



PHARMACOGNOSTICAL AND PHARMACEUTICAL EVALUATION OF VIJASARADI CAPSULE -A FORMULATION FOR INSULIN DEPENDENT TYPE 2 DIABETES MELLITUS

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ABSTRACT

Vijaysaradi capsule is a formulated medicine comprising of equal quantities dry extract of *Vijaysara*, *Meshashringi*, *Methika* and *Rasona*, Each drug of this formulation is proven to have significant hypoglycemic activity as per Ayurvedic classics and insulinotropic activity along with hypoglycemic activity is proved in modern pharmacological experiment and in animal model. Diabetes accounts for a huge share of lifestyle diseases all over the world. One of the main goals of treating diabetes is to maintain normal glucose level and to prevent the development of diabetic complication *Vijaysaradi capsule* can be a promising formulation in the management of Diabetes. In the present study, an attempt has been made to develop pharmacognostical and pharmaceutical standards for *Vijaysaradi capsule*. Pharmacognostical study revealed presence of multicellular warty trichoma, simple trichoma and prismatic crystal of *Meshashringi*, epicarp cells with mucilage content of *Methika*, epidermal cells and brown content of *Rasona*., group of fibers with brown content of *Vijaysar*. Physico-chemical study showed that all the samples are slightly acidic, having pH 6.5 and water soluble extract of 41.2%. HPTLC study showed 3 and 2 peaks for *Vijaysaradi capsule* at 254nm & 366nm respectively.

KEYWORDS: HPTLC, Pharmacognosy, Physicochemical analysis, *Vijaysaradi capsule*.

INTRODUCTION

Diabetes is a clinical syndrome of hyperglycemia with glycosuria due to lack of insulin characterized by polyuria, polydipsia, polyphagia along with hyperglycemia and glucosuria, which may be associated with generalized weakness or weight loss. This is the disease that affects every tissue and every organ of the body and is responsible for the morbidity, reduced life expectancy and diminished quality of life. Diabetes accounts for a huge share of lifestyle diseases all over the world and India is no exception. Globally, an estimated 422 million adults were living with diabetes in 2014, compared to 108 million in 1980. The global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population. Diabetes caused 1.5 million deaths in 2012. Higher-than-optimal blood glucose caused an additional 2.2 million deaths, by increasing the risks of cardiovascular and other diseases. Forty-three percent of these 3.7 million deaths occur before the age of 70 years. The percentage of deaths attributable to high blood glucose or diabetes that occurs prior to age 70 is higher in low- and middle-

income countries than in high-income countries.^[1] Over the past decade, diabetes prevalence has risen faster in low- and middle-income countries than in high-income countries. For the present study a compound is formed which targets to increase the secretion of insulin from β cells of pancreas, lowers the blood sugar level and reduces adipose tissue so that to increase insulin mediated uptake of glucose. *Vijaysara* has some unique and unidentified features in protecting the pancreatic β cells and their regeneration (Chakarvarti et. Al 1981, Subramaniam 1981).^[2] A previous study shows water soluble extract of leaves of *Meshashringi* reduce the insulin requirement in 27 patient^[3], water soluble extract of *Meshashringi* were tested on streptozotocin treated rats for its effect on pancreatic endocrine tissue and results shows therapy led to rise in serum insulin and was able to double the islet number and β cell number.^[4] Yoshinari and Igashari (2010) reported that obese mice that had type 2 diabetes showed improvement in glucose tolerance, triglyceride level in the liver and adipose tissue when they are fed on *Trigonella*.^[5] S -allyle cystiene suphoxide (SACS) a sulphur containing amino

acid of garlic which is the precursor of allin, administered to the allaxon diabetic rats at a dose of 200 mg/kg body weight shows significant decrease in blood glucose and serum lipid.^[6] So, with the multidirectional approach a compound which contains *Vijaysar*, *Meshashringi*, *Methika*, *Rasona* has been taken for the study.

