

Quantitative Estimation of Food Value of Edible Young Shoot of *Melocanna Baccifera*

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ABSTRACT

The very young edible shoot of bamboo- *Melocanna baccifera* is widely used as a raw food ingredient for several dishes of Tripura Tribes. In *Kokborok* (Tribal language - the 3rd Official Language of the state-Tripura, India), it is known as *Muia*. It's soft part is used almost daily & vigorously by the Tribal people, allowing it as one of the major ingredient of almost all curry. There is very little scientific analysis regarding the biological activities of different food items of Tribal people of Tripura. Few therapeutic activities of this young edible shoot and it's different part were performed based on the availability of facilities of laboratories but the quantitative estimation of this edible shoot was not carried out. Therefore, it is pertinent to study **quantitative estimation of food value of edible young shoot**. Methanolic shoot extract of bamboo-*Melocanna baccifera* (MEMB) has transpired the presence of several components like, protein, carbohydrate, minerals like sodium, chloride, phosphate, calcium potassium, alkaloids, fixed oil along with few bioactive constituents like flavonoids, triterpinoids, glycosides. MEMB was able to show some pharmacological activities like analgesic activity, anti-diabetic activity & hepatoprotective activity along with antimicrobial activity. So, the shoot of *Melocanna baccifera* is protective as well as nutritious food for Tribal people of Tripura, India. That's why, nowadays, a section of non-Tribal people of Tripura also used to consume the said food ingredient in several dishes.

Keywords: *Melocanna baccifera*, Shoot, Food value, *Kokborok*, People, Tribal, Ingredient, *Muia*

Introduction

The Tribal people of Tripura take regularly the young bamboo shoot by cooking in their own style. In *Kokborok*, such shoot is called *Muia* (*Kokborok* is the 3rd official Language of Tripura, a North-eastern state of India). These shoots are usually 20 to 30 cm long. In the rainy season, the bamboo shoots begin to emerge from the root of mature bamboos. The shoots remain covered by curvaceous sheaths. These sheaths fall off as the shoots grow mature & larger. These are edible & soft when are of about 20 -25 inches in height. During this stage, the food values specially the protein contents remain peak. *Muia* varies in weight, size & bitterness taste. These are very popular food ingredient not only to the Tribal of Tripura, but also to the other people of North- Eastern region. From the ancient time, different literature

explained the uses of *Muia* both as food as well as medicine. Removing the outer shell & internodes they take this *Muia* as vegetables. They prepare many more dishes mixing with *Muia* such as *Godok*, *Berma bwtwi*, *Mui borok*, *Mui awandru* (dishes of tribal people of Tripura), etc from various types of bamboo shoot (T. Bhakta, 2004, Bahadur *et al.*, 1963, Chongthan *et al.*, 2011 Chauhan *et al.*, 2016, P. Das, 1997). According to the Tribal people of Tripura, the *Muia* of *Melocanna baccifera* is very much tasty among the other type of edible *Muia*. In Bengali, it is known as *Muli bash*. It contains thin wall, diameter is small. It flowers at the intervals of 40 to 44 years (Kuddus *et al.*, 2013) It belongs to family Poaceae (<https://en.m.wikipedia.org>, 2020, Govinda *et al.*, 2016).

Materials and Methods

The plant sample *Melocanna baccifera* was collected from the local market, Kailashahar, Unakoti Tripura. The taxonomical identification was done by Prof. B. K. Datta, Department of Botany, TU (Tripura University). Very young stem of *Melocanna baccifera* was collected. Removing the outer covering & internodes, *Muia* was pieced. The pieces were dried under shade & grinded into very fine powder, then soaked into methyl alcohol for one week. The *Muia* extract (MEMB) was filtered. Further the filtrate was given back to dry for obtaining powder like mass(substance). This substance was served as sample.

