STUDY ON NUTRITIVE VALUE OF SIX INDIGENOUS SPECIES OF TARO *COLOCASIA ESCULENTA* (L) SCHOTT. OF MANIPUR.

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Abstract:

Rhizome crops of Taro are the main food supplement in villages of Manipur but its role in food and nutritional had been studied and well documented.. The contribution of nutritive value of six identified local taro contain ranges about 23-24% starch, 8% sugar, on fresh weight basis and 13 % dry matter,8% nitrogen on dry weight basis, the leaf is a rich source of vit.c, thiamine, riboflavin ,and niacin, on the overall livelihoods of the villagers is significantly high. Improvement of yield and efficient utilization of the local resources thereby improved the food and nutritional security of the people of villagers and farming communities in sustainable manner.

Key words: Taro, local crop, food security, nutritional value.

I. INTRODUCTION :

Taro belongs to aroid family (Araceae) and widely produced in the world for its corms (Njintang et al 2007). Colocasia are edible aroids more food storing in their corms (Adane, 2009). Taro plant is grown in soil with pH 5.5-5.6 in high rainfall and temperature around 21-27 c (Anonymous 1999). Taro is originated from Southern Asia including India and Malaysia (onwueme,1978 In India *colocasia esculenta*. In India C. *esculenta* is grown in West Bengal, Bihar, Uttar Pradesh, Assam, Orissa, Kerala, Andhra Pradesh and Tamil Nadu. Taro is successfully grown in North Eastern states of India due to its adaptability wide range of soil and climatic conditions (Swarnalata Devi,2013). The corm and cormel are used as food after boiling or baking served about the same way as potato. The leaves are usually boiled or prepared in various ways mixed with other condiments like spinach. In Manipur, large number of local genotypes of Taro are found and generally cultivated in farm land and kitchen gardens. These plants are used mainly in the preparation of cuisine[1]. The nutritional value is the main concern is being considered as a food source. The high starch content of Taro is considered as an excellent energy source. Starch is the most important component (73-80%)of Taro (Njintag et. al2007).). Taro corms contain four major protein families, which are present exclusively in the tubers of C. esculenta, not having been found in other plant organs (Hirai et al., 1993). Two albumins,A1 (molecular mass 12 to 14 kDa) and A2 (molecular mass 55to 66 kDa); and two globulins, G1 (molecular mass about 14 kDa)and G2 (molecular mass about 22 kDa) are present. The G2globulin family is composed of two protein bands, one of 24 kDa(G2a) and one 22 kDa (G2b) in size, whereas G1 is composed of a large number of 12 kDa isoforms (Pereira et al., 2014;Shewry, 2003).[2] Taro corms are, undoubtedly, a potent natural source of immune stimulatory molecules. The stimulation of the immune system by CTE(Crude Taro Extract) can positively contribute to health and well being maintenance, since it can be applied to reverse an immuno suppressive status caused by infectious agents, chemotherapeutic agents or even psychological conditions. Moreover, CTE can confer protection against several diseases since it stimulates the proliferation of total haematopoietic and B cells, contributing to the improvement in the immune response. Such molecules represent powerful candidates as new additives for food and pharmaceutical industries. The present study is the different local cultivar of colocasia in terms of nutritious value in Manipur state[2].

II. METHODOLOGY:

The study was undertaken in the laboratory of Central Agricultural University, Iroisemba Manipur during 2009-11.Taro cormel material used in this study were 32 genotypes. out of the six local good identified cultivars were viz. Haopaan, Ingkholpaan, Pangong, Paanangangba, Singdapaan, Yerumpaan planted during in the month of April-May.2009.

As for qualitative evaluation the dry matter (DM) content was worked out as follows:

$$DM = \frac{\text{Dry weight of tubers}}{\text{Fresh weight of tubers}} \times 100$$

Dry weight of cormel was recorded as the oven dried yield at 60 ±2°C to a constant weight. The total nitrogen content (%) of the cormel were analyzed a per Microkjeldahl's method described by Jackson's (1973) to know the total crude protein content (%) Crude protein (%) = Total nitrogen (%) X 6.25.The cormel starch content and total sugar content were analyzed by following the Anthronereagent method as described by S.R.Thimmaih (2006).

III. RESULT AND DISCUSSION:

Nutritive value of good identified *C.esculenta* of four local cultivar of Manipur are presented. Out of the32genotypes/cultivars.Haopaan,Ingkholpaan,Pangong,Paanangangba,Singdapaan,Yerumpaan is the best nutritive value.

1.1 Dry matter:

In both years, dry matter percent of fresh weight of cormel (Table 1.) varied significantly among genotypes under study. The genotype Mukhi-2 (Ingkholpaan) produced maximum dry matter *i.e.* 21.72% in first year, 21.93% in second year and 21.83% on pooled analysis (Table 1. and Fig.2). Minimum values of dry matter were registered 7.79%, 7.60% and 7.70% for Acc.11 in first year, second year and pooled data. In two years, average dry matter for colocasia was recorded about 13% of fresh weight of cormel. In greater yam (*Dioscoreaalata*), Easwari*et al.* (1989) reported that Sree Keerthi and Sree Roopa contained respective dry matter content of 30.4% and 23.2%. In West Bengal, Nandi and Sen (1998) reported significant variation in dry matter of 15 genotypes of sweet potatoes. Similarly Rajesh Kumar and Jain (1999) observed wide variations in dry matter (%) of 30 accessions of Colocasia. According to Hunter and Pouono (1999), Toantal and PSB-G2 were having highest1.73% in dry matter of cormels. In two years, average nitrogen content in cormels (of dry matter) of colocasia was recorded about 1.00% of dry weight of cormels dry weight (35 and 37%, respectively) among taro (*Colocasiaesculenta*) genotypes, they studied.

1.2 Nitrogen content:

The mean values of nitrogen percent of dry weight of cormel were found significant among the genotypes in both years of study (Table 1). The genotype Mukhi-2(Ingkholpaan) contained maximum values of nitrogen in cormels i.e. 2.22% in first year, 2.83% in second year and 2.53% on pooled analysis (Table 1. and Fig.2). