

Kafal (*Myrica esculenta*): A Wild Edible Fruit with Valuable Source of Nutrients

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Introduction

Kafal botanically known as *Myrica esculenta* known for edible fruits and other ethnobotanical uses having potential of generating income in the sub-himalayn region (Pandey et al., 1993). The synonyms of *Myrica esculenta* are *Myrica sapida* Wall, *Myrica farquhariana* Wall, *Myrica integrifolia* Roxb. The species belongs to genus: *Myrica*; having Chromosomes number $n = 7$. Some of the Local name: are Nepali: Hade Kaphal, Kafal, Kaphal; English: Box Myrtle, Bay Berry, Wax Myrtle

Botany

Myrica esculenta is a medium sized, dioecious evergreen tree usually 4- 10 m tall; trunk: 40 cm.; bark gray. Branchlets and buds tomentose. Petiole 0.3-2 cm, pubescent to tomentose; leaf blade narrowly elliptic-ovate or lanceolate, leathery, abaxially pale green, base cuneate, margin entire or sometimes serrate in apical 1/2 apex obtuse to acute. Male inflorescence much branched, erect or pendulous at apex, 4-9 cm; penduncle densely pubescent; bracts overlapping. Male flowers without bracteoles. Stamens 3-7; anthers red, ellipsoid. Female inflorescence erect 1-3.5 cm, many flowered; short flowers, axillary fascicles well-spaced at maturity; rachis densely pubescent and golden granular. Ovary velutinous; stigmas 2, bright red. Drupes many per infructescence, red at maturity, usually ellipsoid, papilliferous. Flowering time August to February, fruiting period: November- May (Gurmachan 2019; Jackson, 1994). It is widely distributed between 900-1200 mean sea level in the Indian Himalayas. The genus *Myrica* consists of about 97 species which are distributed throughout subtropical and temperate regions (Yanthan and Misra, 2013; Sood and Shri, 2018).

Ethnobotanical uses:

Myrica esculenta extract contains phenolic acids and flavonoids which has highly active antioxidant (Kabra et al. 2017). Some other pharmacological includes analgesic (Pant et al. 2014), anticancer (Mann et al. 2015; Saini et al. 2013), antidiabetic (Bhandari et al. 2008; Rawat et al. 2013), antidiarrheal. It is mostly used as a medicine for asthma, cough and fever (Singh et al. 2017). The bark juice is mainly used as astringent and internally as carminative. The bark powdered bark is used for cough, asthma, sinusitis and chronic

bronchitis, diarrhea and dysentery (Joshi et al. 2010; Kunwar et al. 2010). The fruits are also used for body ache, inflammation of vocal cord ulcer, bronchitis, dysentery, jaundice fever, asthma, chronic bronchitis, lung infection and as antiseptic and carminative (bark) Kabra et al. 2019. The fruits are a good source of vitamin c (Joshi et al. 2010). Fruits are used for making juice, syrups, jam and also consumed as raw. It is also used for preparing pickle and refreshing drinks (Sood and Shri, 2018). The income generated from the fruits are important for validating the annual per capita income of the farmers (Bhatt et al. 2000).

Table 1. Nutritional value of Kafal fruit (*Myrica Esculenta*)

Parameters	Value
Ash (%)	1.91-2.18
Moisture content (%)	72.33
Crude fat (%)	4.93
Crude fibre (%)	5.22-7.53
Crude protein (%)	9.62
Carbohydrates (%)	76.33-78.03
Energy (kcal/g)	386.80-395.04
Protein (%)	9.28
Calcium (mg/g)	4.23-4.63
Magnesium (mg/g)	8.4
Potassium (mg/g)	7.63-7.75
Phosphorous (mg/g)	0.24
Sodium (mg/g)	0.75-0.81
Manganese (mg/g)	0.032-0.041
Zinc (mg/g)	0.22-0.32
Iron (mg/g)	0.404-0.417
Copper (mg/g)	0.004-0.005

Source: Sood and Shri (2018)

Propagation

Establishment of seedlings in natural condition have been significantly poor for different species of *Myrica spp.* (Christa and Ostrofsky, 1989). It is basically propagated by seeds but due to physical dormancy

caused by impermeable hard seed coat results in poor germination. Seedlings and saplings contribute significantly to regeneration in Chir pine forests, indicating a suitable environment. Seeds from this ecosystem exhibited good germination percentage (Rawal *et al.* 2003). The species is dioecious in nature with a high number of male flowers thus, male dominant sex ratio might be indicative of its peripheral geographic range of distribution. This species has challenges due to resources poor environments and poor fruit settings. Bhatt *et al.* (2000) on their study found that the germination percentage of pre-treatment of seeds of *Myrica esculenta* at 4 °C for 20 days exhibited best response with germination percentage (48 %) and mechanical scarification for maximum germination percentage (40.0%). A study conducted by Shah (2005) revealed that *Myrica esculenta* propagation through shoot cutting rooting was successful during spring season with treatment of IBA 10,000 ppm in Yr-2 growth. Study also revealed that rooting percentage through air layering was maximum in summer season.

Other uses

It is also utilized as a dye plant (Kunwar *et al.* 2019). The species has multiple uses for both timber and fire woods. Fruits are basically used for making wine due to their savory flavor contentment (MoFE, 2018). In India. Its barks are used for fish poisoning, tanning and dyeing (Pala *et al.* 2010). According to (Pandey *et al.* 2017), the plant has high potential for carbon sequestration in Nepal and India.

Threat and Conservation

Since ancient periods, *Myrica esculenta* has been used in Ayurvedic and nutritional benefits. It has been reported that *Myrica esculenta* contains numerous pharmacological effects to treat various diseases and disorders. Being categorized as underutilized fruit crops, not cultivated commercially, it is often disregarded for its cultivation. However, as the findings suggested that this fruit has numerous advantages and significant potential for its cultivation. The reports also shown that the various pharmacological companies through convergence with Government extract drugs from the plants but no further actions were taken for its cultivation. Government must focus on fostering its cultivation and encourage farmers to adapt its commercial cultivation. Due to over exploitation of such underutilized fruit which has various medicinal properties, it is on the verge of extinction due to negligence, inadequate cultivation and

poor regeneration in natural habitats. Its high time to take proactive steps to boost its conservation, cultivation and utilization.

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