/ Wt of the Sample taken X 100 [2]

pH determination

Required quantity of test sample was admixed with distilled water and the subjected to screening using pH meter.

2. Phytochemical analysis:

Test for alkaloids:

Mayer's Test: To the test sample, 2ml of mayer's reagent was added, a dull white precipitate revealed the presence of alkaloids.

Test for coumarins:

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

Test for saponins:

To the test sample, 5 ml of water was added and the tube was shaken vigorously. Copious lather formation indicates the presence of Saponins.

Test for tannins:

To the test sample, ferric chloride was added, formation of a dark blue or greenish black color showed the presence of tannins.

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% ammomia solution is added to it. Pink colour indicates presence of glycosides.

Test for flavonoids:

Alkaline reagent test. Two to three drops of sodium hydroxide were added to 2 mL of extract. Initially, a deep yellow colour appeared but it gradually became colourless by adding few drops of dilute HCL, indicating that flavonoids were present.

Test for phenols:

Lead acetate test: To the test sample; 3 ml of 10% lead acetate solution was added. A bulky white precipitate indicated the presence of phenolic compounds.

Test for steroids:

To the test sample, 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.

Triterpenoids

Liebermann–Burchard test: To the chloroform solution, few drops of acetic anhydride was added then mixed well. 1 ml concentrated sulphuric acid was added from the sides of the test tube, appearance of red ring indicates the presence of triterpenoids.

Test for Cyanins

Anthocyanin:

To the test sample, 1 ml of 2N sodium hydroxide was added and heated for 5 min at 100^{o}C. Formation of bluish green colour indicates the presence of anthocyanin.

Test for Carbohydrates - Benedict's test

To the test sample 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.

Proteins (Biuret Test)

To extracts 1% solution of copper sulphate was added followed by 5% solution of sodium hydroxide, formation of violet purple colour indicates the presence of proteins.

Results and discussion:

Standardization becomes highly mandatory as it evident the physiochemical, phytochemical as well as the bioactive component profile of the Siddha preparations [(2)]. The physico-chemical analysis like loss on drying, total ash, acid insoluble ash, water soluble extractive, alcohol soluble extractive value was 9.23 ± 0.70, 8.8 ± 1.039, 0.021 ± 0.05, 17.5 ± 1.11, 9.9 ± 0.360. These values are referring, the chooranam have quality and increased lifespan. Also, pH value is 6.4 indicates slightly acidic in nature of chooranam (Table no.1). Phytochemical analysis of chooranam represents the presence of alkaloids, steroids, triterpenoids, coumarin, phenol, tannin, saponins, sugar, betacyanin and absence of flavanoids, glycosides, proteins, anthocyanins (Table no.2). Presence of above organic compounds in Pramega prayogam chooranam is

responsible for medicinal properties. The chooranam can be used as medication for the treatment of the diseases like renal calculi, leucorrhoea and etc.

Table no.1: Physico-chemical analysis

S.No	Parameter	Mean (n=3) SD
1.	*Loss on Drying at 105 °C (%)*	9.23 ± 0.70
2.	*Total Ash (%)*	8.8 ± 1.039
3.	*Acid insoluble Ash (%)*	0.021 ± 0.05
4.	*Water soluble Extractive (%)*	17.5 ± 1.11
5.	*Alcohol Soluble Extractive (%)*	9.9 ± 0.360
6.	*pH*	6.4

Table no.2: Phytochemical test

S.No	Name of the phytochemicals	Presence/ Absence
1.	Alkaloids	+
2.	Steroids	+
3.	Triterpenoids	+
4.	Coumarin	+
5.	Phenol	+
6.	Tannin	+
7.	Saponins	+
8.	Sugar	+
9.	Betacyanin	+
10.	Flavanoids	-
11.	Glycosides	-
12.	Proteins	-
13.	Anthocyanins	-

Conclusion:

This analytical study reveals the standardization of Pramega Prayoga chooranam and having medicinal values due to the presence of secondary metabolites. From this fundamental research, additional preclinical and clinical evaluation should be done for further consumption of the chooranam.

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