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Phytochemical Investigation of Seed of *Cucumis callosus* (Rottl.) Cogn

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ABSTRACT

Powdered seed of *Cucumis callosus* (Rottl.) Cogn. (*Cucurbitaceae*) were subjected to successive soxhlet extraction with petroleum ether 60-80, benzene, chloroform, alcohol and water to get their respective extracts for detailed chemical analysis. Fluorescence character of different extracts and seed powder with various reagents were noted under UV and under normal ordinary light. The total ash value, acid insoluble ash value, water soluble ash and sulphated ash value were 3.522, 0.118, 0.591 and 3.661%, respectively. Loss of weight on drying was 7.945%, the percent yield for petroleum ether 60-80, benzene, chloroform, alcohol, water extracts were 16.08, 3.12, 3.04, 5.79 and 9.84%, respectively. Foaming index was found less than 100. The qualitative chemical analysis of extracts were found positive for alkaloids, proteins, carbohydrates, flavonoids, glycosides, saponins and tannins in alcohol and aqueous solvent extracts. These studies provide referential information for correct identification and standardization of this plant material.

Keywords: *Cucumis callosus*, seed, solvent extracts, physicochemical and phytochemicals.

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INTRODUCTION

Though the traditional Indian system of medicine has a long history of use, however a key obstacle, which has hindered the acceptance of the alternative medicines in the developed countries, is the lack of documentation and stringent quality control. There is a need for documentation of research work carried out on traditional medicines [1]. Phytochemicals may protect human from a host of diseases. Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. Plant produces these chemicals to protect itself but recent research demonstrates that many phytochemicals can protect humans against diseases. Herbal drugs play an important role in health care programs especially in developing countries. Ancient Indian literature incorporates a remarkably broad definition of medicinal plants and considers 'all' plant parts to be potential sources of medicinal substances [2].

Cucumis callosus (Rottl.) Cogn (*Cucurbitaceae*) commonly known as "Kachri" in Rajasthan has been claimed in traditional literature to be valuable against a wide variety of diseases. The herb is distributed throughout India in arid zones. The herb is much branched very common prostrate, perennial herb, Leaves are cordate, suborbicular, deeply palmately 5-7 lobed. Flowers are yellow. Fruits are smooth, obovoid.ellipsoid, green variegated stripes [3,4]. Fruiting in August-November.

Fruit is traditionally used to prevent insanity to strong memory and remove vertigo. The seeds are cooling and astringent and useful in bilious disorder [3,4]. Seeds are powdered and given in twice a day traditionally in diabetics in Sri Lanka, expert cooling effect, improve appetite, easy bowel syndrome, relieves stomach pain, vomiting and constipation [5, 6] Paste of root is applied on scorpion sting, decoction of root is given in indigestion, dropsy, and pulp of fruit used in abortion and to increase menses for women [7].

MATERIALS AND METHODS

Plant material collection and authentication

The plant was collected around the Jaipur, Rajasthan and authenticity of plant was confirmed from "Herbarium Department of Botany, University of Rajasthan, Jaipur. The herbarium No RUBL 20955 of the same was preserved in Herbarium Department of Botany, University of Rajasthan, Jaipur for further reference. The seeds were dried in shade at room temperature and the dried seeds were powdered coarsely and passed through sieve no. 40, and stored in a well closed container.

Extraction of plant seed material

The powdered Material was subjected to hot continuous extraction in a Soxhlet extractor, successively with different known solvents in increasing order of polarity viz petroleum ether (60-80^o), benzene, chloroform, alcohol. Finally, the powdered material was macerated with water for 24 hrs to obtain aqueous extract. Each time before extracting with

next solvent, the powdered material was dried in hot air oven below 50°C. Each extract was then concentrated by distilling off the solvent by evaporation to a water bath [8, 9]. All the extracts were stored in refrigerator for qualitative analysis.

