Government of Assam

DEPARTMENT OF ENVIRONMENT & FORESTS

REPORT ON ARACEAE

EX-SITU CONSERVATION, PROPAGATION AND STUDY ON INDIGENOUS ARACEAE FAMILY IN ASSAM

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FORWARDING

Dibakar Deb, IFS
Silviculturist Assam, Basistha, Guwahati-29

It is with great pleasure that I present this comprehensive report on "Ex-situ Conservation, Propagation, and Study on Indigenous Araceae Family in Assam," published by the Office of the Silviculturist, Assam. This report, meticulously compiled & documented by Smt. Himamoni Handique, Research Officer, Smt. Preeti Buragohain, AFS, DCF, R & E Circle, and Smt. Nigar Sultana, RFO, Loharbond Silviculture Range, is a testament to the dedication of our forest professionals in this entire exercise of collecting germplasm, plantation, maintenance, monitoring & laboratory tests..

The Araceae family, known for its ecological, economic, and traditional food value, holds a deep presence in Assamese culinary practices and represents a vital component of the region's biodiversity. The initiative by the authors to grade these 20 species under Araceae family in terms of food value and toxicity demonstrates a proactive approach to exemplary diligence in documenting the research findings.

I would like to extend my heartfelt appreciation to the authors & frontline field staff whose tireless efforts on the ground have been instrumental in the successful execution of this project. Special thanks are due to Sri Sailen Das, DFO, Genetic Cell Division, whose commitment laid the foundation for this significant project.

This report is not just a valuable resource for forestry professionals and researchers but also holds immense potential for the broader public, enhancing awareness and appreciation of species under Araceae family.. The findings and methodologies documented here will serve as a reference point for future conservation efforts, contributing to the preservation of the Araceae family and the overall biodiversity of our region.

I am confident that the insights gained from this study will inspire further research and conservation initiatives, fostering a deeper understanding of the importance of ex-situ conservation in safeguarding our indigenous plant species.

Congratulations to the authors, co-authors, and all involved for their outstanding contributions to this effort.

Dibakar Deb

TABLE OF CONTENTS

" ARACEAE "

CREATION OF A PLOT FOR COLLECTION, EX-SITU CONSERVATION, PROPAGATION AND STUDY ON INDIGENOUS ARACEAE FAMILY IN ASSAM AND NORTH-EASTERN STATES

Location- Basistha, Silviculture Complex
Area-0.04 Ha

(funded by CAMPA, Assam)

Introduction

A considerable section of marginal forest fringe community population is major consumer of plant based forest foods namely, leafy vegetable and rhizomes. Among which, the rhizome constitutes a major component of food available inside the forest. The Araceae family commonly known as Aroids, which consist of many underground food crops, are considerably important plant family of tropical and sub-tropical regions. This family comprises of 8 subfamilies, 119 genera and 6450 species (Mabberley 2017). Assam is rich in the diversity of plants due to its various edhaphic, climatic and other ecological factors, favouring a unique ecosystem where aroids coexist with other plant species (Das *et al*.., 2011). These plants are valued by the forest fringe communities since ancient time due to their medicinal properties. Most of these plants serve ornamental and culinary purposes, while the remainder is utilized for medicinal applications, animal feed, packaging, traditional games, religious ceremonies, fishing, and various other uses (Talukdar and Devi, 2015). They are rich in carbohydrates, vitamins, and minerals, providing essential nutrition to those communities. Moreover, various Araceae species are known to be used in traditional medicines (Basumatary *et al..,* 2015; Chaudhury *et al..,* 2021). For instances, the tubers and leaves of some species are utilized for their supposed therapeutic properties, including anti-inflammatory and antimicrobial effects (Singh *et al*.., 2018). In Assam, traditional medicine derived from Araceae plant species, either alone or in combination, has been employed by local tribes to address over 60 health ailments (Neog *et al*.., 2016).

Members of the Araceae family are consume by forest dwellers as food (Borah *et al..,* 2020). The plants are incorporated into a variety of local dishes, contributing to diversity of the native cuisine (Das & Teron, 2014). Extracted starch from aroids could be used in foods, synthesis of edible film, food coating, fine printing paper, plastic sheets, cosmetics, textile and photographic industries (Saikia and Konwar, 2012). The species are high source of iron and known to be used for blood purification (Kutum *et al..,* 2011).

Being an important family, the forest department have initiated systematic research on Araceae. At this backdrop, the nutritional value, toxic content and medicinal content needs to be calibrated so to ascertain the consumption of the species like *Alocasia accuminata, A. odorata*, etc. as a forest-based food and medicine, etc. Now a days, Aroids are extensively cultivated and utilized for various reasons, owing to its significant economic and scientific importance. Notably, its application in food and medicine is intriguing, as these plants are inherently toxic and necessitate meticulous preparation to ensure safe consumption. In view of the above, distinctive

research on this species need to be contemplated to scientifically establish the importance of Araceae family as a healthy food and important medicine for the forest dependent communities.

