Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2012, 4(4):1950-1955

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Evaluation of *Ocimum sanctum* and *Ocimum basillicum* Mucilage- As a Pharmaceutical Excipient

Prasad V. Kadam*, Kavita N. Yadav, Sachin K. Jagdale, Rakesh S. Shivatare, Sumeet K. Bhilwade and Manohar J. Patil

Marathwada Mitra Mandal's College of Pharmacy, Thergaon (Kalewadi), Pune, India

---

ABSTRACT

In recent year, limited choice of excipients with all the good qualities attributes and presently available in the market can make formulation design and Excipients selection challenging. Thus the aim of this study was to isolate and evaluate Pharmaceutical Excipient from the seed of Ocimum sanctum and Ocimum basillicum which can be useful for designing new formulations. The coarse powder of both Ocimum sanctum and Ocimum basillicum was defatted by using Petroleum ether and that defatted seeds were activated in hot air oven. The activated seeds are soaked in 6^{th} part of chloroform water and filtered. To the filtrate an equal volume of alcohol (95%) was added to precipitate the excipient. The resultant excipients were evaluated for physicochemical properties, water absorption capacity, phytochemical test etc. The isolated excipients having neutral p^H with slight solubility in water which produces a stable suspension. The concentration of excipient was increased with decrease in the specific gravity of solution. The study shown that, the parameters evaluated for excipients was within the permissible limits. This information can be useful for designing new formulations or for modification of the conventional formulations.

Key Words: Characterization, Excipients, *Ocimum basillicum*, *Ocimum sanctum*.

INTRODUCTION

Ayurvedic system of medicine is widely practiced and accepted by peoples not only in India but also in the developed countries such as USA, Europe, China, Japan, Canada etc.[1]. Nearly 80% of the world's population relies on traditional medicines for primary health care, most of which involve the use of plant extracts[2]. The International Pharmaceutical Excipients Council defines Excipients as any substance other than the active drug or pro-drug that is included in the manufacturing process or is contained in a finished pharmaceutical dosage form [3]. Pharmaceutical excipients are the additives used to convert active pharmaceutical ingredients into pharmaceutical dosage form suitable for administration to patients [4]. New and improved Excipients continue to be developed to meet the needs of conventional drug delivery systems and to meet the needs of advanced pharmaceutical dosage form manufacturing. Plant products serve as an alternative to synthetic products because of local accessibility, environment friendly nature and lower prices compared to imported synthetic products [5]. India is one of the 12-mega biodiversity centers having about 10% of the world's biodiversity wealth. Out of 17,000 species of higher plants reported to occur within India, 7500 are known to have medicinal uses. This proportion of medicinal plants is the highest known in any other country [6]. Many products from natural sources like plant exudates, gums, mucilage, and starches are utilized for preparation of pharmaceutical dosage forms like tablets, syrups, suspensions, emulsions, ointments and sustained drug release systems [7]. Majority of investigations on

natural polymers in drug delivery systems are centered on polysaccharides and proteins, due to their ability to produce a wide range of materials and properties based on their molecular structures [8]. The current works on Excipients development and functionality of these materials including their importance in formulation design processing challenges directly related to excipients, and therapeutic benefits. The population uses most of the plants of Labiatae family as source holy crude drugs [6,9]. Members of Labiatae family are abundantly distributed throughout India, and have been known for their nutritional values which may be attributed to carbohydrates present their in. In the present work attempts have been made to evaluate the excipients extracted from Member of Labiatae family that is from *ocimum sanctum* and *ocimum basillicum* [10]. Ocimum sanctum (OS) is considered a sacred plant in the Hindu culture and known as "Tulsi" or "Tulasi" in Hindi or Holy Basil in English. Basils (Ocimum spp., Lamiaceae) contain a wide range of essential oils rich in phenolic compounds, linalool and a wide array of other natural products including polyphenols such as flavonoids and anthocyanins[11]. Ocimum basilicum L. (Lamiaceae), commonly known as sweet basil is an evergreen multipurpose herb. In tropical countries, it is often cultivated in homestead gardens and as a pot plant in many countries. Dried leaves of basil are used to flavour stew, sauces, salads, soups, meat and tea. The plant has been considered ethnobotanically important because of its use in traditional health care system[12]. The work had been designed to develop suitable method for extraction of excipients with maximum yield and to explore utility of excipients for pharmaceutical purpose. The information will be of use to develop newer strategies for production of new formulations and will be a part of research on traditional drugs.

EXPERIMENTAL SECTION

Identification and Collection of Drug

The crude drugs i.e. seeds *ocimum sanctum* and *ocimum basillicum* used in preparation were purchased from the local Market, Pune, and were identified and Authenticated by Department of Pharmacognosy Marathwada Mitra Mandal's College of Pharmacy, Pune by correlating their morphological and microscopical characters with those given in literatures.

