

Comparative study of moisture content of ethnomedicinal plants used in Giridih District of Jharkhand for curing malaria disease

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ABSTRACT

Malaria is a common and significant public health problem in the tribal and forest-fringed areas of Giridih district, particularly around the Parasnath Hills. Malaria continues to be a major health threat in India as well as worldwide. The present treatments for this disease are not always sufficiently effective and sometimes cause adverse side effects. Some common medicinal plants such as *Moringa oleifera* and *Azadirachta indica* are traditionally used by local vaidyas and knowledgeable tribal healers for the treatment of malaria. The present study was conducted to investigate the moisture content in the leaves of these two plants.

Key Words - Ethnomedicinal plants, Tribal communities, Moisture content, Malaria disease

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INTRODUCTION

Plants have been an essential part of human civilization, providing resources for food, shelter, and medicine. Ethnobotany, which deals with the relationship between people and plants, plays an important role in preserving traditional knowledge and linking it with modern science (Reddy, 2008). Jharkhand, particularly Giridih district, possesses rich biodiversity and a wide variety of medicinal plants. Local tribal communities have developed extensive traditional healing practices using plant-based treatments for malaria and other diseases. The comparative study of moisture content of some ethnomedicinal plants used for malaria treatment was carried out in the present investigation.

Azadirachta indica L. is an important medicinal plant belonging to the family Meliaceae, which is widely distributed in tropical regions of the world. *Moringa oleifera* L., belonging to the family Moringaceae, is considered an underutilized plant species. In India it is commonly known as Sahjan or Drumstick tree

(Singh & Prasad, 2013). Both plants are traditionally used in the treatment of malaria and several other diseases.

Different parts of *Azadirachta indica* have been traditionally used for the treatment of skin infections, dental problems, metabolic disorders such as diabetes, and several other ailments.

Moringa oleifera leaves are the most widely used part of the plant and have been reported to possess medicinal properties useful in malaria treatment as well as other chronic conditions such as hypertension, cardiovascular diseases, infections, and inflammatory disorders (Christianto & Smarandache, 2020).

Moisture content of plant material is expressed as a percentage of the initial weight of the sample. It represents the difference between the initial weight of fresh leaves and the final weight of the same leaves after drying. The percentage of moisture content varies from one plant species to another.



Fig. 1- (Map of Jharkhand showing Giridih District)

MATERIALS & METHODS

For studying moisture content, two plant species belonging to different families were selected from different areas of Giridih district. The plant species were identified with the help of The Botany of Bihar and Orissa Vol. I–VII (Haines, 1921).

Fresh leaves of the plants were collected and washed properly. The leaves were then air-dried for a short period and weighed using a weighing machine. After recording the initial weight, the leaves were kept in a hot air oven at 55°C for about half an hour. This process was repeated two or three times until a constant weight was obtained.

The dried leaves were weighed again. The difference between the initial weight of fresh leaves and the final weight after drying was considered as the moisture content.

The percentage of moisture content was calculated using the following formula:

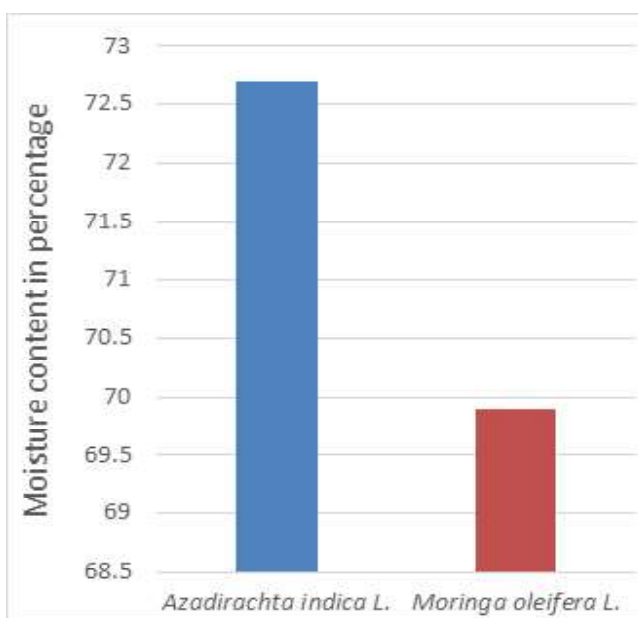
$$\text{Moisture Content} = \frac{\text{Initial weight of leaves} - \text{final weight after drying}}{\text{Initial weight of leaves}} \times 100$$

Table 1-Moisture content of *Azadirachta indica* L.