Need

For centuries, the tribal communities and residents of Assam and the Northeastern States have incorporated "Kosu" into their traditional dishes, utilizing its rhizomes, leaves, and shoots. They remain integral to most native cuisines, often enjoyed alongside a variety of fruits, vegetables, and meats. Thus, many species within the Araceae family are utilized by indigenous communities in various manners, yet there is a lack of scientific validation and pertinent dietary data to support these practices. Also, some of the species of the Araceae are observed to be avoided in the local cuisines. For eg. “Borahe nukhua kosu” is not consumed by the local communities. This species is even avoided by wild boars and other animals. Therefore, it is required to establish a scientific validation on the species of the Araceae family for proper understanding of its nutritional, medicinal and toxicological properties to benefit the local communities and mankind as a whole.

Therefore, it is essential to conduct scientific validation of the Araceae family species to enhance the understanding of their nutritional, medicinal, and toxicological characteristics, thereby benefiting local communities and humanity at large.

Objective

To carry out ex-situ experiment for propagation of different species belonging to Araceae family to determine their toxicity, food nutrient content and medicinal value and grade the species accordingly.

Methodology

1. Collection of rhizomes(germplasm) from different forest area, market places, villages. Collected during the month of Feb-March. Identifying the species is done by its local name wherever it is found.
2. Soil preparation for better growth of the collected germplasm. Organic materials such as cowdung, leaves mould, sand etc. are used for readying the soil for the planting.
3. Planting the collected germplasm in the prepared beds at Basistha. Planting is done during the months of March-April with a spacing of 1 x 1 mtrs. Different species are planted in different beds.
4. Observing the growth and morphology of the species. The planting period to matured stage is monitored accordingly species wise and weeding and mulching is carried out whenever necessary.
5. Digging out the rhizome and harvesting the edible parts of the plants for laboratory tests. Collection period is November-January, by digging out method. Sample of each collected species are sent to laboratory for its analysis and the rest are harvested for future germplasm by sundry method and storing it in dry area.
6. Laboratory analysis for *starch, protein, calcium oxalate.*
7. Regeneration of the species considered for the experiment.

List of the Species taken for the experiment

Sl. No	Local name	Scientific name
1	GONDHI KOSU	*Homalomena aromatica*
2	BORAHE NUKHUA KOSU	*Colocasia sp*
3	PANCHAMUKHI KOSU	*Alocasia cucullate*
4	DOHI KOSU	*Alocasia odora*
5	SENGMORA	*Lasia spinosa*
6	GARO KOSU	*Colocasia sp*
7	SAMA KOSU	*Divaricate typhonium*
8	KOLA KOSU I	*Colocasia esculenta*
9	PAHARIA KOSU I	*Colocasia sp*
10	NOGA KOSU	*Colocasia sp*
11	OLL KOSU	*Amorphophallus bulbifera*
12	NIL KOSU	*Xanthosoma robusta*
13	MAAN KOSU	*Alocasia indica*
14	TEPU KOSU	*Alocasia accuminata*
15	PAHARIA KOSU II	*Colocasia sp*
16	KOLA KOSU II	*Colocasia sp*
17	KAJALA NAL KOSU	*Colocasia sp*
18	PODUM KOSU / ADOLIA KOSU	*Colocasia sp*
19	MANCACHAR KOSU	*Colocasia sp*
20	TELI KOSU	*Colocasia sp*

1. GONDHI KOSU

- ***Scientific Name:*** ***Homalomena aromatica***
- ***Distribution:*** *In India it is available in North-eastern states. In Assam, it is abundantly found in Karbi-Anglong, North-Cachar Hills, Lower Assam Zone.*
- ***Plant description:*** *average height of the plant measures 0.5-0.8 m. Popular among various communities as Gondhi kosu due to its significant aroma.*
- ***Edible Part:*** *whole plant.*
- ***Local cuisine:*** *Rhizome is boiled and mixed with other herbs and spices to prepare pitika, rhizome is also cooked with fish/meat, boiled leaf is cooked with acidic fruit, stem is used to prepare various chutney, etc.*
- ***Nutritional value:*** *starch 26.24%, Protein 2.1%.*
- ***Medicinal Uses:*** *Rhizomes possess anti-inflammatory, analgesic, antidepressant, antiseptic, sedative, antispasmodic properties.*
- ***Commercial Uses:*** *Rhizome oil used as fixative in perfume industry.*
- ***Planting & Harvesting time:*** *March-April (planting), November-December (Harvesting). For commercial use, the plant is harvested after 3 years.*