Extraction and Isolation of Excipients

The air-dried and cleaned seeds were passed through grinding mill. The coarse powder was prepared and defatted by using Petroleum ether ($60\text{-}80^0$), by using continuous hot extraction process, and the oil collected was further analyzed for different studies. The defatted seeds of both *Ocimum sanctum* and *Ocimum basillicum* were first activated in hot air oven for 1hr at a temperature of $100\text{-}120^0$c. The activated seeds are soaked in 6^{th} part of chloroform water for 24 hrs, for release of excipients into water. The material was squeezed in a muslin bag to remove marc from the filtrate. To the filtrate an equal volume of alcohol (95%) was added to precipitate the excipient. The excipients were separated, dried in oven at temperature less than $50^o \pm 2$. Collected excipient was stored in tightly closed container in cool, dark place [13-16].

Organoleptic Evaluation

Organoleptic evaluation was carried out to assess the color, odor and taste of the isolated excipients [6,17].

Physicochemical Evaluation

Physical standards are helpful in evaluation of the quality and purity of the crude drug, isolated excipients thus proximate chemical analysis was carried out before starting the extraction and isolation of excipients as well as after the isolation of excipients. In physicochemical evaluation ash value such as total ash, acid insoluble ash, swelling factor, moisture content was evaluated. The ash value indicates the presence of inorganic salts present in the drug. The water soluble and alcohol soluble extractive values were determined. The information collected from this evaluation was useful for standardization and obtaining the quality standards for crude drugs. Determinations of these physicochemical constants were done as per procedures mentioned in accordance with WHO guidelines [17,18].

Characterization of Excipient

The excipients isolated from Ocimum sanctum and Ocimum basillicum was estimated to check the characteristics of excipients which include water absorption capacity, Solubility, pH, specific Gravity of excipients [17-21].

Preliminary Phytochemical Investigations

The qualitative chemical tests carried out for the identification of the nature of phyto-constituents present in excipients. For this the suspension of excipients was prepared in water and this was further used to carry out different chemical tests as per the procedure [22].

RESULTS AND DISCUSSION

The raw material used for isolation of excipients was examined for probable adulterants such as plant material of similar appearance some physicochemical parameter. The result of evaluation of raw material lies within limit which is mentioned in Table 1. The values were within limit. It indicates that the powder was free from any adulteration or contamination like dirt, sand etc. The isolated excipients were evaluated according to standard procedure. They were evaluated by comparative analysis for their organoleptic, Physicochemical and some physical parameter.

Table 1: Physicochemical evaluation of crude drug

S.N.	Parameter	Values (% w/w)	
		Ocimum sanctum	***Ocimum basilicum***
1.	Total ash	12	12
2.	Acid insoluble ash	3.2	5.2
3.	Water soluble ash	5.6	5.2
4.	Loss on Drying	6.6	6.5
5.	Swelling Factors	9 ml	13 ml
6.	Water Absorption Capacity	9 ml	12.5 ml

Organoleptic Evaluation

The organoleptic evaluation provides the simplest and quickest means to establish the identity and thereby ensure quality of a particular sample and these features are useful in judging the material in excipients. The organoleptic evaluation of the excipients was mentioned in table no.2.

Table 2: Preliminary Analysis of the excipients

S.N.	Crude Drug	Yield % w/w	Colour	Odour	Texture
1.	*Ocimum sanctum*	1.22	Brownish, Ash like	Characteristic	Hygroscopic powder
2.	*Ocimum basillicum*	2.00	Dark Yellowish Brown	Characteristic Sweetish	Hygroscopic powder