Physicochemical parameters

The total ash is particularly important in the evaluation of purity of drugs, i.e. the presence or absence of foreign organic matter such as metallic salts and/or silica. The total ash value of plant material indicated the amount of minerals and earthy materials attached to the plant material.

Preliminary phytochemicals screening

The extracts obtained from successive solvent extraction were then subjected to various qualitative chemical tests to determine the presence of various phytoconstituents like alkaloids, carbohydrates, proteins/amino acids, glycosides, fixed oils & fats, phenolics, tannins, phytosterols, flavonoids, Saponins. [11].

Fluorescence characters of the plant powder and extract:

When physical and chemical parameters are inadequate as it often happens with the powdered drugs, the plant material may be identified from their adulterants on basis of fluorescence study. The treatment of powdered drugs with different chemical reagents reveals the presence of different chemical constituents with fluorescence character in UV light. The fluorescent method is adequately sensitive and enable the precise and accurate determination of the analyze over a satisfactory concentration range without several time consuming dilution steps prior to analysis of pharmaceutical samples [12]. The non-fluorescent compound may fluoresce if mixed with impurities that are fluorescent. Therefore, the results obtained from the present fluorescent studies will also help to check any impurities present in plant powder [13].

RESULTS AND DISCUSSION

All the results generated from the present study are represented in the respective tables. The powdered seed of *Cucumis Callosus* (Rottl.) Cogn. were subjected to Preliminary physicochemical and phytochemicals analyses which were found to be very promising.

Physicochemical Investigation

The determination of various physicochemical parameters i.e. total ash, acid insoluble ash, water soluble ash and loss on drying were calculated as per Indian Pharmacopoeia [10]. The results are tabulated in the Table 1.

Table 1 Physicochemical Parameters of powdered seed of *Cucumis Callosus* (Rottl.) Cogn.

Sr. No.	Parameters	% W/W
1.	Ash values	
	(a) Total ash	3.522
	(b) Acid insoluble ash	0.118
	(c) Water soluble ash	0.591
	(d) Sulphated ash	3.661
2.	Loss on drying	7.945

Fluorescence characters of the seed powder and extracts:

Fluorescence characters of the seed powder under ordinary light and UV light (254 & 366 nm) were determined and are tabulated in Table 2 and seed powder extracts are tabulated in the Table 3.

Table 2 Fluorescence Analysis of powdered seed of *Cucumis callosus* (Rottl.) Cogn.

Sr. No.	Chemical Treatment	Day light	UV Light	
			254 nm	366 nm
1.	Powder as such	Pale yellow	Pale yellow	Brown
2.	Powder + Water	Pale white	Pale white	Pale white
3.	Powder + 1 N HCl	Light yellow	Light yellow	Pale green
4.	Powder + 5% NaOH	Light yellow	Light yellow	Pale green
5.	Powder + 1N NaOH (Alcoholic)	Light yellow	Light yellow	Pale green
6.	Powder +50%HNO ₃	Yellow	Yellow	Green
7.	Powder +50%H ₂ SO ₄	Pinkish Brown	Brown	Brown
8.	Powder +Ammonia	Pale white	Pale white	Light green
9.	Powder +Acetic acid	Pale white	Pale white	Light green
10.	Powder + I ₂ sol ⁿ .	Red	Dark red	Dark red
11.	Powder + FeCl ₃	Orange	Orange	Yellowish green

Table3 Fluorescence Analysis of extracts of powdered seed of *Cucumis callosus* (Rottl.) Cogn.

Sr. No.	Chemical Treatment	Day light	UV Light	
			254 nm	366 nm
1.	Petroleum Ether (60-80) extract	Orange golden yellow	Brown	Brown
2.	Benzene extract	Creamish light brown	Light brown	Brown
3.	Chloroform extract	Creamish light brown	Light brown	Brown
4.	Alcoholic extract	Brown	Greenish yellow	Greenish yellow
5.	Aqueous extract	Brown	Dark brown	Dark brown

Extraction values of successive solvent extracts

The preliminary phyto-profiling for the seed of *Cucumis Callosus* (Rottl.) Cogn.were carried out wherein the consistency was found. The extraction of any crude drug with a particular solvent yields a solution containing different phyto-constituents. Extractive values were also determined which are primarily useful for the determination of exhausted or adulterated drugs. Extractive value is also useful for evaluation of crude drug, which gives an idea about the nature of the chemical constituents present in a crude drug and is useful for the estimation of specific constituents, soluble in that particular solvent used for extraction [14] and results are tabulated in the Table 4.

