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Research Article

PHARMACOGNOSTICAL, PHARMACEUTICAL AND MICROBIOLOGICAL ANALYSIS OF *MRUDWIKA SHARKARA*

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ABSTRACT

Draksha (Mrudwika) is best among all fruits as per Ayurveda. It is also indicated in different diseases as a medication and used in diets in fresh and dry forms. *Draksha* is a fruit that is only available during certain times of the year. *Sharkara* dosage form of it can be prepared to make that is palatable. *Draksha* is used in dry form i.e., *Munakka (Mrudwika*, raisins). Commonly, *Munakka, Kismis*, and Currants are three varieties with slight differences in their characteristics and nutritional content. They own property in *Mridu Rechana, Vatahara, Pittahara, Brimhana*, *Vrishya*, and *Rasayana*. For health promotion, disease prevention, and a wide range of *Vata, Pitta*, and *Raktaja Vyadhis* and *Apatarpana Vyadhis, Draksha* should be regularly incorporated into diet in either dry or fresh form. In the present study, an attempt has been made to develop pharmacognostical and pharmaceutical standards for *Mrudwika Sharkara* for assurance of quality of herbal compounds pharmacognostical and pharmaceutical analysis should be done. **Methods:** *Mrudwika Sharkara* was subjected to microscopic evaluation for pharmacognostical study, analysis physic-chemical analysis includes specific gravity, pH value, reducing sugar, non-reducing sugar and total sugar and high Performance thin layer chromatography (HPTLC). *Mrudwika Sharkara* was assessed for microbiological which include smear examination and culture study. **Results:** Pharmacognostical study showed the presence of certain identifying characters of *Mrudwika* and *Sharkara*. In pharmaceutical study, preliminary physico-chemical analysis showed specific gravity is 1.160, pH value is 4, reducing sugar 21.1%, non reducing sugar 48%, total sugar content 69.1%. HPTLC analysis showed eight spots in 254nm and six spots in 366nm. From date of preparation 23/06/21 to 18/10/22 no fungal contamination was found in *Mrudwika Sharkar* **Conclusion:** Present work was carried out to standardize the formulation *Mrudwika Sharkara* in terms of its identity, quality and purity. All of the preparation's active ingredients were identified by pharmacognostic and physicochemical examination. Self life of *Mrudwika Sharkara* showed that the quality of syrup in standard condition.

INTRODUCTION

Draksha is indicated in *Trishna* (thirst), *Daha* (burning sensation), *Jwara* (fever), *Shwasa* (breathlessness), *Raktapitta* (bleeding disorders), *Kshyatakshaya* (injury related depletion), *Udavarta* (upward movement of air), *Swarabheda* (hoarseness of voice), *Madatyaya* (alcohol addiction), *Tiktasyata* (unpleasant taste in mouth), *Asya shosa* (dryness of mouth), and *Kasa* (cough). It has action like *Brimhana* (nurishment), *Vrishya* (aphrodisiac), and *Rechana* (laxative). Being *Snigdha, Guru, Mridu, Madhura*, it alleviates *Vata* and due to its *Madhura* and *Shita* characteristics it alleviates *Pitta* and *Rakta*. Some other benefits are also mentioned in Ayurveda texts like *Medhya* (boosts intellect), *Soumanasya Janana* (pleasantness of mind), *Trishna Nigrahana* (pacifies thirst), *Snehana* (brings about unctuousness), *Anulomana (*laxative), *Hridya* (good for health), *Rakta Prasadana* (blood purifiers), *Raktapitta Shamaka* (alleviates bleeding disorders), *Kaphanisaraka* (expectorants), *Sandhanakara* (binder), *Mutrala*

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(diuretic), *Garbhasthapaka* (helps in conception), *Jivaniya* (vitality), and enhances *Balya* (strength).

Sharkara (syrup) is a palatable liquid formulation which in consistency of honey with a higher shelf life. Liquid dosage forms are widely used because they are expected to be absorbed into the systemic circulation sooner than other oral dosage forms from the gastrointestinal tract. Typically, oral liquid preparations consist of syrup, suspensions, and other forms.

Types

1) *Gosthani Draksha* (*Badi Draksha*/large size grapes)
2) *Kali Draksha* (*Choti Draksha*/small size grapes)
3) Dried form of *Draksha* in the form of *Munakka*, *Kishmish*.