Physicochemical Evaluation

The results of physicochemical parameters of crude drugs were summarized in Table 1 and that of the excipients were mentioned in table 3. As excipient is the product of natural origin certain physicochemical properties can helpful in identifying characters of excipient. Thus seeds of *Ocimum sanctum* & *Ocimum basilicum* and their isolated excipient was also subjected to determination of various ash values for determination of inorganic content or any adulteration if present, the total ash was found to be greater might be because of presence of mineral salts in mucilage [19] Sometimes, inorganic variables like calcium oxalate, silica, carbonate content of crude drug affects "total ash" values, such variables are then removed by treating with acid (as they are soluble in hydrochloric acid and then acid-insoluble ash value is determined [6]. The result of total ash value indicated the purity of drug that is the presence or absence of foreign matter such as metallic salt or silica present in the crude drug or in excipient; the values for *Ocimum sanctum* and for *Ocimum basillicum* were found to be 14 and 14.2 respectively [22]**.** Acid insoluble ash particularly indicates contamination with silicious materials e.g., earth and sand, comparisons of this with the total ash value of the same sample will differentiate between contaminating materials and variations of the natural ash of the drug which was found to be 4.8 and 4.8 in *Ocimum sanctum* and for *Ocimum basillicum* respectively. The water soluble ash was used to detect the presence of material exhausted by water, the result were found to be 5.20 and 4.8 for *Ocimum sanctum* and for *Ocimum basillicum* respectively. The result of ash values was found to be fairly low, thus conclusion can be drawn that quality and purity of the excipient was good enough. The swelling factor gives an idea about the mucilage content in excipient while Loss on drying gives an idea about the moisture content [22]. As the seeds of *Ocimum sanctum* & *Ocimum basilicum* and excipient having mucilaginous taste and also measurable swelling factor The swelling index for *Ocimum sanctum* and *Ocimum basilicum* was found to be 20 ml and 2.5 ml respectively, hence it confirm that the excipients obtained from *Ocimum sanctum* & *Ocimum basilicum* contain mucilage and also the quality of the excipients was good. Insufficient drying favors the spoilage by molds and bacteria and makes possible the enzymatic destruction of active principles. Not only is the

ultimate dryness of the drug is important, equally important is the rate at which the moisture is removed and the condition under which it is removed. If the rate is too slow, much spoilage may occur before the drying process is completed; for *Ocimum sanctum* and for *Ocimum basillicum* the values were found to be 7.6 and 5.5 respectively which signify that the excipients was properly dried and properly stored.

Table 3: Physicochemical analysis of Excipients

S. N.	Parameter	Values (% w/w)	
		Ocimum sanctum	*Ocimum basillicum*
1.	Total ash	14	14.2
2.	Acid insoluble ash	4.8	4.8
3.	Water soluble ash	5.20	4.8
4.	Swelling Index	20 ml	2.5 ml
5.	Moisture Content	7.6	5.5

Characterization of Excipient:

For both the excipients the pH was determined which was with in the range of 6-7. This value was closer to neutral, so that it may be less irritating to GIT, hence can be utilized for making the uncoated tablets. Solubility values are useful for evaluation of excipient and give an idea about the nature of chemical constituents present in them. The amount of solubility produced by excipient in a particular given solvent is often an approximate measure of a certain constituent or group of related constituents the excipient contains. In some cases the amount of excipient soluble in a given solvent is an index of its purity [6], from result it was observe, since the excipient was slightly soluble in water system it shows the presence of highest amount of polar constituents than non polar constituents and also the non-polar constituents are slightly soluble in water produces a stable suspension which on heating produces jelly like consistency. For the water absorption capacity of the seeds of *Ocimum sanctum* & *Ocimum basilicum* and excipients, it was found that the water absorption capacity of the excipients obtained from was fairly high, which indicate its water holding property, which is an important parameter during designing the formulation. It was found to be 15 ml and 2 ml for *Ocimum sanctum* and *Ocimum basilicum* respectively. The specific gravity measurements were done for the determination of the concentrations of substances in aqueous solutions. The specific gravity was also checked for 0.5 to 3 % w/v concentration of excipient suspension in distilled water. The results for specific gravities have been shown in table 4.

Table 4: The Specific gravities of Excipient suspension

Sr. No.	Concentration % w/v	Specific gravity	
		Ocimum sanctum	*Ocimum basilicum*
1	0.5	1.013	1.012
2	1	1.011	1.009
3	2	1.010	1.008
4	3	0.993	1.007

It was observed that as concentration of excipient was increased when there was decrease in the specific gravity of solution. The observation for specific gravities has been shown in Figure 1.

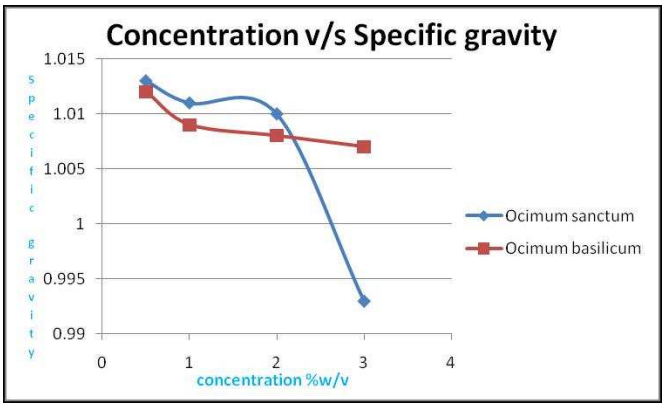

Fig 1: Specific gravity of Excipients

Phytochemical Study

The detail composition of excipients and its activity was depending upon the major types of phytoconstituents present in the formulation which was expressed in Table 5. The Phytochemical evaluation gives the information about phytoconstituents present in the formulation. Phytochemical evaluation of *Ocimum sanctum* excipient showed, amino acids and proteins whereas *Ocimum basilicum* excipient showed the presence of only carbohydrates which revealed their potent therapeutic activity.