Table 4 Extractive values of seed of *Cucumis callosus* (Rottl.) Cogn.

Sr. No.	Solvent extracts	Colour	Consistency	Yield (% W/W)
1.	Petroleum Ether extract	Orange golden yellow	Semi solid with sticky	16.08%
2.	Benzene extracts	Creamish light brown	Non sticky	3.12%
3.	Chloroform extract	Creamish light brown	Non sticky	3.04%
4.	Alcohol extract	Brown	Non Sticky	5.79%
5.	Aqueous extract	Brown	Non sticky	9.84%

Preliminary phytochemical screening

Table 5 Preliminary phytochemical screening of extracts of powdered seed of *Cucumis callosus* (Rottl.) Cogn.

Sr. No.	Name of the Test	Procedure	PE	BE	CE	AE	AE
1.	Alkaloids	Dragondroffs reagent Mayer's reagent Hager's reagent	-	-	-	+	+
2.	Carbohydrates	Molish's reagent+ conc.H ₂ SO ₄ Fehling's solution A&B	-	-	-	+	+
3.	Proteins& Amino acids	Biuret test Xanthoprotein test Millon's reagent test Lead acetate test	-	-	-	+	+
4.	Glycosides	Legals test. Borntragers test. Keller killiani test. Cardiac Glycsides Coumarin Glycosides	-	-	-	+	+
5.	Saponins	Drug + water + shaking	-	+	-	+	+
6.	Flavonoids	Shinodaw's Test Zn-HCl acid reduction Test	-	-	-	+	+
7.	Fixed oils & Fats	Spot test	+	-	-	-	-
8.	Phenolics/ Tannins	FeCl ₃ + lead acetate + water	+	-	-	+	+

9.	Steroids	Drug +acetic anhydride + H ₂ SO ₄	-	-	-	-	-
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Key: + = Present; - = Absent; PE=Petroleum ether Extract; BE=Benzene Extract; CE = Chloroform Extract; AE = Alcoholic Extract; AqE = Aqueous Extract

Preliminary phytochemical screening mainly revealed the presence of alkaloids, proteins, carbohydrates, flavonoids, glycosides, saponins and tannins in alcohol and water extracts. The results pertaining to this investigation were presented in Table 5.

Foaming Index of powdered seed of *Cucumis callosus* (Rottl.) Cogn

Table 6 Foaming Index of powdered seed of *Cucumis callosus* (Rottl.) Cogn

Sr. No.	Test volumetric flask No. (10ml)	Height of foam (cm.)
1.	1	0.05
2.	2	0.1
3.	3	0.2
4.	4	0.3
5.	5	0.3
6.	6	0.4
7.	7	0.5
8.	8	0.6
9.	9	0.7
10.	10	0.8

Thus, the foaming index of the powdered *Cucumis Callosus* (Rottl.) Cogn. was found less than 100.

CONCLUSION

In the present physicochemical investigation and preliminary phytochemical screening of powdered seed of *Cucumis callosus* (Rottl.) Cogn. provide valuable information regarding their identification, authenticating and chemical constituents which may be useful for the standardization and preparation of monograph. The constituents of *Cucumis callosus* (Rottl.) Cogn. may have several medicinal properties and can be utilized for the treatment of various diseases. Further research on this species may help in the isolation of therapeutically potent compounds which can be finally be subjected to pharmacological activities, thus leading to opening up new avenues in the use of natural products for therapeutic purpose.

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