

Effect of girth of *Acacia catechu* trees on recovery of Katha through traditional method of extraction

MINAL G KHAWALE, VINOD M MHAISKE*, SATISH S NARKHEDE, VINAYAK K PATIL and
AJAY D RANE

College of Forestry, Dr Balasaheb Sawant Konkan Krishi Vidyapeeth
Dapoli, District Ratnagiri 415712 Maharashtra, India

*Email for correspondence: vinod.mhaiske@gmail.com

© Society for Advancement of Human and Nature (SADHNA)

Received: 05.08.2023/Accepted: 16.09.2023

ABSTRACT

Khair (*Acacia catechu* Willd) is a deciduous tree containing dark red heartwood inside the sapwood and belongs to the family Fabaceae. It yields mainly two products Katha and cutch which have many medicinal benefits and industrial uses. Katha is an indispensable ingredient of Paan preparations in India. The present study was carried out in Ratnagiri district of Konkan region of Maharashtra state to assess the Katha yield using traditional method of extraction. The heartwood of Khair was divided into different girth classes viz up to 30 cm, 30 to 40 cm and 40 to 50 cm. The extraction of Katha was done by chipping and boiling of heartwood. The results revealed that the recovery of Katha ranged from 5.06 to 6.68 per cent with overall recovery of 5.97 per cent. The maximum recovery was reported in the girth class 40 to 50 cm while minimum in girth class up to 30 cm. The study showed that as the girth of heartwood increased the recovery of Katha was also increased.

Keywords: Katha; *Acacia catechu*; recovery; girth class

INTRODUCTION

Acacia catechu Willd (Khair) that belongs to family Fabaceae (Troup 1921) is a moderate size deciduous tree containing yellowish white sapwood and dark or light red heartwood (Sharma 1981). Khair is found in drier regions of the sub-Himalayan tract up to an altitude of 1,200 m from Punjab to northeastern states, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh and Tamil Nadu (Chatterjee and Pakrashi 2006). Khair is found growing in both natural and plantation forms in most of the parts of the country (Singh and Lal 2006) and is usually 2.5 feet in girth and 25 feet in height (Kulkarni 1956).

Besides, traditional and commercial importance, Khair has tremendous ecological significance (Singh and Lal 2006). The heartwood of *A catechu* is durable and is much prized for boat making, railway sleepers, poles, posts etc (Trotter 1929). The heartwood of the tree is mainly used for extracting Katha and cutch (Singh and Lal 2006). Katha is regarded as astringent, cooling and digestive and is

useful in sore throat, cough, diarrhea, ulcers, boils and eruptions on the skin. It is an indispensable ingredient of Paan preparations.

Total area under Khair plantation is about 5,800 sq km in the country, with the annual consumption of 63,000 tonnes of Khair heartwood for making of Katha. It has been estimated that about 3,000 to 3,500 tonnes of Katha is produced annually in the small-scale industries in the country. However, the annual demand of this species is increasing exponentially as numerous small cottage industries are established every year (Wanage et al 2013). Khair tree has more medicinal and industrial uses and it is a scientifically important plant. It appears that the gap between the demand and supply of Khair wood is increasing (Khawale et al 2022).

A number of notable studies on Katha recovery have been conducted by Fernandez (1894), Kumar (1998), Karnik et al (1965), Jain (1980) and Dobhal and Beri (1981). Many Katha industries are operating in Maharashtra state but no work has been conducted till date on recovery of Katha on the basis of plant

girth. An understanding of the Katha recovery in Maharashtra state is a prerequisite. Therefore, present investigations were conducted to see the effect of heartwood girth on the recovery of Katha in traditional method of Katha extractiaon.

MATERIAL and METHODS

The present study was carried out in Ratnagiri district of Konkan region of Maharashtra state. Availability of Khair logs in adequate quantity favoured the establishment and growth of Katha producing industries in this region. Total 8 industries had been producing Katha traditionally in Dapoli Forest Range; out of these one industry was selected randomly in consultation with local forest officers. Main source of Khair logs for Katha industry was local farmers of the district. Available Khair logs from Katha producing units were selected for the study. Bark and sapwood of Khair logs were removed by the labourers using bark remover and special saw. Accordingly, the logs of heartwood were separated and selected for further processing. The girth of heartwood ranged between 20 to 46 cm, therefore, girth was divided into three groups viz up to 30 cm, 30 to 40 cm and 40 to 50 cm. The girth of the heartwood log was measured using measuring tape.

Chipping machine was used to make chips of heartwood logs. The collected chips were filled in the sacks. The weight of sacks was taken with the help of weighing balance. Total 60 kg chips from three girth classes each were taken for the further processing. Traditional method of Katha extraction is commonly called Chulan method in Konkan region of Maharashtra. Sixty kg heartwood chips were poured in aluminum vessels of 200 litres capacity to which 120 litres of water was added and allowed to boil by burning of wood for 2.30 h. The liquid extract of heartwood was

collected in bucket through attached pipe, transferred to another vessel and heated for 2.30 h. While extract boiling, its specific gravity was measured using twaddle hydrometer showing 26° reading and liquid was allowed to cool. The weight of collected extract was measured using weighing balance. Sample of 100 g of cool liquid extract of heartwood was collected in the sample bags. The samples were kept in Petri plates at room temperature for drying purpose. Daily observations on weight of samples were taken using weighing balance till these became dry and solid.