Table 5: The Preliminary Phytochemical Study

Sr. No	Test	Observation	
		Ocimum sanctum	*Ocimum basilicum*
1.	Tests for carbohydrates		
	Molisch Test	+	+
	Reducing sugars	-	-
	Non-reducing sugars	+	+
	Starch	-	-
	Gums	+	+
	Mucilage	+	+
2.	Tests for proteins	+	-
3.	Test for amino acids	+	-
4.	Test for fats and oils	-	-
5.	Test for steroids	-	-
6.	Test for volatile oils	-	-
7.	Test for glycosides	-	-
8.	Test for alkaloids	-	-
9.	Test for tanins	-	-

CONCLUSION

The pharmaceutical extracted from *ocimum sanctum* and *ocimum basillicum*, their characterization by using modified method. The isolated excipients were evaluated for physicochemical properties, water absorption capacity, specific gravity, p^H, phytochemical test etc. The study that, all the evaluated parameters for excipients was within the permissible limits as per WHO, all these investigations are not specified in the standard literature such as in pharmacopoeia. Pharmaceutical excipients extracted from ocimum sanctum and ocimum basillicum shown slight solubility in water so it may be very useful in making stable suspension also contain gum and mucilage so it may be used as binder in making tablet.

REFERENCES

[1] VK Gupta; V Arya, *J. Chem. Pharm. Res.*, **2011**, 3(1), 613-620.
[2] N Savithramma; M Linga Rao; G Bhumi, *J. Chem. Pharm. Res.*, **2011**, 3(5),28-34.
[3] C Dorothy; RK Chang, *Pharm. Tech.*, **2007**, 6, 12-16.
[4] AH Kibbe. Handbook of pharmaceutical excipients, 3rd edition, pharmaceutical press, London, **2000**, 1-14.
[5] S Tripathy, K Pramod, AK Banthia. Scientific abstract 56th Indian Pharmaceutical Congress, **2004**, A-71.
[6] Anonymous. Indian Pharmacopoeia, Govt of India, Ministry of Health and Family Welfare, Vol. 2, The Controller of Publications, Delhi, **1996**, 53-54, 95- 110.
[7] GS Banker, NR Anderson. Tablets, 3rd edition, Varghese Publishing house, Mumbai, **1987**, 336.
[8] Anonymous. The Wealth of India, First Supplement Series, (raw material) IV, CSIR publication, New Delhi, **2003**, 217-221.
[9] KM Nadkarni. Indian Materia Medica, 3rd edition, Popular Prakashan, Mumbai, **2007**, 937-942.
[10] KR Kirthikar, BD Basu. Indian Medicinal Plants, 2nd edition, vol. II, Popular Publications dehradun, India, **1999**, 2452-2455.
[11] V Joshi; B Bothara; J Surana, *J. Chem. Pharm. Res.*, **2011**, 3(1),478-487.
[12] M Johnson; A Babu; V Irudayaraj, *J. Chem. Pharm. Res.*, **2011**, 3(1),715-720.
[13] GT Kulkarni, K Gowthamarajan, BG Rao, B Suresh. Indian Drugs, **2002**, 39(8), 422-425.
[14] VS Londhe, Formulation studies of seed gum Leucaena leucocephala, M. Pharm Thesis, Poona College of Pharmacy, Pune University, **1990**; 17-19.
[15] DM Patel; DG Prajapati; NM Patel, *Indian J. Pharm. Sci*., **2007**, 69(3), 431-435.
[16] KS Rao; SH Mishra, *Indian J. Pharm. Sci*., **1992**, 54(1), 28-30.

[17] WC Evans. Trease and Evan's Pharmacognosy, 15th edition, Sounders Company Limited, London, **2002**, 98-99.
[18] WHO, Quality Control Methods for Medicinal Plant Materials, AITBS Publishers, Delhi, **2002**, 46-51
[19] PK Mukherjee. Quality control of herbal drugs, 1st edition, Business Horizons, New Delhi, **2003**, 97- 98,184-195, 248- 249, 529-567, 701-725, 750-766.
[20] ME Aulton. The science of dosage forms designs, 2nd edition, Churchill Livingstone, New Delhi, **1988**, 133-135.
[21] CK Kokate, AP Purohit, SB Gokhale. Pharmacognosy, 22nd Edition, Nirali Prakashan, Pune, **2003**, 99, 109, 257.
[22] KR Khandelwal. Practical Pharmacognosy Techniques and experiments, 11th edition, Nirali Prakashan, Pune, **2004**, 149-159.