Material	Number of observations	Weight of fresh leaves (in gms)	Weight of dried leaves (in gm)	Difference	% of Moisture content
Fresh leaves of <i>Azadirachta indica</i> L.	1.	10	2.68	7.32	73.2 %
	2.	10	2.66	7.33	73.3 %
	3.	10	2.64	7.35	73.5 %
	4.	10	2.70	7.29	72.9 %
	5.	10	2.80	7.20	72.0 %
	6.	10	2.83	7.16	71.6 %
	7.	10	2.75	7.25	72.5 %
	8.	10	2.71	7.28	72.8 %
	9.	10	2.74	7.25	72.5 %
	10.	10	2.74	7.25	72.5 %
Average					72.70 %

Table 2-Moisture content of *Moringa oleifera* L.

Material	Number of observations	Weight of fresh leaves (in gms)	Weight of dried leaves (in gm)	Difference	% of Moisture content
Fresh leaves of <i>Moringa Oleifera</i> L.	1.	10	2.92	7.08	70.8 %
	2.	10	2.90	7.10	71.0 %
	3.	10	2.86	7.14	71.4 %
	4.	10	3.06	6.94	69.4 %
	5.	10	2.96	7.04	70.4 %
	6.	10	2.98	7.02	70.2 %
	7.	10	2.88	7.12	71.2 %
	8.	10	3.10	6.90	69.0 %
	9.	10	3.21	6.79	67.9 %
	10.	10	3.22	6.78	67.8 %
Average					69.91 %



Graph 1 – Comparative Study of Moisture Content

RESULT & DISCUSSION

The comparative study of moisture content of two ethnomedicinal plants, namely *Azadirachta indica* L. and *Moringa oleifera* L., was carried out. The results indicate that *Azadirachta indica* L. has a relatively higher moisture content, while *Moringa oleifera* L. shows comparatively lower moisture content, as presented in Tables 1 and 2.

The comparative study of the weight of dried leaves of both plants indicates that *Moringa oleifera* leaves retain comparatively higher dry matter after drying. *Moringa oleifera* is known for its rich therapeutic properties and nutritional value. Due to its relatively lower average moisture content

(69.91%), the leaves may have better storage potential and medicinal use.

Moringa oleifera is widely used in traditional medicine and may serve as a useful plant resource for managing malaria and other health conditions. Some earlier studies have also reported the use of medicinal plants for malaria treatment in different regions of Jharkhand (Hembrom, 1995)

Therefore, it is necessary to conserve these ethnomedicinal plants and promote their sustainable use for natural healthcare practices.

CONCLUSION

The present study highlights the importance of ethnomedicinal plants traditionally used by tribal communities of the Giridih district for the treatment of malaria. The comparative analysis of moisture content in the leaves of *Azadirachta indica* and *Moringa oleifera* shows noticeable variation between the two species. *Azadirachta indica* leaves were found to possess relatively higher moisture content, whereas *Moringa oleifera* leaves exhibited comparatively lower moisture content and retained greater dry matter after drying. This difference in moisture levels may influence the storage stability and potential medicinal use of the plant materials. The findings support the traditional use of these plants in local healthcare practices and indicate that *Moringa oleifera*, due to its lower moisture content and higher dry matter, may have better preservation potential for medicinal preparations.

Overall, the study emphasizes the need to document, conserve, and scientifically evaluate ethnomedicinal plants used by tribal communities, as they represent valuable natural resources for the development of affordable and sustainable healthcare solutions.

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