Lack of standardization of poly-herbal formulations creates difficulty in validating the efficacy and maintaining quality of the product. Therefore, it is important to ensure the standard and quality right from

the raw drugs to the finished product. Hence an attempt has been made to study *Vijaysaradi capsule* by pharmacognostical, physico-chemical parameters and to develop HPTLC (High-Performance Thin Layer chromatography study) of the compound formulation of *Vijaysaradi capsule*.

MATERIALS AND METHODS

Collection of raw drugs

Extracts of formulation was purchased separately from Konark Herbs and Healthcare, Daman The ingredients and the part used are given in **Table 1**.

Table No. 1: Ingredients and the part used of Vijaysaradi capsule.

Sl No:	Drug	Botanical Name	Part Used	Form	Ratio
1	<i>Vijaysar</i>	<i>Pterocarpus marsupium</i> , Roxb P.indicus, roxb P.indicus	Heart wood	Extract – Powder	1 part
2	<i>Meshshringi</i>	<i>Gymnema sylvestre</i> R.Br	Leave	Extract – Powder	1 part
3	<i>Methika</i>	<i>Trigonella foenum graecum</i> , Linn.	Seed	Extract – Powder	1 part
4	<i>Rasona</i>	<i>Allium sativum</i> , Linn	Bulb	Extract-Powder	1 part
Total	<i>Vijaysaradi capsule</i>			Extract – Powder	

Method of preparation

As per information provided by Konark Herbs and Healthcare, the procedures involved in the preparation of extract are collection of raw drugs authentication by quality control lab, cleaning drying, pulverizing, extraction, filtering and concentration Extraction of *Vijaysar*, *Methika*, were done with water and that of *Rasona* and *Meshashringi* with 50% alcohol. Extracts were stored in separate air- tight container *Vijaysaradi capsule* was prepared by mixing the four powders in equal proportions in mass mixing machine till the homogeneous mixture was obtained and then filled in capsules.

Pharmacognostical Study

Pharmacognostical analysis of powder was based on organoleptic characters and microscopic studies, i.e., dissolving *Vijaysaradi capsule* powder in small quantity of distilled water, filtering through filter paper and the precipitate treated with or without stain to find out the characters and were later compared with the findings of individual ingredients of the *Vijaysaradi capsule* powder. The micro photographs were taken under Carl Zeiss Trinocular microscope attached with camera.^[7,8]

Pharmaceutical Study

Vijaysaradi capsule powder was analyzed with appropriate protocols for standard physico-chemical parameters, such as aqueous soluble extract, alcohol soluble extract, pH, uniformity of weight, total ash, loss on drying as per CCRAS recommendations at the Pharmaceutical Chemistry Laboratory, IPGT & RA.^[9]

HPTLC

Methanol extract of *Vijaysaradi capsule* powder was spotted on pre coated silica gel GF 60₂₅₄ aluminum plates by means of Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. The mobile phase consisted of Chloroform: MeOH in a ratio of 9:1 v/v. After development densitometry scan was performed with a Camag T. L. C. scanner III in reflectance absorbance mode at 254nm and 366nm under control of Win CATS Software (V 1.2.1. Camag). Then the plate was sprayed with Vanillin Sulphuric acid followed by heating and then visualized in day light.

Organoleptic evaluation

Organoleptic features like color, odour, taste and consistency of the *Vijaysaradi capsule* were recorded and are placed in **Table no 2**.

Table 2: Organoleptic characters of Vijaysaradi capsule.

Vijaysaradi capsule	Colour	Odour	Taste	Consistency
<i>Vijaysar</i>	Redish brown	Charecterstic odour	Tasteless Kashaya	Fine powder
<i>Meshshringi</i>	Greenish brown	Charecterstic odour	Bitter	Fine powder
<i>Methika</i>	Brown to light brown	Charecterstic odour	Bitter	Fine powder
<i>Rasona</i>	Light brown	Garlic	Characteristic taste	Fine powder

Microscopic evaluation

Microscopic evaluation was conducted by dissolving powders of individual drugs and *Vijaysaradi capsule* in the distilled water, then stained and studied under microscope for the presence of characteristics of

ingredient drugs. Powder microscopy of *Vijaysaradi capsule* showed striking characters of all 4 individual constituents which is summarized in **Table 3(Plate no 1 Fig 1-20)**.

