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Development of monograph and study of variation in chemical constituent of plant *Balanites roxburghii*

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Abstract

The term "Monographia" is derived from the Greek word "mono" (single) and *grapho* (to write), meaning "writing on a single subject". Unlike a textbook, which surveys the state of knowledge in a field, the main purpose of a monograph is to present primary research and original scholarship. The difficulty associated with development of herbal monograph is that the availability of huge diversity related herbal plant. For this study sample was collected from three different places at different seasons i.e. rainy season winter season, summer season. This parameters was studied, macroscopic, microscopic study, organoleptic evaluation, phytochemical tests, chemical variation study was done, alkaloids, flavonoids, glycosides, saponins.

Keywords: monograph, *Balanites roxburghii*

1. Introduction

Monograph: is defined as Specialist work of writing, in contrast, to reference work on a single herbal plant or an aspect usually by a single author [1]. During the past decade, traditional systems of medicine have become a topic of global importance. Current estimates suggest that, in many developing countries, a large proportion of the population relies heavily on traditional practitioners and medicinal plants to meet primary health care needs. Although modern medicine may be available in these countries, herbal medicines have often maintained popularity for historical and cultural reasons. Concurrently, many people in developed countries have begun to turn to alternative or complementary therapies, including medicinal herbs [2].

Preparation of monograph of a particular herbal plant is an important step for the establishment of the discovered medicinal plant. Some governmental or regulatory authority/agency gives some guidelines for the development of herbal monograph or plant. In routine life, we got so many different ayurvedic and herbal plant or drug of the plant, from that some drugs are frequently used but that is not established or no specific monograph is available on those plants. Assurance of the safety, quality, and efficacy of medicinal plants and herbal products has now become a key issue in industrialized and in developing countries. The general consumers and health-care professional's need up-to-date, authority's information on the safety and efficacy of medicinal plants [2].

Over the past two decades there has a tremendous increase in the use of herbal medicines; however, there is still significant lack of research data in this field. According to the diversity of medicinal plant and herbal medicines, it is difficult to develop monograph on commonly used medicinal plants [3].

Monographs include standard sections, such as Names (i.e. botanical nomenclature). Therapeutics, Historical Uses, etc. and can be very helpful for preliminary fact-finding before running searches in the research databases, For example, knowing Herb's common and scientific names, and any chemical constituents that are unique to that species or genus will be useful in developing effective search queries [4].

2. Material and Methods

2.1 Collection and authentication of plant materials

Balanites roxburghii plant was collected from three different regions from Sangli district i.e. Miraj, Tasgaon and Palus, collected plant were authenticated from botany department. The collected plant was shade dried. Sample A-Miraj, Sample B-Tasgaon, Sample C-Palus.

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2.2 Macroscopy of leaf, microscopic study of leaf

Determination of the type of apex, base, shape, vein, margin, length and width were performed. Determination of Stomatal number, determination of Stomatal index, determination of vein islet number, was done for leaf.

2.3 macroscopy of fruit

Determination of Shape, Length, Diameter, Color, type of seeds, length of Seeds was done.

2.4 Physiochemical Evaluation:

Physiochemical evaluation of *Balanites roxburghii* plant by using following parameters, phytochemical investigation, determination of solvent extractive value, determination of ash value, determination of moisture content, determination of bitterness value, determination of swelling index, determination of foaming index.

2.5 Determination of chemical constituents^[5]

Determination of % of alkaloid, glycoside, flavonoids, Saponin was determined as per procedure.

3. Result and Discussion

Sample was collected from tree different regions at three seasons, and collected plant was authenticated from the botany department of K. W. C. Sangli,

Table 1: Macroscopy of leaf, Microscopic study of leaf

Sr. no.	Leaf		Fruit	
1	Apex.	Acute.	Shape.	Long, Narrow
2	Base.	Asymmetrical.	Length.	2.5- 7 cm.
3	Shape.	Ovate or Oblong.	Diameter.	1.5- 4 cm.
4	Length.	1.5-2cm.	Colour.	Green- Yellow.
5	Width.	0.5-1.5cm.	Type of seeds.	Pyrene (stone).
6	Vein.	Lateral.	Length of seed	1.5- 3 cm.
7	Margin.	Compute.		

The Stomatal number of the leaf sample of *Balanites roxburghii* was found 275/ sq. mm, The Stomatal index of the leaf sample of *Balanites roxburghii* was found 26.19/ sq. mm, The number of vein islet was found to be 22/sq. mm. The number of vein islet was found to be 22/sq. mm. and the vein islet number.

Table 2: Organoleptic evaluation

Sample.	Colour.	Odor.	Taste.
A.	Greenish brown.	Aromatic.	Characteristic.
B.	Yellowish brown.	Aromatic.	Characteristic.
C.	Yellowish Brown.	Aromatic.	Characteristic.

Organoleptic properties of different samples of powdered drug i.e. sample A had a greenish brown, sample B had Yellowish brown colour, sample C had a Yellowish brown colour, The odour and taste of the samples was found to be aromatic odour and Characteristic tastes for those all samples, respectively.