RESULTS and DISCUSSION

The results of recovery in traditional method of extraction (Table 1) show that under the girth class up to 30 cm, 17.56, 28.81 and 5.06 per cent recovery was observed in chips to liquid extract, liquid to dry Katha and chips to dry Katha respectively. The recovery in girth class 30 to 40 cm was reported 21.28, 28.96 and 6.16 per cent under chips to liquid extract, liquid to dry Katha and chips to dry Katha respectively.

In girth class 40 to 50 cm, 23.71, 29.03 and 6.68 per cent recovery was made from chips to liquid extract, liquid to dry Katha and chips to dry Katha respectively. Thus maximum (6.68%) chips to dry Katha recovery was reported under the girth class 40 to 50 cm and minimum (5.06%) under the girth class up to 30 cm. The overall recovery of three girth classes was recorded 20.85 per cent (chips to liquid extract), 28.93 per cent (liquid to dry Katha) and 5.97 per cent (chips to dry Katha).

Range of the Katha recovery reported in this study is in accordance with the finding of Fernandez (1894) and more than what was reported by Mathur (1961). Results revealed that as the girth of Khair tree increased, the recovery of Katha was also increased.

Table 1. Effect of girth class on Katha yield

Girth class (cm)	Weight (kg)			Per cent recovery		
	Chips	Liquid extract	Dry Katha	Chips to liquid extract	Liquid to dry Katha	Chips to dry Katha
Up to 30	60.00	10.54	3.05	17.56	28.81	5.06
30 to 40	60.00	12.77	3.70	21.28	28.96	6.16
40 to 50	60.00	14.23	4.12	23.71	29.03	6.68
Mean	60.00	12.51	3.62	20.85	28.93	5.97

Katha recovery from heartwood of Khair varies with respect to girth of heartwood (Dobhal and Beri 1981, Gupta 1979 and Kumar 1998). On the contrary, Mathur (1961) revealed that Katha recovery decreased with increase in diameter class of Khair tree. Jain (1980) observed that trees, which had attained the girth of 60 to 120 cm, were generally preferred for the isolation of Katha. Trees with less than 5 cm DBH could not be recommended for Katha extraction (Wanage et al 2013). Recovery of Katha is attributed to various factors (Khawale et al 2022); age of the tree is an important factor for Katha yield (Wanage et al 2013).

CONCLUSION

Khair tree has traditional, commercial and tremendous ecological significance. Results revealed that as the girth of Khair tree increased, the recovery of Katha also increased. It was concluded that Katha recovery from heartwood of Khair varied with increase in girth of heartwood.

ACKNOWLEDGEMENT

Authors are grateful to Divisional Forest Officer, Chiplun, Ratnagiri, Maharashtra for granting permission to conduct the research experiments at Dapoli Forest Range, Ratnagiri, Maharashtra. Thanks are also due to Katha industry for providing necessary facilities to carry out the research work.

REFERENCES

- Chatterjee A and Pakrashi SC 2006. The treatise on Indian medicinal plants. Publications and Information Directorate, National Institute of Science Communication, New Delhi, India.
- Dobhal NP and Beri RM 1981. A note on the Katha content of *Acacia catechu* Willd growing in thick and open forests. Indian Forester **107(4)**: 252-254.
- Fernandez EE 1894. Yield of Katha. Indian Forester **20(7)**: 258-259.
- Gupta NK 1979. Variation studies on Katha and cutch content in different parts of the Khair, *Acacia catechu* Willd tree. MSc Thesis, CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur, District Kangra, Himachal Pradesh, India.
- Jain PP 1980. A note on the production of Katha and cutch in India. Indian Forester **106(8)**: 563-573.
- Karnik MG, Sharma OP and Dobhal NP 1965. Pilot plant production of Katha and cutch from Khair tree *Acacia catechu* Willd. Indian Forester **91(11)**: 778-780.
- Khawale MG, Mhaiske VM, Patil VK, Narkhede SS and Rane AD 2022. Recovery of Katha in India – a review. International Journal of Farm Sciences **12(3)**: 139-141.
- Kulkarni DH 1956. Heartwood volumes and Katha yields by indigenous method from dry type Khair of central India. Indian Forester **82(8)**: 403-405
- Kumar S 1998. Studies on biomass and Katha yield estimation in Khair (*Acacia catechu* Willd) in Himachal Pradesh. PhD Thesis, Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh, India.
- Mathur CM 1961. Recovery percentage of Katha and heartwood weight tables of *Acacia catechu*. Indian Forester **87(10)**: 609-610
- Sharma RP 1981. Yield tables of *Acacia catechu* (Khair) (plantation origin) for various levels of stocking. Indian Forester **107(9)**: 551-562.
- Singh KN and Lal B 2006. Notes on traditional uses of Khair (*Acacia catechu* Willd) by inhabitants of Shivalik range in western Himalaya. Ethnobotanical Leaflets **10**: 109-112.
- Trotter H 1929. The common commercial timbers of India and their uses. Central Publication Branch, Government of India, Calcutta, West Bengal, India, 153p.
- Troup RS 1921. The silviculture of Indian trees. Volume 2, Clarendon Press, Oxford, UK.
- Wanage SS, Rane AD, Gunaga RP, Narkhede SS and Bhawe SG 2013. Yield table of *Acacia catechu* for the lateritic-humid tropics. Journal of Tree Sciences **32(1-2)**: 8-13.