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# STUDIES ON DIFFERENT BANANA VARIETIES OF KALIABOR SUB-DIVISION OF ASSAM, INDIA AND ESTIMATION OF THEIR SUGAR CONTENT

Dr. Basistha Kalita[1]

[1] Assistant Professor, Department of Botany, Kaliabor College, Kuwaritol, Nagaon, Assam, India

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## ABSTRACT

Banana is the common name for the plants of the genus Musa. It is considered as one of the oldest cultivated plant in India. It is a very common fruit in India. The fruit belongs to the family Musaceae and it contains low saturated fats, cholesterol. It is also a good source of dietary fibre, vitamin C, potassium, magnesium, iron and a very good source of vitamin B6. Kaliabor is a subdivision of Nagaon district situated in the middle part of the state of Assam. The area of the subdivision is 947.40 sq. km. Main occupation of the people of the Sub Division is agriculture. Apart from the principal cultivation of rice people also cultivates different fruit plants of which banana occupies one of the important position. Since time immemorial people of Kaliabor Sub Division have been cultivating different varieties of bananas. In the present investigation a survey work on bananas cultivated by the people of the area is carried out in the villages of Kaliabor Subdivision. An attempt was also made to estimate the sugar content of some of the banana varieties found in the Sub Division. The present study reveals the presence of 35 varieties of banana in Kaliabor sub-division, out of which 33 species are edible and 2 are ornamental. The total sugar content and reducing sugar of Amrit sagar banana (Musa acuminate Colla), Bhim banana (Musa balbisiana Colla), Chenichampa banana (Musa champa Hort.), Hoindha banana (Musa spp.), Hunda banana (Musa spp.), Jahaji banana (Musa chinensis Sweet.), Kachulopa banana (Musa spp.), Kach banana (Musa paradisica L.), Malbhog banana (Musa valutina (Wendil. & Drude)), Monohor banana (Musa sapientum L.) were estimated and Manuhar banana ((Musa sapientum L.)) topped the list with 0.8442 gm total sugar content and 0.06642 gm reducing sugar followed by others.

**Keywords**: Banana, Kaliabor sub-division, Sugar content.

## 1. INTRODUCTION

Bananas, the oldest food crop of the world is thought to be originated in Malayasia (Simmonds, 1962) or Indonesia (Horry et al., 1997). Malaysia is considered as the primary centre of origin of banana and from there, it spread to India and Burma. India has the second largest diversity of indigenous bananas in the world. India has more than 300 germplasms, out of 600 reported worldwide (Meghawal & Jayachandran, 2023) It is evident that cultivation of bananas started as back as 4000 BC in New Guinea (Denham et al., 2004). Later on the cultivation of bananas was spread throughout the tropics and sub-tropics of Asia, America, Africa and Australia (Anonymous, 2008). Banana is a very common popular and important fruit not only for India but also for all the countries of the world. Banana is such an important plant for human civilization that every part of the plant is exploited in different purposes different people in different part of the world. Most of the countries cultivate banana for fruits. The ripen bananas are consumed as raw fruits. Un-ripen fruits of some bananas are used as vegetables and also for making chips. Bananas are also widely used as processed food like pickle, cake, yogurt, nectar, baby food etc. Alcoholic beverages, Vinegar etc can also be made from fermented ripe bananas (Singh et al. 2018). It forms the staple food for man villagers and tribal of eastern and southern India (Shruthi, 2019). In India the whole plant of banana is used in different purposes. In addition to the fruits, the inflorescences, the young aerial stems etc. are consumed as vegetables by the people of Assam and North east. The underground stem of some banana plant particularly bhim banana are used to prepare an alkaline solution which is popularly known as kolakhar in

Assamese. Kolakhar is extensively used to prepare a food item which is considered as fruitful against acidity. The young leaf blades are used in holly occasions as alternatives to utensils. Indian people also believe that eating food on leaf blade of banana is good for health. In South India, North east India, West Bengal etc. people use banana leaf extensively for eating rice. Thus Banana becomes an important part of the Indian culture. Besides banana is an excellent source of nourishment and a well-balanced diet to people of all ages (Jyothirmayi and Rao, 2015). Bananas are considered as a rich source of vitamin A, vitamin B-complex, vitamin C, manganese, potassium and digestible food fibres are present in the fruits in sizeable levels (Aurore et al., 2009; Elayabalan et al., 2017).

