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QUALITATIVE AND QUANTITATIVE ANALYSIS OF SIDDHA FORMULATION *KADALAZHINJIL KUDINEER*

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ABSTRACT

Siddha formulations reduce the risk of side effects and some herbs rejuvenate the body by curing the ailments. In order to prove this scientifically, Qualitative and Quantitative analyses have to be carried out to prove the presence of active constituents. The main objective of this study is to find out the active constituents present in the trial *Siddha* formulation which helps in taking this medicine to next level in this scientific world. Physicochemical and chemical analyses were carried out. This study proves the presence of Iron, Starch and Reducing Sugar.

KEYWORDS

Siddha formulation, *Kadalazhinjil Kudineer*, Chemical and Physicochemical analysis, Ash value, pH, Moisture content, Total Tannin and Saponin content.

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INTRODUCTION

The author has taken *kadalazhinjil kudineer* for curing tinea infections in children. It has been believed that most of the *Siddha* formulations have toxic elements like Mercury, Lead, Cadmium and Arsenic. Qualitative and Quantitative Analysis has been carried out in order to prove the absence of such toxic elements. In chemical analysis, Iron, Starch and Reducing Sugar were present. Toxic constituents like Lead, Mercury and Arsenic are absent. In Physicochemical analysis, Ash value, pH,

Moisture content, Total Tannin and Saponin content were estimated and Cadmium is absent.

MATERIAL AND METHODS

Kadalazhinjli (Salacia reticulata) root bark is made into a coarse powder. Water is added and boiled to get 1/8 measure of the decoction. Filtered and consumed. Salacia reticulata - 8.75gm, water - 70 ml (8 parts)[1].

QUALITATIVE AND QUANTITATIVE ANALYSIS

CHEMICAL ANALYSIS OF TRIAL MEDICINE - *KADALAZHINJIL KUDINEER*

Preparation of Sodium Carbonate Extract

2gm of the sample *Kadalazhinjil Kudineer,* is mixed with 5gm of Sodium Carbonate and taken in a 100ml beaker and 20ml of distilled water is added. The solution is boiled for 10 minutes, cooled and then filtered. The filtrate is called Sodium Carbonate Extract.

PHYSICOCHEMICAL ANALYSIS

Preparation of the plant extract

Preparation of the extracts was assessed by following method as described by Janarthanam *et al.,* 2013. One gram of dried powder of *KK* plant materials were extracted with 20 mL aqueous for 1 min using an Ultra Turax mixer (13,000 rpm) and soaked overnight at room temperature. The sample was then filtered through Whatman No. 1 paper in a Buchner funnel. The filtered solution was evaporated under vacuum in a rota-vator at 40 °C to a constant weight and then dissolved in respective solvents. The dissolving rate of the crude extracts was approximately 100 %. The solution was stored at 18 °C until use.

Phytochemical Screening of plant Extracts of KK

The phytochemical screening of palnt extracts KK were assessed by standard method as described by Brinda *et al.,* (1981); Siddiqui and Ali (1997) and Savithramma *et al.,* (2011). Phytochemical screening was carried out on the plant extracts using different solvents to identify the major natural chemical groups such as tannins, saponins, flavonoids, phenols, terpenoids, alkaloids, glycosides, cardiac glycosides**,** coumarins and steroids. General reactions in these analyses revealed the presence or absence of these compounds in the leaf extracts tested.

PHYTOCHEMICAL ANALYSIS

Test for Tannins

For tannin identification, 1 ml of the plant extract, one ml of ferric chloride (5% $FeCl_3$) was added. Formation of dark blue or greenish black indicates the presence of tannins.

Test for Saponins

For saponin identification, 2ml Plant extract, 2ml of distilled water was added and shaken in graduated cylinder for 15 min lengthwise, formation of 1cm layer of foam indicates the presence of saponins.

Test for Quinones

For Quinones identification, 1ml Plant extract, 1ml of concentrated sulphuric acid (H_2SO_4) was added. Formation of red colour indicates the presence of Quinones.

Test for Flavonoids

For flavonoids identification, 2ml of plant extract, 1ml of 2N sodium hydroxide (NaOH) was added. Formation of yellow colour indicates the presence of flavonoids.