Table 3: Microscopic characters.

Drug	Characters
<i>Vijaysar</i>	1. Fragment of crystal fibre. 2. Fragment of lignified border pitted vessel. 3. Fragment of simple trichome. 4. Group of lignified schleride. 5. Prismatic crystal
<i>Meshashringi</i>	6. Epidermal cell 7. Group of schleride 8. Parenchymal cells. 9. Rhomboidal crystal 10. Schleride with brown content 11. Simple warty trichome.
<i>Methika</i>	12. Fragment of annular vessel. 13. Fragment of lignified border pitted vessel 14. Lignified stone 15. Parenchymal cells with simple starch grain and microcrystal.
<i>Rasona</i>	16. Fragment of epidermal cell 17. Fragment of fiber with oil globule 18. Fragment of spiral vessel 19. Prismatic crystal 20. Rhomboidal crystal.

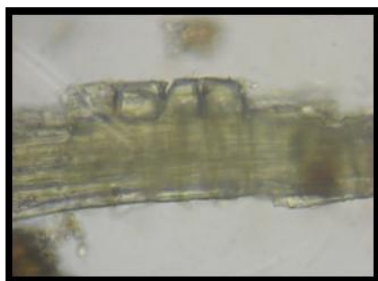
Plate 1: Photomicrographs of *Vijaysaradi capsule*.

Fig.1



Fig.2



Fig.3



Fig.4



Fig.5

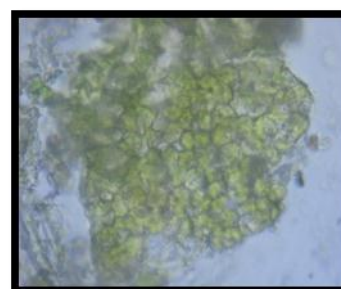


Fig.6



Fig.7

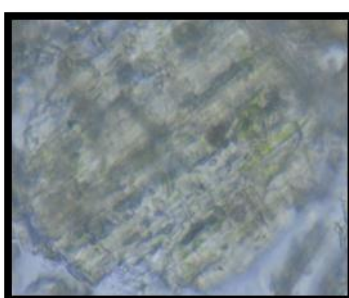


Fig.8

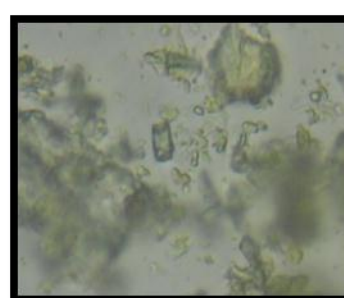


Fig.9

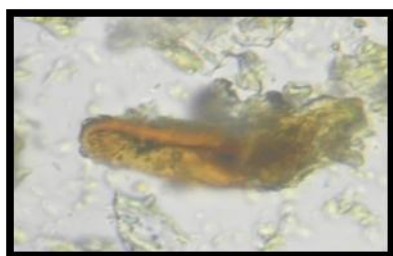


Fig.10



Fig.11

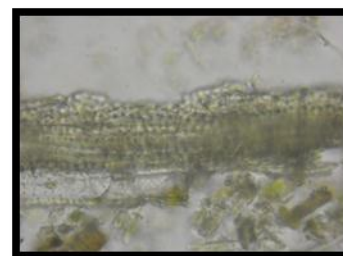


Fig.12



Fig.13

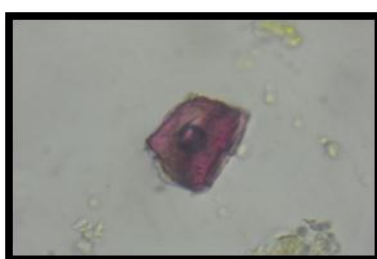


Fig.14

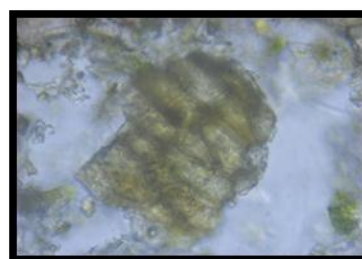


Fig.15

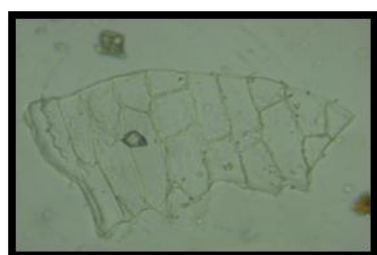


Fig.16

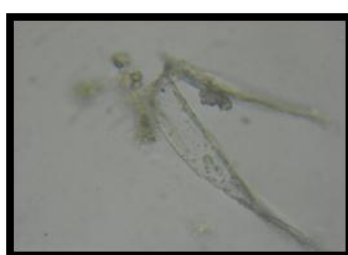


Fig.17



Fig.18

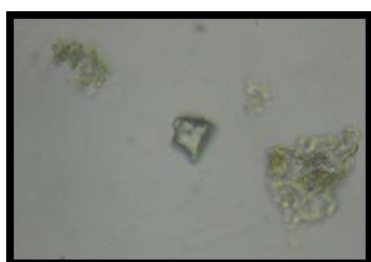


Fig.19



Fig. 20

Pharmaceutical study of *Vijaysaradi capsule*

Physico-chemical parameters like loss on drying, ash value, water and alcohol soluble extract etc were carried out and the results are depicted in **Table no.4**.

Table 4: Physico-chemical parameters of *Vijaysaradi capsule*.

Name of the Analysis	Value of <i>Vijaysaradi capsule powder</i> .
Ash value percentage	0.9437% w/w
Loss on drying percentage	4.2% w/w
Water soluble extract percentage	41.2% w/w
Alcohol soluble extract percentage	3.6% w/w
Weight variation of Capsule	Average wt. 0.545gm Highest wt. 0.600gm Lowest wt. 0.460gm
pH value	6.5

High performance thin layer chromatography (HPTLC)

On performing HPTLC, the chromatogram of *Vijaysaradi* capsule powder showed 3 peaks with

maximum R_f values 0.01, 0.85 and 0.90 at short wave UV 254nm; while at long wave UV 366 nm, the chromatogram showed 2 spots with maximum R_f values 0.01, 0.87 [Table 5 (Plate 2. Fig. 1 - 2)].

Table 5: HPTLC results of *Vijaysaradi* capsule.

HPTLC	254 nm		366nm	
	No. of Spots	Rf Value	No. of Spots	Rf Value
	3	0.01, 0.85 and 0.90	2	0.01 and 0.87

Plate 2: HPTLC Study.

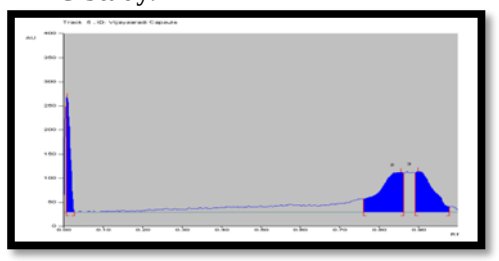


Fig.1

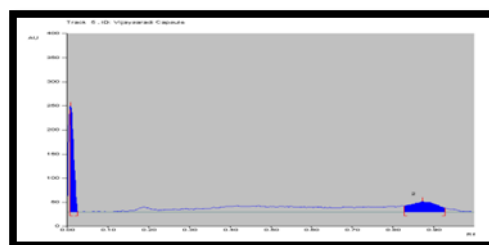
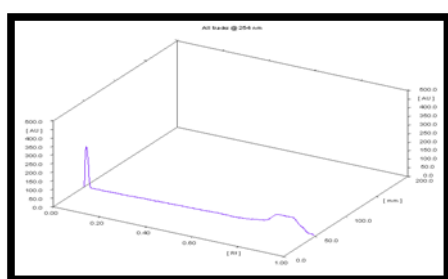
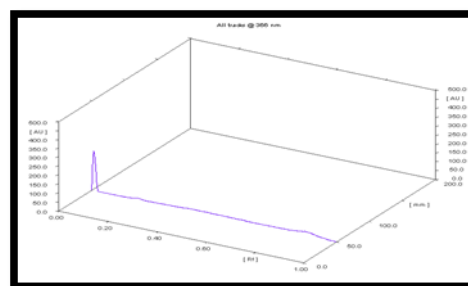


Fig.2

Plate 3. Three Dimensional Spectra Comparison



Spectra at 254nm



Spectra at 366nm

DISCUSSION

Vijaysaradi capsule, the formulated drug, thought to be beneficial for diabetes has been analyzed. Study on *Vijaysaradi* capsule was a step towards pharmacognostical and pharmaceutical standardization of the drug. The presence of all contents of raw drugs in the final product showed the genuinity of the final product. All the pharmaceutical parameters analyzed has shown values permissible for the *Churna*. The physico-chemical parameters showed that percentage of water soluble extract was more than alcohol soluble extract. Ash value of the final product is 0.9437% w/w shows the presence of inorganic material. It also showed presence of slightly acidic nature of *Churna*. Thus it can be inferred that the drug may yield desired pharmacological action. HPTLC study showed 3 and 2 peaks for *Vijaysaradi* capsule at 254nm & 366nm respectively.

CONCLUSION

The formulation *Vijaysaradi* capsule, which was subjected to pharmacognostical study, reveal genuineness as all the ingredient microscopic characters were observed. Physico-chemical and HPTLC studies inferred that the formulation meets the minimum quality standards as reported in the API at a preliminary level. Though the ground work requisites for the

standardization of *Vijaysaradi* capsule is covered in the current study, additional important analysis and investigations are required for the identification of all the active chemical constituents of the test drug to substantiate the clinical efficacy. The inference from this study may be used as reference standard in further quality control researches.

REFERENCE

1. Global report of diabetes-world health organisation www.who.int/diabetes
2. Prem Kumar Sing, Dashu Bakshi, Therapy with methanolic extract of *Pterocarpus marsupium* Roxb and *Ocimum Sanctum* Linn. reserves dyslipidemia and oxidative stress in alloxin induced type 1 diabetic rat model. Experimental and Toxicologic pathology. www.elsevier.de/etp view at google scholar
3. Prem Kumar Sing, Dashu Bakshi, Therapy with methanolic extract of *Pterocarpus marsupium* Roxb and *Ocimum Sanctum* Linn. reserves dyslipidemia and oxidative stress in alloxin induced type 1 diabetic rat model. Experimental and Toxicologic pathology. www.elsevier.de/etp view at google scholar

4. ERB. Shanmugusam dravm. K.Leela Gopinath. possible regeneration of islets of langherhans in streptozotocin diabetic rats given Gymnema Sylvestre leaf extracts. Journal of Ethnopharmacology.
5. A.P. Vpaganlawar, SL Badole SSDJ College of pharmacy, Nasik. Maharashtra.
6. Indian Journal of Experimental Biology, May 2013; 51: 363-374.
7. Khandelwal KR. Practical Pharmacognosy techniques and experiments. 19th ed. Pune: Nirali Prakashan; 2008; 149-166.
8. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 42nd ed. Pune: Nirali Prakashan, 2008; 102.
9. Anonymous, Parameters for qualitative assessment of Ayurveda and Siddha drugs, Part A, New Delhi: CCRAS, 2005; 31.