2. BORAHE NUKHUA KOSU

- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *All over Assam.*
- ***Plant description:*** *average height of the plant measures 2.0-2.5m. Commonly named as borahe nukhua kosu as it is not consumed even by pigs and wild boars due to its high toxicity.*
- ***Edible Part:*** *not consumable, high content of toxicity.*
- ***Nutritional value:*** *starch 18.60%, protein 2.5%, calcium oxalate 63.4mg/g.*
- ***Medicinal Uses:*** *not discovered so far.*
- ***Commercial Uses:*** *widely distributed in wild.*
- ***Planting & Harvesting time:*** *naturally grown in wild throughout the year.*

3. PANCHAMUKHI KOSU

- ***Scientific Name:*** ***Alocasia cucullata***
- ***Distribution:*** *In India it is available in North-eastern states. It is a common species cultivated all over Assam.*
- ***Plant description:*** *average height of the plant measures 1.5-2 m. The tubers open into five buds each time thus named as Panchmukhi.*
- ***Edible Part:*** *Rhizome*
- ***Local cuisine:*** *Rhizome is boiled and mixed with other herbs and spices to prepare pitika, rhizome is also cooked with fish/meat.*
- ***Nutritional value:*** *Starch 22.90%, Protein 2.3%.*
- ***Medicinal Uses:*** *It is applied externally to treat snake bite, rheumatism, arthritis, abscesses. Used in traditional medicine.*
- ***Commercial Uses:*** *widely cultivated for consumption.*
- ***Planting & Harvesting time:*** *March-April (planting), November-December (Harvesting).*

4. DOHI KOSU

- ***Scientific Name:*** ***Alocasia odora***
- ***Distribution:*** *It is easily available among all the districts of Assam and North-East India.*
- ***Plant description:*** *average height of the plant measures 2m.*
- ***Edible Part:*** *Leaves, stem and newly developed shoot.*
- ***Local cuisine:*** *stem is first boiled and then cooked with fish/meat, boiled stem is also added in various vegetarian dishes, etc.*
- ***Nutritional value:*** *starch 23.80%, protein 2.2%.*
- ***Medicinal Uses:*** *treatment for common cold, stomach ache, cholera, hernia, antifungal, antiparasitic, antioxidant, etc.*
- ***Commercial Uses:*** *cultivated for consumption and also used as an ornamental plant.*
- ***Planting & Harvesting time:*** *March-April (planting), throughout the year (Harvesting).*

5. SENGMORA

- ***Scientific Name:*** ***Lasia spinosa***
- ***Distribution:*** *abundantly found in damp and waterlogged areas throughout Assam.*
- ***Plant description:*** *average height of the plant measures 1.0-1.5m.*
- ***Edible Part:*** *stem and leaves.*
- ***Local cuisine:*** *Stem and leaves are cooked with fish/meat, boiled stem is also added in various vegetarian dishes, etc.*
- ***Nutritional value:*** *starch 27.76%, protein 2.2%.*
- ***Medicinal Uses:*** *treatment of rheumatoid arthritis, inflammatory diseases, cough, hemorrhoids, gastro intestinal diseases, etc.*
- ***Commercial Uses:*** *collected from wild for consumption and selling.*
- ***Planting & Harvesting time:*** *found in wild, harvested throughout the year.*

6. GARO KOSU

- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *abundant in Garo hills & Boko region of Assam.*
- ***Plant description:*** *average height of the plant measures 2m. Since it is abundantly found in the Garo Hills, it is locally known as Garo kosu.*
- ***Edible Part:*** *flower and rhizome.*
- ***Local cuisine:*** *Rhizome is boiled/fried and then mixed with different herbs and spices to prepare pitika, boiled rhizome is also cooked with fish/meat, etc.*
- ***Nutritional value:*** *starch 22.90%, protein 3.1%*
- ***Medicinal Uses:*** *regulates high blood pressure, antioxidants, anti-inflammatory, antidiabetic, anti-cancerous.*
- ***Commercial Uses:*** *cultivated for sale.*
- ***Planting & Harvesting time:*** *March-April (planting), December-January (Harvesting).*

7. SAMA KOSU

- ***Scientific Name:*** ***Divaricate typhonium***
- ***Distribution:*** *abundantly found all over Assam.*
- ***Plant description:*** *average height of the plant measures 0.2m.*
- ***Edible Part:*** *stem, leaves, new shoot.*
- ***Local cuisine:*** *stem is added in variety of chutneys with lots of pepper and chillies and is also used to prepare different curries with meat/fish/acidic fruits.*
- ***Nutritional value:*** *starch 24.80%, protein 2.3%.*
- ***Medicinal Uses:*** *anti-inflammatory, antioxidant, analgesic, antidiarrheal, etc.*
- ***Commercial Uses:*** *collected from wild.*
- ***Planting & Harvesting time:*** *sprouting during monsoon, collected for consumption during summer. Shoots shade off in winter.*