Table 3: phytochemical investigation

Sr. No.	Chemical	Season		
		Rainy	Winter	Summer
1	Alkaloids	+	+	+
2	Glycosides	+	+	+
3	Saponin	+	+	+
4	Tannin	+	+	+
5	Flavonoids	+	+	+

+ Present

All samples collected in different seasons contain alkaloids, glycosides, saponins, tannins and flavonoids.

Table 4: Season-wise variations in chemical constituent.

Glycoside%.		Saponons %.		Flavonoids%.		Alkaloids%.	
Rainy Season.							
A.	5.41	A.	24.06	A.	7.96	A.	0.83
B.	5.05	B.	24.56	B.	7.83	B.	0.94
C.	5.08	C.	25	C.	7.98	C.	0.93
Winter Season.							
A.	5.4	A.	24	A.	8	A.	0.8
B.	4.98	B.	24.58	B.	7.84	B.	0.9
C.	5.58	C.	24.98	C.	7.98	C.	0.94
Summer Season.							
A.	5.57	A.	25.1	A.	7.97	A.	0.8
B.	4.99	B.	24.55	B.	7.87	B.	0.93
C.	5.40	C.	24.2	C.	7.91	C.	0.93

Chemical variations in different seasons were calculated but no significant change was observed in results.

Table 5: Physiochemical properties

Sr. no.	Parameters	All Seasons		
		A	B	C
1	Water-soluble extractive value (% w/w)	19.20	28.80	11.20
2	alcohol soluble extractive value (% w/w)	13.60	10.40	18.40
3	hexane soluble extractive value (% w/w)	2.40	2.32	1.79
4	Total ash value (% w/w)	5.4	7.4	9.0
5	Water soluble ash value (% w/w)	9.5	9.0	8.5
6	Acid-insoluble ash value (% w/w)	1.0	1.5	1.0
7	Moisture content (% w/w)	7.1	5.2	5.4
8	Bitterness	No	No	No
9	Swelling index	30	10	10
10	Foaming index	>1000	>1000	>1000

Above values of quality parameters was taken mean of all samples. Water-soluble extractive value 19.20%, 28.80% and 11.20% respectively, for alcohol soluble extractive value, 13.60%, 10.40% and 18.40% respectively, hexane soluble extractive value, 2.40%, 2.32% and 1.79% respectively, Total ash value, 5.4%, 7.4% and 9.0% respectively, Water soluble ash value, 9.5%, 9.0% and 8.5% respectively, Acid-insoluble ash value, 1.0%, 1.5%, and 1.0% respectively, Moisture content, 7.1%, 5.2% and 5.4% respectively, none of them sample having bitter test. Swelling index sample A contains a 30% and sample B and C contain 10%. Foaming index of all samples was over 1000.

Preparation of monograph on plant *Balanites roxburghii* Name: *Balanites roxburghii*.



Fig 1 showing image of plant *Balanites roxburghii*.

Genus: *Balanites*.

Species: *B. Roxburghii*.

Family: *Zygophyllaceae*.

Kingdom: Plantae.

Synonym: *Balanites indica* Tiegh, *Agialid roxburghii* (planch). In Maharashtra, it calls as a 'Hingot'.

Description

Microscopy

Stomatal number

The Stomatal number of the leaf sample of *balanites roxburghii* is 275/ sq. mm.

Stomatal index

The Stomatal index of the leaf sample of *balanites roxburghii* is 26.19 % / sq. mm.

Vein islet number

The number of vein islet is to be 22/sq. mm.

Powdered Characteristics

Red colored lignified xylem vessels, Pink colored vascular bundle, Pink colored Trichomes.

Chemical constituents

Major: Saponins (24-25%), flavonoids (7-8%), Glycoside (4.98-5.58)

Minor: Alkaloids (0.83-0.94)

Identification test

Test for glycoside: Baljet test and Keller- killiani test. If the test was positive it means presence of glycosides.

Test for Flavonoids: Shinoda test and sulphuric acid test. If the test was positive it means presence of flavonoids.

Test for Alkaloids: Dragendorff's test, Mayer's test, and Wagner's test. If the test was positive it means presence of alkaloids.

Test for saponins: Foam test, if the test was positive it means presence of saponins.

Limit for quality parameter

Water-soluble extractive value: 11.20%- 28.80%.

Alcohol soluble extractive value: 10.40%- 18.40%.

Hexane soluble extractive value: 0.79%- 2.40%.

Ash value

Total ash value: 5.40%- 9.0%.

Water soluble ash value: 8.5%- 9.5%.

Acid-insoluble ash value: 3.9%-6.0%.

Other parameters

Moisture content: 5.2%- 7.1%. Foaming index: Over 1000.

4. Conclusion

Monograph of plant *balanites roxburghii* was prepared successfully and the study of chemical variations in plant at different seasons was studied and no significant changes were found in the percentage of chemical constituents. Quality parameters like water soluble extractive value, ash value, moisture content, swelling index, foaming index, bitterness value was studied successfully.

5. References

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