From Literature, it may be revealed that MEMB may show the presence of carbohydrate, fat, protein, vit. C, tannin, alkaloid, fixed oil, glycosides, triterpinoids, flavonoids, chloride, phosphate, calcium, magnesium, copper, sodium, phosphorous, potassium and nitrate (De *et al.*, 2020, Namasudra *et al.*, 2015)

Quantitative estimation of Carbohydrate was determined by using Anthrone reagent method, protein (N×6.25) was estimated using the method of micro-kjeldahl & amount of fat was estimated gravimetrically (Bora *et al.*, 2015). Flavonoids content was determined by using Zhishen *et al.*, method (Zhishen *et al.*, 2010). The amount of Tannins was estimated following the methods of Obadoni & Ochuko (Obadoni *et al.*, 2001), Graham, Singleton and Rosi (1965) Graham *et al.*, 1992, Singleton *et al.*, 1965). Estimation of glycoside was performed following the methos (De *et al.*, 2020, Namasudra *et al.*, 2015). Estimation was carried out following the Patel *et al.*, method (Patel *et al.*, 2016, Ferguson, 1957). Estimation of Iron content was done by following the method of Ranganna (Ranganna, 1997) using spectrophotometer and standard curve. Estimation of Calcium and Magnesium were done by complexometric method using EDTA (Santra *et al.*) complexing agent. In this method, metalochromic indicators (i.e. Solichrome dark blue for Ca & Eriochromic black for Mg) were used. Estimation of Chlorine, Copper was also done by titrimetric method (Santra *et al.*) Estimation of sodium, Phosphorous were carried out by colorimetric Method (Santra *et al.*). Results are depicted in Table – 1.

Results

Name of constituents	Amount
Carbohydrate	23.69% w/w
Fat	12.50% w/w
Protein	17.51% w/w
Tannin,	23.95 mg/100gm
Alkaloid	+
Fixed oil,	+

Glycosides,	+
Triterpinoids,	5.22 mg/100gm
Vit. C	5.90 mg/100gm
Flavonoids.	8.96 mg/100gm
Chlorine	563.7 mg/100gm
Copper	11.0 mg/100gm
Magnesium	35.12 mg/100gm
Calcium,	90.12 mg/100gm
Iron	19.0 mg/100gm
Sodium	150.0 mg/100gm
Phosphorous	15.0 mg/100gm

Table – 1: Quantitatively estimated phytoconstituents of the shoots of *Melocanna baccifera*

The results shows that the extract consists of carbohydrate, proteins in moderate amount. It is highly rich in chlorine (563.7 mg/100gm). Significant amount of sodium (150.0 mg/100gm) is also present in the MEMB. Results reveal the presence of Calcium in moderate amount (90.12 mg/100gm). Iron, copper, magnesium are also present but in negligible amount.

Discussion:

The phytochemical studies revealed that the *Muia* extract contains carbohydrate, fat protein, vit.C, tannin, alkaloid, fixed oil, glycosides, triterpinoids, flavonoids, chloride, phosphate, calcium, magnesium, copper, sodium and phosphorous. In addition, *Muia* also contains potassium and nitrate. Quantitative Estimation of the extract also revealed the amount of different constituents which are depicted in the Table 1. Plant extract contains Glycosides, Flavonoids, Alkaloids, Triterpenoids & Tannins, Saponins, Phenols. “The concentration of different bioactive components varies from plant to plant. Due to this variation in concentration of components available, plant exhibits the typical medicinal property” (Atikya *et al.*, 2014). So, these bioactive elements may thus enhance the anti-bacterial action. Other phytochemical components of the sample may assist too. “The plant part used for extraction & age of plant – both are important factors that can affect the ethnopharmacological action of the extract. It is also reported that, older the plants, much less alkaloids compared to younger plants” (Debalke *et al.*, 2018).

Antimicrobial activity as well as the therapeutic activity such as analgesic activity, hepatoprotective activity and antidiabetic activity (Namasudra *et al.*, 2019a, 2019b) of *Muia* (MEMB) might be associated with the emergence of alkaloids, triterpinoids, flavonoids, tannins, glycosides, fixed oils, minerals and other bioactive components of the plants. Further intensive studies may highlight the probable mechanism of action of the phytoconstituents of the shoot of *Melocanna baccifera*. Ultimately, MEMB was able to show some pharmacological activities like analgesic activity, anti-diabetic activity, hepatoprotective activity & antimicrobial activity. So, the shoot of *Melocanna baccifera* is a nutritious food of tribal people of Tripura, India.

CONFLICT OF INTEREST

The authors declared no conflict of interest regarding the publication of this article.

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