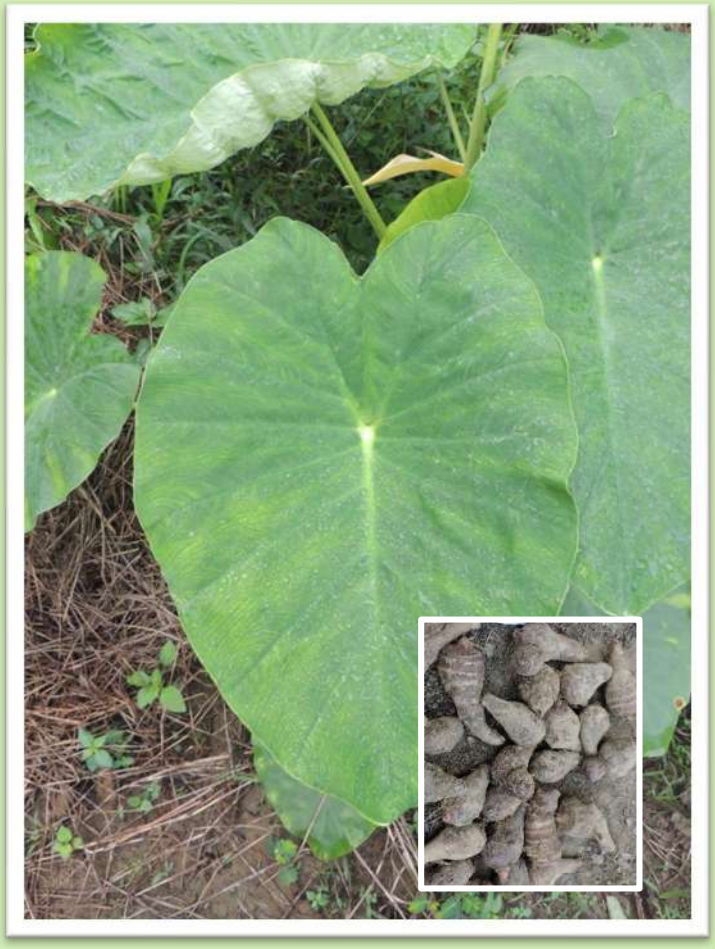
8. KOLA KOSU I

- ***Scientific Name:*** ***Colocasia esculenta***
- ***Distribution:*** *found throughout Assam.*
- ***Plant description:*** *average height of the plant measures 1.0-1.5m. Locally known as kola kosu as the stem is blackish in colour which distinguish it from the other varieties.*
- ***Edible Part:*** *whole plant.*
- ***Local cuisine:*** *Rhizome is boiled and mixed with other herbs and spices to prepare pitika, rhizome is also cooked with fish/meat, steamed stems/ leaves are also used in different pitikas. The flower is added in curries, dal or acidic fruit.*
- ***Nutritional value:*** *starch 20.6%, protein 2.9%.*
- ***Medicinal Uses:*** *antidiabetic, anticancer, antidiarrhea, treat hepatic ailments, hemorrhoids, etc.*
- ***Commercial Uses:*** *cultivated for sale.*
- ***Planting & Harvesting time:*** *March-April (planting), December-January (Harvesting).*

9. PAHARIA KOSU I

- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *found in hilly areas of Karbi-Anglong and Dima Hasao, NC hill region of Assam.*
- ***Plant description:*** *average height of the plant measures 0.5m. Found predominantly in hilly areas, not easily seen in plains thus locally named as Paharia kosu.*
- ***Edible Part:*** *whole plant.*
- ***Local cuisine:*** *Leaves and stem are boiled and consumed as pitika. Boiled leaves/stems are also fried and cooked with dry fish/smoked meat etc.*
- ***Nutritional value:*** *starch 26.94%, protein 3.4%.*
- ***Medicinal Uses:*** *treatment of heart ailments, aids digestive health.*
- ***Commercial Uses:*** *collected from wild.*
- ***Planting & Harvesting time:*** *found in wild. Shooting in January-february.*

10. NOGA KOSU



- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *found in hilly areas of Karbi-Anglong and Dima Hasao, NC hill region of Assam.*
- ***Plant description:*** *average height of the plant measures 2.0-2.5m.*
- ***Edible Part:*** *whole plant.*
- ***Local cuisine:*** *leaves are used for preparing various boiled curries with chillies, spicies and other vegetables. Leaves are also consumed as fritters.*
- ***Nutritional value:*** *starch 23.20%, protein 2.5%.*
- ***Medicinal Uses:*** *treatment of heart ailments, regulates blood pressure, aids digestive health.*
- ***Commercial Uses:*** *collected from wild.*
- ***Planting & Harvesting time:*** *March-April (planting), December-January (Harvesting).*