## 2. OBJECTIVE

Kaliabor is a subdivision of Nagaon district situated in the middle part of the state of Assam. The area of the subdivision is 947.40 sq. km. Main occupation of the people of the Sub Division is agriculture. Apart from the principal cultivation of rice people also cultivates different fruit plants of which banana occupies one of the important position. Since time immemorial people of Kaliabor Sub Division have been cultivating different varieties of bananas. Though the people of the area have been cultivating bananas since time immemorial but their approach of banana cultivation and its commercial exploitation is still in conventional stage. Application of modern techniques of cultivation and attempt to add more value to fruits or the banana plants as a whole may change the economic scenario of the area. Considering the importance of the bananas, the following objectives of the present work is planned

i. To make a survey of banana varieties in Kaliabor Sub Division
ii. To estimate the sugar content of some important banana varieties available in Kaliabor Sub Division.

## 3. MATERIALS

i. Plant materials collected from the farmer and wild for identification
ii. Camera
iii. Somogy's Reagent
iv. Starch Indicator

## 4. METHODOLOGY

A thorough survey of the bananas of Kaliabor Sub Division was carried out. The primary information regarding the banana plants were collected from elderly people of the area during the survey work. The species found during the survey work was identified with standard literature and photograph. The sugar content of the species were estimated with the help of somogy's method.

## 5. RESULT AND DISCUSSION

Kaliabor is a rural Sub Division of Assam covering an area of 947.40 sq. km. The study has been conducted in 30 different villages of Kaliabor Sub-division where bananas are cultivated for commercial purpose. The villages where the survey work conducted were Uluoni Gaon, Hatigaon, Deori Chilabandha, Chilabandha, Niz Chilabandha, Niz Pubthori, Bortol, Samoguri Satra, Silghat, Sonarigaon, Chatial, Langichuk, Bogajan Satro, Jakhalabandha, Gumuthagaon, Latugaon, Pachonichuk, Missa, Borbhogia, Bhoraligaon, Salona bazaar, Sariyobari, Anjukpani, Balijuri, Mikirgaon, Kohon basti, Borjuri, Sonarijuri, Langsulipi and Langkhang.

The survey reveals the presence of 35 species of bananas in Kaliabor Sub-Division (Table-I).

| Sl. No. | Vernacular Name (Assamese) | Scientific Name | Occurance |
|---|---|---|---|
| 1 | Amrit sagar kol | *Musa acuminate* Colla | All villages |
| 2 | Bejia kol | *Musa* spp. | Missa, Pachani Chuk |
| 3 | Bhim kol | *Musa balbisiana* Colla | All villages |
| 4 | Bhorotmuni kol | *Musa* spp. | Balijuri |
| 5 | Bhot Monuhar kol / Manuhar kol | *Musa sapientum* L. | All villages |
| 6 | Bhottha kol | *Musa* spp. | Sariyobari, Missa |
| 7 | Bon kol | *Musa sanguinea* Hook. & Drude | Kalibheti, Sonarijuri |
| 8 | Bongali Jahaji kol | *Musa* spp. | Balijuri, Sariyobari |