Test for Alkaloids

For Alkaloids identification, 2ml Plant extract, 2ml of concentrated Hydrochloric acid (HCl) was added. Then few drops Mayer's reagent was added**.** Presence of green colour or white precipitate indicates the presence of alkaloids.

Test for Glycosides

For Glycosides identification, 2ml of the plant extract, 3ml of chloroform and 10% ammonium solution was added. Formation of pink colour indicates the presence of glycosides.

Test for Cardiac glycosides

For Cardiac glycosides identification, 0.5 ml of the plant extract, 2 ml of glacial acetic acid and few drops of 5 % ferric chloride were added. This was under layered with 1 ml of concentrated sulphuric acid. Formation of brown ring at interface indicates the presence of -+cardiac glycosides.

Test for Terpenoids

For Terpenoids identification, 0.5 ml of the plant extract, 2 ml of chloroform along with concentrated

Sulphuric acid. Formation of red brown colour at the interface indicates the presence of Terpenoids.

Test for Phenols

For phenol identification, 1ml of the plant extract, 2ml of distilled water followed by few drops of 10 % ferric chloride was added. Formation of blue / green colour indicates the presence of phenols.

Test for Coumarins

For coumarins identification, 1 ml of plant extract, 1 ml of 10 % NaOH was added. Formation of yellow colour indicates the presence of coumarins.

Test for Steroids

For steroid identification, 0.5 ml of the plant extract, 2 ml of chloroform and 1 ml of Sulphuric acid (H_2 SO_4) were added. Formation of reddish brown ring at interface indicates the presence of steroids.

Test for Anthocyanin and Beta cyanin

For Anthocyanin and Beta cyanin identification, to 2ml of the plant extract, one ml of 2N sodium hydroxide (NaOH) was added and heated for 5 min at 100°C. Formation of bluish green colour indicates the presence of anthocyanin and formation of yellow colour indicates the presence of betacyanin.

S.No	EXPERIMENT	OBSERVATION	INFERENCE
I	**TEST FOR ACID RADICALS**		
1 a	**TEST FOR SULPHATE** 2ml of the above prepared extract is taken in a test tube. To this, 2ml of 4%Ammonium Oxalate solution is added.	Absence of White Precipitate	Absent
b	2ml of the extract is added with 2ml of Dilute Hydrochloric acid until the effervescence ceases off. Then 2ml of Barium Chloride solution is added.	Absence of White Precipitate	Absent
2	**TEST FOR CHLORIDE** 2ml of the extract is added with Dilute Nitric Acid until the effervescence ceases. Then 2ml of Silver Nitrate solution is added	Absence of White Precipitate	Absent
3	**TEST FOR PHOSPHATE** 2ml of the extract is treated with 2ml of Ammonium Molybdate solution and 2ml of Concentrated Nitric Acid.	Absence of yellow Precipitate	Absence
4	**TEST FOR CARBONATE** 2ml of the extract is treated with 2ml of Magnesium Sulphate solution.	Absence of White Precipitate	Absent
5	**TEST FOR SULPHIDE** 1gm of the substance is treated with 2ml of Concentrated hydrochloric Acid.	Absence of Rotten egg smell	Absent
6 a	**TEST FOR FLUORIDE AND OXALATE** 2ml of extract is added with 2ml of Dilute Acetic Acid and 2ml of Calcium Chloride solution and heated.	Absence of White Precipitate	Absent
b	5 drops of clear solution is added with 2ml of dilute Sulphuric Acid and slightly warmed. To this, 1ml of Dilute Potassium Permanganate solution is added.	Absence of Potassium Permanganate solution discolouration	Absent
7	**TEST FOR BORATE** 2 pinches of the substance is made into a paste by using Sulphuric Acid solution and Alcohol (95%) and introduced into the flame.	Absence of Green tinged flame	Absent
II	**TEST FOR BASIC RADICALS**		
8	**TEST FOR LEAD** 2ml of the extract is added with 2ml of Potassium Iodide solution.	Absence of Yellow precipitate	Absent