Draksha (grape) is best among all fruits, due to its qualities[1]. According to *Raja Nighantu Draksha* is of two types; *Gosthani Draksha* (*Badi Draksha*/large size grapes) and *Kali Draksha* (*Choti Draksha*/small size grapes). These two have common effect on *Shwasavriddhi* (dyspnoea) and *Hrillasa* (nausea) and the *Gosthani* type is used specially in *Daha* (burning sensation), *Murchha* (syncope), *Jwara* (high body temperature), *Trishna* (thirst). *Gosthani Draksha* is also *Madakaraka* and *Hrudya* good for health.

The dried form of *Draksha* in the form of, Kishmish, Currants is also used. There is always a confusion regarding the variety and superiority of dried grapes. These three types vary a lot from each other not only in their appearances, but also in nutrition value.

Mrudwika (*Gosthani Draksha (Badi Draksha*/ large size grapes) is *Hitatama Aahara Dravya*[2] and *Aushadha Dravya. Mrudwika* owns the properties of *Mridu Rechana, Vatahara, Pittahara, Brimhana, Vrishya,* and *Rasayana. Mrudwika* is used as *Sadya Santarpana Dravya*[3].

AIMS AND OBJECTIVES

1. To evaluate raw drugs of *Mrudwika Sharkara* for authenticity through various pharmacognostical procedures.
2. To develop the pharmacognostical and phyto-chemical profile of *Mrudwika Sharkara.*
3. Microbiological study of *Mrudwika Sharkara* to determine the self-life of drug.

MATERIALS AND METHODS

Collection, Identification and Authentication of raw drugs

The *Draksha* was collected from the authentic source from the market in Jamnagar and was authenticated in the Pharmacogonosy Laboratory, Institute for Teaching and Research in Ayurveda, Jamnagar.

Preparation of Drug

Total two ingredients *Mrudwika* (*Vitis vinifera*) and other is sugar candy. The dried drugs of *Mrudwika* were collected purchased from the market in quantity of 1kg each. The drugs were soaked in water over night, next day juice of *Mrudwika* was squeezed after removing seed. Total 800ml *Swaras* (juice) obtained. 1.7kg (double quantity) sugar candy boiled with water on mild flame and boiled till getting 1 string or get honey like consistency. Total obtained quantity of syrup was 2 litres. Prepared *Sharkara* was packed in air tight container after it was cool (figure 2).

Pharmacognostical Study

The pharmacognostical study comprises of organoleptic study and microscopic study of finished product.

Organoleptic Study

The organoleptic characters of polyherbal drugs are very important and give the general idea regarding the genuinity of the sample. Organoleptic parameters i.e., taste, colour, odour and touch of *Mrudwika Sharkara* were scientifically studied as per the standard references.

Microscopic Study

Mrudwika Sharkara dissolved with water and microscopy of the sample was done without stain and after staining with phloroglucinol+HCl. Microphotographs of *Mrudwika Sharkara* ware also taken under Corl-zeisstrinocular microscope[4].

Pharmaceutical Evaluation

Physicochemical Analysis

The physicochemical analysis of *Mrudwika Sharkara* was carried out at Modern Pharmaceutical Chemistry Laboratory, ITRA, Jamnagar. The quality control parameters mentioned for Syrup in Ayurvedic Pharmacopoeia of India[5] and CCRAS[6] guidelines i.e., hardness, total ash, pH value, water and alcohol soluble extractives were analysed.

High Performance Thin Layer Chromatography Study (HPTLC)

Methanolic extract *Mrudwika Sharkara* was spotted on pre-coated silica gel GF 60_{254} aluminium plate as 5mm bands, 5mm apart and 1cm from the edge of the plates, by means of a Camang Linomat V sample applicator fitted with a 100µL Hamilton syringe for comparative analysis. Toluene: Ethyl acetate (9:1) was used as the mobile phase. After development, a densitometric scan was done with Camang TLC scanner III in reflectance absorbance mode at 254nm and 366nm UV detection.

Observation and Results

Pharmacognostical study

The initial purpose of the study was to evaluate the authenticity of the raw drug used to prepare the

Mrudwika Sharkara. The final product *Mrudwika Sharkara* in syrup form was subjected to organoleptic analysis and microscopic examination to authenticate the drug.

Organoleptic Analysis

Organoleptic characteristics like state, colour, odour and taste of *Mrudwika Sharkara* are recorded as shown in table 2.

Table 2: Organoleptic Characteristics of *Mrudwika Sharkara*

S. No.	Parameters	Result
1	State	Liquid
2	Colour	Light brown
3	Odour	Characteristic
4	Taste	Sweet

Microscopic examination

The microscopic examination showed the following feature of the *Mrudwika*. (Figure 3).

Acicular crystal (Figure 4a), epicarp (Figure 4b), lignified parenchymal cell (Figure 4c), oil globules (Figure 4d), orange and red colouring matter (Figure 4e), paranchyma with colouring matter (Figure 4f), prismatic crystal (Figure 4g), rosett crystal (Figure 4h), stone cell (Figure 4i).

Pharmaceutical Study

Physicochemical parameters

Physicochemical parameters of the syrup like specific gravity, total solid contain, pH value, reducing sugar, non reducing sugar and total sugar were all found to be within the normal range.

Table 4: Physicochemical parameters of *Mrudwika Sharkara*

Test	Results
Specific Gravity	1.35kg/cm^2
Reducing sugar	21.1%
Non reducing sugar	48%
Total sugar	69.1%
pH value (5% aqueous solution)	4

High-Performance Thin Layer Chromatography Study (HPTLC)

The densitogram of methanol extract of *Mrudwika Sharkara* showed 8 peaks corresponding to the Rf values -0.04, 0.02, 0.11, 0.13, 0.34, 0.46, 0.67 and 0.79 respectively when visualized at 254nm. At 366nm, the densitogram showed 6 peaks corresponding to Rf values 0.07, 0.09, 0.17, 0.24, 0.29, 0.64, 0.72 and 0.87 respectively as shown in table 4. The HPTLC densitogram is showed in Figure 4.

Table 5: HPTLC of *Mrudwika Sharkara*

Sample	Visualization	No. of Peaks	Max Rf	Area %
Mrudwika Sharkara	254 nm	8	-0.04	7.4
			0.02	48.3
			0.11	7.1
			0.13	8.4
			0.34	8.1
			0.46	6.6
			0.67	7.3
			0.79	6.8
	366 nm	6	0.02	46.2
			0.07	33.1
			0.74	5
			0.79	4.9
			0.83	6
			0.88	4.8

Table 6: Showing observations of sample preserved at room temperature

S.No	Date of investigations after preparation of samples *Mrudwika Sharkara*	Storage at: Humidity (%)	Temp. (°C)	Observations of both samples: Gram's Stain	Aerobic culture	Wet mount/ 10% KOH Preparation	Fungal culture
1.	25/08/2021	85%-68%	(27^0-30^0)	Microorganisms not seen	No organisms isolated	Fungal filaments not seen.	No fungal pathogen isolated
2.	06/10/2021	89%-84%	(26^0-34^0)	Microorganisms not seen	No organisms isolated	Fungal filaments not seen.	No fungal pathogen isolated
3	1/11/2021	73%-50%	(24^0-33^0)	Microorganisms not seen	No organisms isolated	Fungal filaments not seen.	No fungal pathogen isolated
4	24/11/2021	80%-55%	(21^0-30^0)	Microorganisms not seen	No organisms isolated	Fungal filaments not seen.	No fungal pathogen isolated
5	05/01/2022	95%-87%	(29^0-20^0)	Microorganisms not seen	No organisms isolated	Fungal filaments not seen.	No fungal pathogen isolated
6	28/02/2022	51%-33%	(36^0-17^0)	Microorganisms not seen	No organisms isolated	Fungal filaments not seen.	No fungal pathogen isolated
7	18/10/22	42%-58%	(35^0-22^0)	Microorganisms not seen	No organisms isolated	Fungal filaments not seen.	No fungal pathogen isolated

DISCUSSION

The screening of commercial varieties, substitutes, adulterants, and any other quality control of drugs is made easier with the assistance of pharmacognostic evaluation. It is a simple and reliable tool, helps to obtain information about biochemical and physical properties of crude drug[7]. The pharmacological study of the final product *Mrudwika Sharkara* revealed all the striking features of the individual drug used for the manufacturing process. This confirms the authenticity of the finished product. Moreover, there was no major change in the characteristics of the microscopic features observed in the final product. The physicochemical analysis was done to establish the quality of the finished product. All the parameters used for the physicochemical analysis of *Mrudwika Sharkara Yoga* was found within limits. Reducing sugar contain, non reducing sugar and total sugar are 21.1%, 48% and 69.1%. In syrup maximum 66.7%W/W sugar candy can be added as per Indian pharmacopeia or approx. 85%w/w according to U.S.P, which is necessary for stability[8]. The quantitative determination of active substances, the identification of impurities, and the identification of constituents are all carried out with HPTLC. The high performance thin layer chromatographic analysis (HPTLC) of the finished product showed 8 peaks at UV 254nm corresponding to the Rf values -0.04, 0.02, 0.11, 0.13, 0.34, 0.46, 0.67, and 0.79. At UV 366nm visualization, 6 peaks were spotted corresponding to the Rf values 0.02, 0.07, 0.74, 0.79, 0.83 and 0.88. The maximum area percentage i.e., 48.3 corresponds to the Rf value 0.02 at UV 254nm visualization. At UV 366 nm, maximum area percentage i.e., 46.2 corresponds to the Rf value 0.02. The max area percentage corresponding to the Rf values 0.02 signifies the highest quantitative presence of chemical compound of the final product.

Microbiological study of *Mrudwika Sharkara* was carried out to observe the stability with respect to microbial contamination of sample prepared and preserved in different climatic and temperature conditions. The study's conclusion revealed that the sample did not contain any microorganisms.

Most of the time, stability is measured in terms of a product's shelf life, which is the time from when it is made to when it is supposed to be used or eaten. For microorganisms to grow in any media, surface, or object, they need water, humidity, and the right temperature.

CONCLUSION

The microscopic examination of the *Mrudwika Sharkara* showed the presence of Acicular crystal (Figure 4a), apicarp, lignified parenchymal cell, oil globules, orange & red colouring matter, paranchyma with colouring matter, prismatic crystal, rosett crystal, simple fibre, stone cell, spiral vessel.

The physicochemical analysis that pH value, specific gravity, reducing sugar, non reducing sugar and total sugar was 4, 1.35kg/cm^2, 21.1%, 48%, 69,1%, respectively. HPTLC analysis showed maximum area percentage corresponding to the Rf value 0.02. As no study is available to date for the quality control for the given finished product, present study can be used as a standard reference for further quality control research. Further analytical studies can be proposed for precise identification of the chemical compounds which helps in drug development and understanding the therapeutic potential.

The product's shelf life is the time from when it is made until the intended use or consumption. For the purpose of microbiological research, prepared *Mrudwika* syrup was examined. The shelf life of a product is determined by a number of factors, including its organoleptic qualities and microbiological safety. As a result, the *Mrudwika Sharkara* microbiological study demonstrated that the syrup was of standard quality. Until now, there was no evidence of bacterial or fungal microorganism growth. i.e., 23/06/2021 from the date of preparation in case of *Mrudwika Sharkara* up to 18/10/2022.

Figure 1: Raw material of *Mrudwika Sharkara*

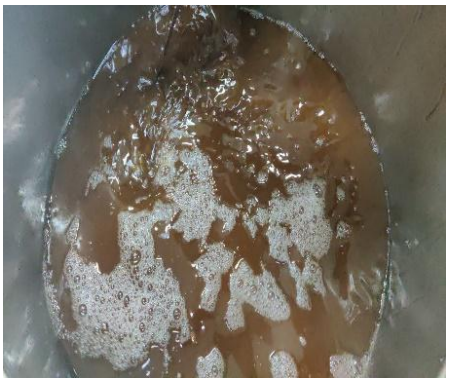
Overnight shocked *Mrudwika*

Mrudwika

Extract juice from shocked *Mrudwika*

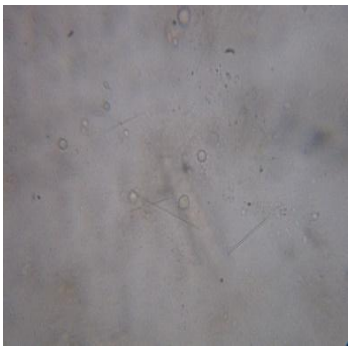
String of sugar syrup

Added *Mrudwika* juice in sugar syrup

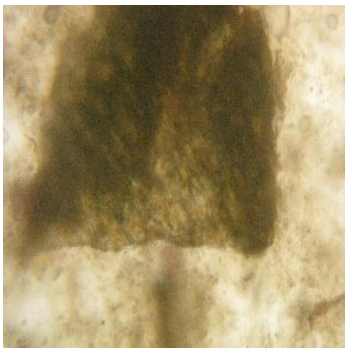


Mrudwika Sharkara

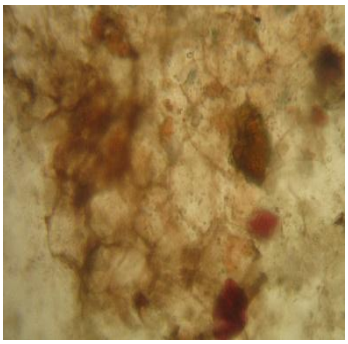
Figure 2 : Method of Prepration of *Mrudwika Sharkara*



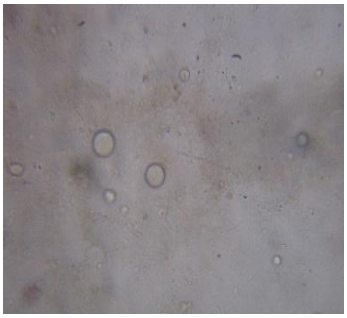
(a)Acicular crystal



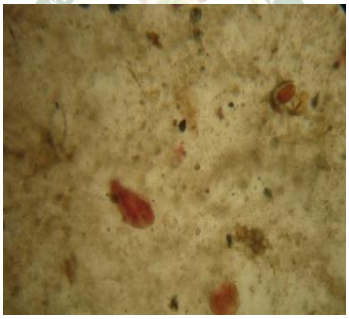
(b)Epicarp



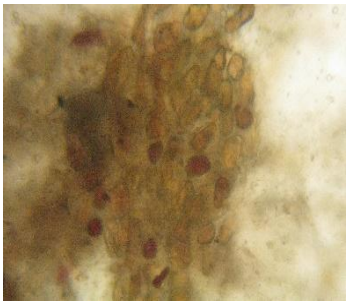
(c)Lignified parenchymal cell



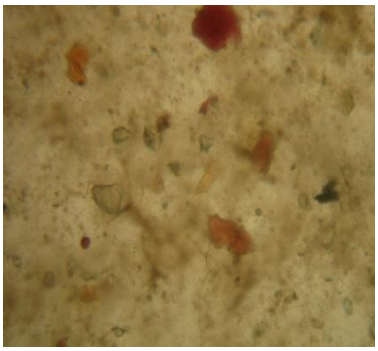
(d)Oil globules



(e)Orange & red colouring matter

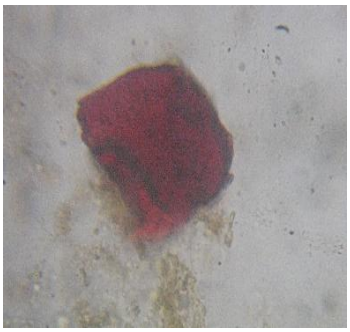


(f)Parenchyma with colouring matter

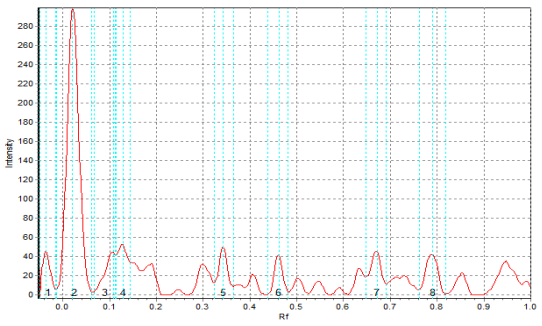


(g)Prismatic crystal

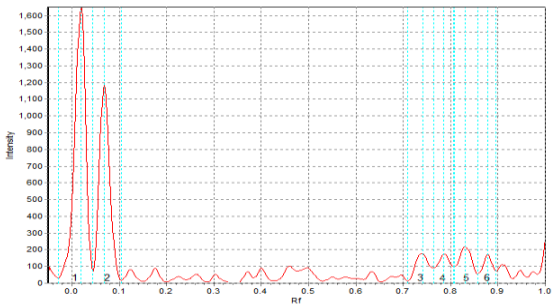
(h)Rosette cell



(i)Stone cell



(a)254 nm



(b)366 nm

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