| | | | |
|---|---|---|---|
| 9 | Bor Jahaji kol | *Musa* spp. | Sonarigaon, Silghat, Kuwaritol, Uluoni, Jakhalabandha |
| 10 | Chani champa | *Musa champa* Hort. | All villages |
| 11 | Chorai kol | *Musa* spp. | Chilabandha |
| 12 | Dhigjuwa kol | *Musa* cornicalata (Rumph) Kurz.. | Sariyobari, Balijuri Uluoni, Hatigaon |
| 13 | Hari kol | *Musa* spp. | Balijuri |
| 14 | Hoindha kol | *Musa* spp. | Samaguri satra |
| 15 | Honda kol | *Musa* spp. | Chilabandha |
| 16 | Jahaji kol | *Musa chinensis* Sweet. | All villages |
| 17 | Jati kol | *Musa* spp. | All villages |
| 18 | Jurmoni kol | *Musa* spp. | Sonarigaon, Silghat, Kuwaritol, Uluoni, Jakhalabandha |
| 19 | Kach kol | *Musa paradisica* L. | All villages |
| 20 | Kechulepa kol | *Musa* spp. | All villages |
| 21 | Malbhog kol | *Musa valutina* (Wendil. & Drude) | All villages |
| 22 | Mikir khunda kol | *Musa* spp. | Niz Chilabandha |
| 23 | Naga Malbhog | *Musa mannii* H. Wendl. Ex Baker | Balijuri, Sariyobari Niz Pubthoria, Uluoni |
| 24 | Naga kol | *Musa nagalandiana* (S. Dey & Gogoi) | Balijuri, Kohon Basti, Sariyobari |
| 25 | Nichila kol | *Musa* spp. | Balijuri |
| 26 | Padma kol | *Musa* spp. | Dewri Chilabandha |
| 27 | Phul kol | *Musa ornate* Roxb. | Salona bazzar |
| 28 | Phul nothoka kol | *Musa* spp. | Sonarijuri, Sariyobari |
| 29 | Ram kol | *Ravenala madagascariensis* | Balijuri |
| 30 | Sap kol | *Musa* spp. | Kali Bheti |
| 31 | Sepa Athia kol | *Musa* spp. | Balijuri |
| 32 | Saker Champa | *Musa* spp. | Kohon Basti |
| 33 | Thio Jahaji | *Musa* spp. | Chilabandha |
| 34 | Tuloshi Malbhog | *Musa* acuminate "Red Dacca" | Niz Pub Thoria, Silghat Sonarigaon, Balijuri |
| 35 | Xunali kol | *Musa* spp. | Langsulipi |

Note: Scientific name not found in the banana varieties where in the place of Scientific name only Musa spp. are written.

The table shows the presence of 35 varieties of Bananas in Kaliabor Sub Division. Among the varieties Amrit sagar kol (Musa acuminate Colla), Bhim kol (Musa balbisiana Colla), Chani champa kol (Musa champa Hort.), Jahaji kol (Musa chinensis Sweet.), Jati kol (Musa spp.), Kach kol (Musa paradisica L.), Kechulepa kol (Musa spp.), Malbhog kol (Musa valutina (Wendil. & Drude) and Manuhar kol (Musa sapientum L.) were found in all the villages where the survey was carried out. These varieties are extensively used by the people. Varieties like Bharatmani kol (Musa spp.), Nichila kol (Musa spp.), Padma kol (Musa spp.), Phul kol (Musa ornate Roxb.), Phul nothoka kol (Musa spp.), Ram kol (Ravenala madagascariensis), Saker champa kol (Musa spp.), Sap kol (Musa spp.), Xunali kol (Musa spp.), etc. are of very rare occurrence and are found only in one or two villages..This kinds of varieties need special attention for conservation.

Out of the total 35 varieties of Banana available in Kaliabor Sub Division 10 varieties were selected for the estimation of total sugar content and reducing sugar depending up on their extensive use by the people of the area. The findings of the experiment is presented in Table- II & III

**Table II**
**Total sugar content present in the selected Banana varieties of Kaliabor Sub Division**

| Sl.No. | Banana Variety | Scientific Name | Total Sugar per Gram |
|---|---|---|---|
| 1 | Amrit sagar kol | *Musa acuminate* Colla | 0.0443 gm |
| 2 | Bhim kol | *Musa balbisiana* Colla. | 0.02276 gm |
| 3 | Bhottha kol | *Musa* spp | 0.03514 gm |
| 4 | Chani champa | *Musa champa* Hort. | 0.2262 gm |
| 5 | Jahaji kol | *Musa chinensis* Sweet. | 0.01782 gm |
| 6 | Kach kol | *Musa paradisica* L. | 0.01284 gm |
| 7 | Kechulepa kol | *Musa* spp. | 0.05288 gm |

| | | | |
|---|---|---|---|
| 8 | Malbhog kol | *Musa valutina* (Wendil. & Drude) | 0.0349 gm |
| 9 | Manuhar kol | *Musa sapientum* L. | 0.8442 gm |
| 10 | Tuloshi Malbhog | *Musa spp.* | 0.01782 gm |

Table- II explains the presence of highest amount of total sugar content in Manuhar kol (Musa sapientum L.) 0.8442 gm followed by Chani champa kol (Musa champa Hort.), Kechulepa kol (Musa spp.), Amrit sagar kol (Musa acuminate Colla), Bhottha kol (Musa spp.), Malbhog kol (Musa valutina (Wendil. & Drude), Bhim kol (Musa balbisiana Colla.), Tuloshi Malbhog (Musa acuminate "Red Dacca"), Jahaji kol (Musa chinensis Sweet.) and Kach kol (Musa paradisica L.)

**Table III**
**Reducing sugar present in the selected Banana varieties of Kaliabor Sub Division**

| Sl.No. | Banana Variety | Scientific name | Reducing Sugar per Gram |
|---|---|---|---|
| 1 | Amrit sagar kol | *Musa acuminate* Colla | 0.0216 gm |
| 2 | Bhim kol | *Musa balbisiana* Colla. | 0.00216 gm |
| 3 | Bhottha kol | *Musa* spp | 0.01944 gm |
| 4 | Chani champa | *Musa champa* Hort. | 0.001632 gm |
| 5 | Jahaji kol | *Musa chinensis* Sweet. | 0.00162 gm |
| 6 | Kach kol | *Musa paradisica* L. | 0.00054 gm. |
| 7 | Kechulepa kol | *Musa* spp. | 0.04158 gm |
| 8 | Malbhog kol | *Musa valutina* (Wendil. & Drude) | 0.0162 gm |
| 9 | Manuhar kol | *Musa sapientum* L. | 0.06642 gm |
| 10 | Tuloshi Malbhog | *Musa* acuminate "Red Dacca" | 0.001632 gm |

Table III shows the presence of highest amount of reducing sugar in Manuhar kol (Musa sapientum L.) 0.06642 gm followed by Kechulepa kol, Amrit Sagar kol (Musa acuminate Colla), Bhottha kol, Malbhog kol (Musa valutina Wendil. & Drude), Bhim kol (Musa balbisiana Colla.), Chani Champa kol (Musa champa Hort.), Tuloshi Malbhog kol (Musa acuminate "Red Dacca"), Jahaji kol (Musa chinensis Sweet.) and kach kol (Musa paradisica L.).

## 6. CONCLUSION

Kaliabor Sub-Division is rich in banana diversity and people have been maintaining the germplasm of banana generation after generation, but they are not much aware of it's commercial aspects. People are using the fruits and other parts of bananas in conventional way. Bananas like Amrit sagar (Musa acuminate Colla), Bhim (Musa balbisiana Colla.), Chani champa (Musa champa Hort.), Jahaji (Musa chinensis Sweet.), Malbhog (Musa valutina Wendil. & Drude), Manuhar (Musa sapientum L.), Kach (Musa paradisica L.) etc. with high nutrient value are the potential candidates for commercial exploitation. Value addition to the conventional way of commercial exploitation may change the economic scenario of the locality. People should be encouraged to maintain the germplasm both for commercial exploitation and as a conservation measure. Such attempt will definitely boost the economic and environmental need of the locality.

Images of few important banana varieties available in kaliabor Sub Division

Musa acuminate Colla

Musa valutina (Wendil. & Drude)

Musa paradisica L.

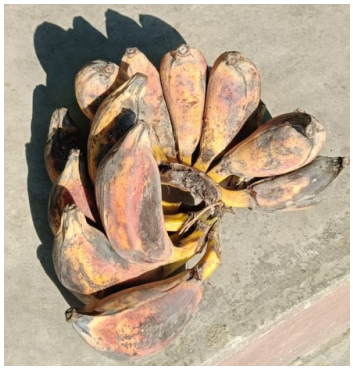
Musa champa Hort.

Musa acuminate “Red Dacca”

## IMAGES OF FEW IMPORTANT BANANA VARIETIES AVAILABLE IN KALIABOR SUB DIVISION

Musa chinensis Sweet

Honda kol (Musa spp.)



Musa balbisiana Colla

Musa sapientum L.

Kechulepa kol (Musa spp.)

## CONFLICT OF INTERESTS

None.

## ACKNOWLEDGMENTS

None.

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