11. OLL KOSU

- ***Scientific Name:*** ***Amorphophallus bulbifera***
- ***Distribution:*** *widely found all over Assam.*
- ***Plant description:*** *average height of the plant measures 1.0-1.5m.*
- ***Edible Part:*** *leaf, stem, new shoot.*
- ***Local cuisine:*** *soft tender leaves are boiled and smashed and added into different vegetarian and non-vegetarian recipes.*
- ***Nutritional value:*** *starch 35.10%, protein 3.3%.*
- ***Medicinal Uses:*** *used in ayurveda, treatment for intestinal ailments and ulcers.*
- ***Commercial Uses:*** *collected from wild.*
- ***Planting & Harvesting time:*** *found in wild, harvested during rainy season.*

12. NEEL KOSU

- ***Scientific Name:*** ***Xanthosoma robusta***
- ***Distribution:*** *commonly found all over Assam.*
- ***Plant description:*** *average height of the plant measures 1.5m. commonly known as neel kosu as the stem resembles the colour blue/indigo.*
- ***Edible Part:*** *whole plant.*
- ***Local cuisine:*** *Boiled stems are cooked with fish or consumed simply adding black pepper.*
- ***Nutritional value:*** *starch 24.10%, protein 2.4%.*
- ***Medicinal Uses:*** *anti-inflammatory, treatment of cough, bronchitis, asthma, arthritis, etc.*
- ***Commercial Uses:*** *cultivated for sale.*
- ***Planting & Harvesting time:*** *March-April (planting), December-January (Harvesting).*

13. MAAN KOSU

- ***Scientific Name:*** ***Alocasia indica***
- ***Distribution:*** *all over Assam.*
- ***Plant description:*** *average height of the plant measures 1.5-2.0m.*
- ***Edible Part:*** *Stem and rhizomes*
- ***Local cuisine:*** *stems and rhizomes are consumed boiled or fried.*
- ***Nutritional value:*** *starch 20.45%, protein 2.3%.*
- ***Medicinal Uses:*** *antioxidant, anti-inflammatory, antinociceptive, treatment of jaundice, abdominal diseases, spleen inflammation, digestive, laxative, diuretic, astringent and traditionally used for treatment of rheumatic arthritis.*
- ***Commercial Uses:*** *cultivated for sale.*
- ***Planting & Harvesting time:*** *March-April (planting), December-January (Harvesting).*

14. TEPU KOSU

- ***Scientific Name:*** ***Alocasia accuminata***
- ***Distribution:*** *abundantly found in damp areas all over Assam.*
- ***Plant description:*** *average height of the plant measures 0.75-1.0m.*
- ***Edible Part:*** *whole plant.*
- ***Local cuisine:*** *Rhizomes can be cooked with dal. Leaves and stems can be consumed fried with black pepper and chillies. It can be added to fresh fish, dry fish and meat dishes to enhance the taste.*
- ***Nutritional value:*** *starch 23.15%, protein 2.5%.*
- ***Medicinal Uses:*** *antimicrobial, antifungal, antioxidant, hepatoprotective, antidiarrheal, antiprotozoal.*
- ***Commercial Uses:*** *cultivated for sale.*
- ***Planting & Harvesting time:*** *March-April (planting), December-January (Harvesting).*

15. PAHARIA KOSU II

- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *found in hilly areas of Karbi-Anglong and Dima Hasao, NC hill region of Assam.*
- ***Plant description:*** *average height of the plant measures 0.5-1m. Found predominantly in hilly areas, not easily seen in plains thus locally named as Paharia kosu.*
- ***Edible Part:*** *rhizome, stem.*
- ***Local cuisine:*** *Rhizomes and stems are consumed boiled or fried.*
- ***Nutritional value:*** *starch 25.75%, protein 2.9%.*
- ***Medicinal Uses:*** *anti-inflammatory, antioxidant, treatment of heart ailments, aids digestive health.*
- ***Commercial Uses:*** *collected from wild.*
- ***Planting & Harvesting time:*** *found in wild.*