9 a	**TEST FOR COPPER** One pinch of the substance is made into a paste with Concentrated Hydrochloric Acid in a watch glass and introduced into the non-luminous part of the flame.	Absence of Bluish Green coloured flame	Absent
b	2ml of the extract is added with excess of Ammonia solution.	Absence of deep blue.	Absent
10	**TEST FOR ALUMINIUM** To the 2ml of the extract, Sodium Hydroxide solution is added in drops to excess.	Absence of White Precipitate	Absent
11	**TEST FOR IRON** To the 2ml of the extract, 2ml of Ammonium Thiocyanate solution and 2ml of Concentrated Nitric acid is added.	Blood red colour is present	Present
12	**TEST FOR ZINC** To the 2ml of the extract, sodium Hydroxide solution is added in drops to excess.	Absence of White Precipitate	Absent
13	**TEST FOR CALCIUM** 2ml of the extract is added with 2ml of 4% Ammonium Oxalate solution.	Absence of White Precipitate	Absent
14	**TEST FOR MAGNESIUM** To the 2ml of the extract, Sodium hydroxide solution is added in drops to excess.	Absence of White Precipitate	Absent
15	**TEST FOR AMMONIUM** To the 2ml of the extract, few ml of Nessler's Reagent and excess of Sodium Hydroxide solution are added.	Absence of Reddish Brown precipitate	Absent
16	**TEST FOR SODIUM** 2 pinches of the substance is made into a paste by using Hydrochloric Acid and introduced into the blue flame.	Absent of Yellow colour flame	Absent
17	**TEST FOR MERCURY** 2ml of the extract is treated with 2ml of Sodium Hydroxide solution.	Absence of Yellow precipitate	Absent
18	**TEST FOR ARSENIC** 2ml of the extract is treated with 2ml of Silver Nitrate solution.	Absence of Yellow precipitate	Absent
19	**TEST FOR STARCH** 2ml of the solution is treated with weak Iodine solution.	Blue colour is obtained	Present
20	**TEST FOR REDUCING SUGAR** 5ml of Benedict's Qualitative solution is taken in a test tube and allowed to boil for 2 minutes and 10 drops of the extract is added and again boiled for 2 minutes. The colour changes are noted.	Green colour is obtained	Present

CHEMICAL ANALYSIS OF TRIAL MEDICINE – *KADALAZHINJIL KUDINEER*

S.No	CONSTITUENTS	*KADALAZHINJIL KUDINEER*
ACID RADICALS		
1	SULPHATE	ABSENT
2	CHLORIDE	ABSENT
3	PHOSPHATE	ABSENT
4	CARBONATE	ABSENT
5	SULPHIDE	ABSENT
6	FLURIDE AND OXALATE	ABSENT
7	BORATE	ABSENT
BASIC RADICALS		
8	LEAD	ABSENT
9	COPPER	ABSENT
10	ALUMINIUM	ABSENT
11	IRON	PRESENT
12	ZINC	ABSENT
13	CALCIUM	ABSENT
14	MAGNESIUM	ABSENT
15	AMMONIUM	ABSENT
16	SODIUM	ABSENT
17	MERCURY	ABSENT
18	ARSENIC	ABSENT
19	STARCH	PRESENT
20	REDUCING SUGAR	PRESENT

Table No.1: Phytochemical screening from plant extracts of KK

S.No	Phytochemicals Tested	plant extracts of *KK*
		Aqueous
1	Tannins	**++**
2	Saponins	**++**
3	Quinones	**++**
4	Terpenoids	**++**
5	Steroids	**++**
6	Flavonoids	**++**
7	Phenol	**++**
8	Alkaloids	**+**
9	Glycosides	**-**
10	Cardiac glycosides	**+**
11	Coumarins	**++**
12	Antho cyanin	**-**
13	Beta cyanin	**+**

Key: + = positive, ++ = strong positive, - = negative

Physiochemical analysis

S.No	Sample	pH	Moisture (%)	Ash	Cadmium
1	KK	5.9	1.6	13.85	Negative

Quantification of Tannin and Saponin

S.No	Plant sample	Total saponin conent (%)	Total tannin content (µg TAE / g)
1	*KK*	19.5	18.0

CONCLUSION

The results of this study shows that the *Siddha* formulation *Kadalazhinjil Kudineer* has Iron, Starch and Reducing Sugar were present. Toxic constituents like Lead, Mercury and Arsenic are absent. In Physicochemical analysis, Ash value, pH, Moisture content, Total Tannin and Saponin content were estimated and Cadmium is not absent.

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CONFLICT OF INTEREST

I declare that I have no Conflict of Interest.

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