16. KOLA KOSU II

- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *widely distributed in wild all over Assam.*
- ***Plant size:*** *average height of the plant measures 0.5-1.0m. Locally known as kola kosu as the stem is blackish in colour which distinguish it from the other varieties.*
- ***Edible Part:*** *stem, flower, leaves, new shoot.*
- ***Local cuisine:*** *It can be cooked with dal. Leaves and stems can be consumed fried with black pepper and chillies. It can be added to fresh fish, dry fish and meat dishes to enhance the taste.*
- ***Nutritional value:*** *starch 21.23%, protein 2.6%.*
- ***Medicinal Uses:*** *antioxidant, antidiabetic, anti-inflammatory, anticancer.*
- ***Commercial Uses:*** *collected from wild.*
- ***Planting & Harvesting time:*** *found in wild, harvested in summer.*

17. KAJALA NAL KOSU

- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *Commonly found in Assam.*
- ***Plant description:*** *average height of the plant measures 1.0-1.5 m.*
- ***Edible Part:*** *new shoot and stem.*
- ***Local cuisine:*** *Shoots and stems can be consumed fried or boiled with black pepper and chillies.*
- ***Nutritional value:*** *starch 22.60%, protein 2.5%.*
- ***Medicinal Uses:*** *regulate high blood pressure, reduce stress on cardiovascular system, antioxidant.*
- ***Commercial Uses:*** *cultivated for sale.*
- ***Planting & Harvesting time:*** *March-April (planting), December-January (Harvesting).*

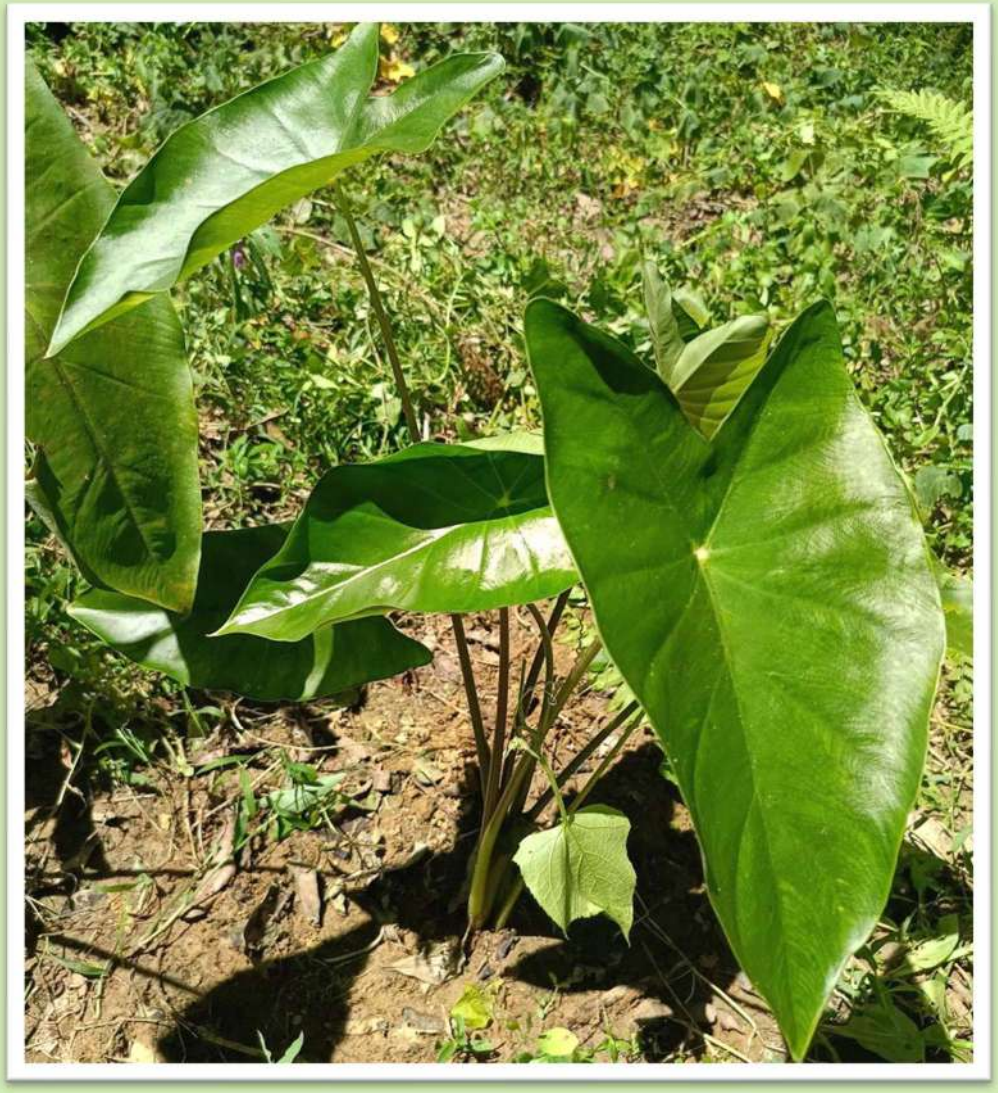
18. PODUM KOSU/ADOLIA KOSU

- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *found in Karbi-Anglong, Golaghat, Sibsagar and Lakhimpur districts of Assam.*
- ***Plant description:*** *average height of the plant measures 0.5m. The leaves resemble the leaves of lotus thus known as podum kosu. It is also popular as adolia kosu as only one stem comes out of each tuber.*
- ***Edible Part:*** *leaf, stem, new shoot.*
- ***Local cuisine:*** *Leaves and stems can be consumed fried or boiled alone or with other herbs and spices. It can be made as vegetarian or non-vegetarian dish.*
- ***Nutritional value:*** *starch 24.15%, protein 2.3%.*
- ***Medicinal Uses:*** *anti-inflammatory, antioxidant, regulate blood pressure, etc.*
- ***Commercial Uses:*** *collected from wild.*
- ***Planting & Harvesting time:*** *March-April (planting), December-January (Harvesting).*

19. MANCACHAR KOSU

- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *found in Mancachar and Dhubri districts of Assam.*
- ***Plant description:*** *average height of the plant measures 2.0-2.5m.*
- ***Edible Part:*** *rhizome, stem.*
- ***Local cuisine:*** *Rhizomes can be cooked with dal or simple salt and spices. Stems can be eaten fried or boiled or as chutneys. It can be added with acidic fruits to prepare different curries.*
- ***Nutritional value:*** *starch 23.65%, protein 2.1%.*
- ***Medicinal Uses:*** *anti-inflammatory, antioxidant.*
- ***Commercial Uses:*** *cultivated for sale.*
- ***Planting & Harvesting time:*** *March-April (planting), December-January (Harvesting).*

20. TELI KOSU



- ***Scientific Name:*** ***Colocasia sp.***
- ***Distribution:*** *found in tropical rainforest of Upper Assam.*
- ***Plant description:*** *average height of the plant measures 0.5m. the leaves of the plant are glossy and has peculiar shine thus locally known as teli (oily) kosu.*
- ***Edible Part:*** *leaf, stem and new shoot.*
- ***Local cuisine:*** *Leaves, stems and new shoots can be prepared as curries or chutneys with acidic fruits and chillies.*
- ***Medicinal Uses:*** *anti-inflammatory, antioxidant*
- ***Commercial Uses:*** *collected from wild.*
- ***Planting & Harvesting time:*** *found in wild, harvested in summer.*

Results and Analysis

To check the nutritional properties and toxicity of the Araceae family, 19 species were examined for starch and protein and 3 species were examined for presence of calcium oxalate. The samples were examined at Horticulture Research Station, Assam Agricultural University, Kahikuchi. The results are shown in the table below.

Sl. No	Local name	Scientific name	Starch (%)	Protein (%)	Calcium oxalate (mg/100g)
1	GONDHI KOSU	*Homalomena aromatica*	26.24	2.1	-
2	BORAHE NUKHUA KOSU	*Colocasia sp*	18.60	2.5	63.4
3	PANCHAMUKHI KOSU	*Alocasia cucullate*	22.90	2.3	-
4	DOHI KOSU	*Alocasia odora*	23.80	2.2	-
5	SENGMORA	*Lasia spinosa*	27.76	2.2	-
6	GARO KOSU	*Colocasia sp*	22.90	3.1	33.1
7	SAMA KOSU	*Divaricate typhonium*	24.80	2.3	-
8	KOLA KOSU I	*Colocasia esculenta*	20.60	2.9	-
9	PAHARIA KOSU I	*Colocasia sp*	26.94	3.4	-
10	NOGA KOSU	*Colocasia sp*	23.20	2.5	-
11	OLL KOSU	*Amorphophallus bulbifera*	35.10	3.3	51.3
12	NIL KOSU	*Xanthosoma robusta*	24.10	2.4	-
13	MAAN KOSU	*Alocasia indica*	20.45	2.3	-
14	TEPU KOSU	*Alocasia accuminata*	23.15	2.5	-
15	PAHARIA KOSU II	*Colocasia sp*	25.75	2.9	-
16	KOLA KOSU II	*Colocasia sp*	21.23	2.6	-
17	KAJALA NAL KOSU	*Colocasia sp*	22.60	2.5	-
18	PODUM KOSU/ADOLIA KOSU	*Colocasia sp*	23.65	2.1	-
19	MANCACHAR KOSU	*Colocasia sp*	24.15	2.3	-

From the above findings, the species are graded and found that, Oll kosu (*Amorphophallus bulbifera*), Paharia kosu I (*Colocasia sp*) and Borahe nukhua kosu (*Colocasia sp*) constitutes the highest composition of starch, protein and calcium oxalate respectively.

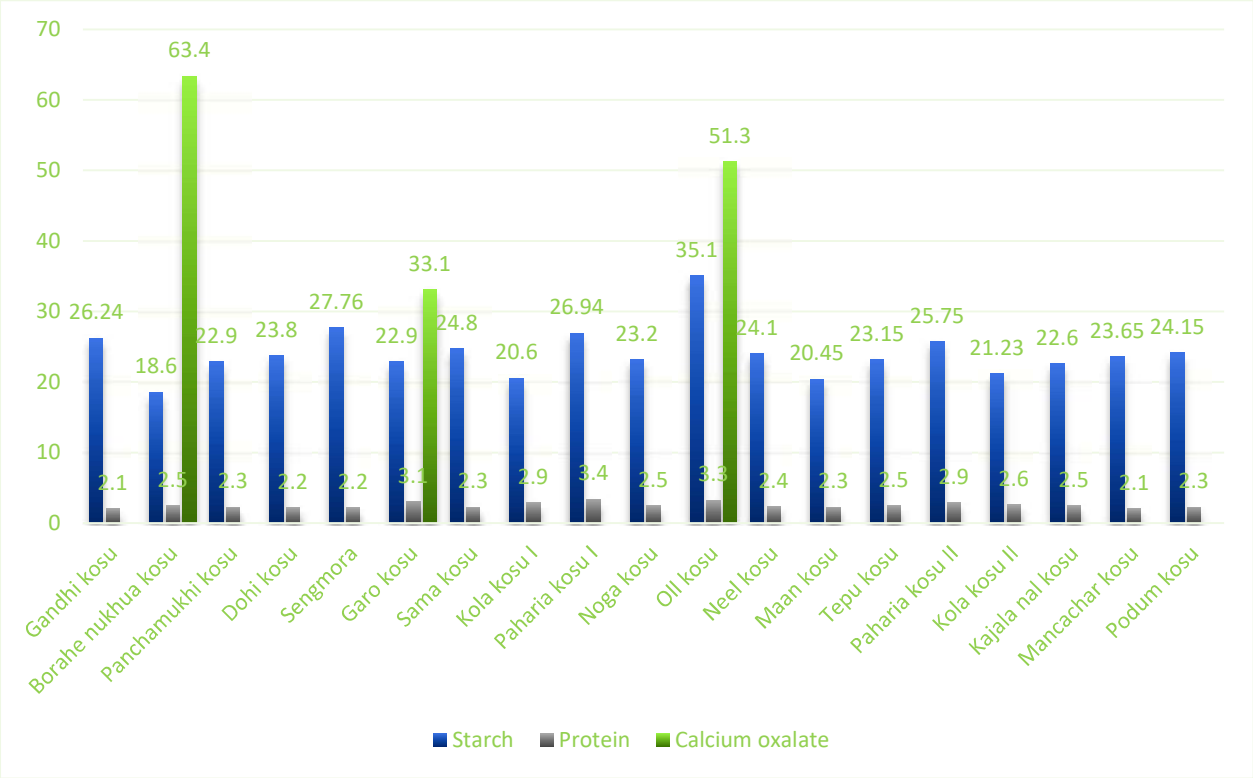


Figure 1: chart shows composition of starch, protein and calcium oxalate present in the examined Araceae species.

Limitations

1. Lack of previous research on Kosu.
2. Most of the locally named varieties of kosu are yet to be named scientifically.
3. Due to fund constraints, Further, deep analysis couldn't be done on the species.
4. Occurrence of Covid-19 and lockdown also affected the project significantly.

Discussion

Taro (kosu) of Araceae family is one of the most important medicinal as well as commercial species found abundantly in Assam. But, during our survey, it was found that little study has been carried out on these species. For our project, we collected live plants and rhizomes of 20 species from nearby market, villages, forest areas, etc. During the study, we minutely observed their morphology, growth, overall size of the plant, rhizome. After growing them for 6-8 months, stem and rhizome samples from the fully grown plants were sent to Krishi Vikas Kendra, Kahikuchi for starch, protein and calcium oxalate analysis. Starch and protein analysis was done for calculating the nutrient value of the species and calcium oxalate analysis was checked to understand the toxicity level of the species. Out of the 20 species studied, Oll kosu (*Amorphophallus bulbifera*), Paharia kosu I (*Colocasia sp*) and Borahe nukhua kosu (*Colocasia sp*) constitutes the highest composition of starch, protein and calcium oxalate respectively.

PHOTOGRAPHS

Bed and soil preparation for planting

Planting of Araceae species

PHOTOGRAPHS

Sprouting of the planted species in the plot

Weeding for proper growth of the species.

PHOTOGRAPHS

Growing stages

Fully grown plants

PHOTOGRAPHS

Measurement of growth parameters.

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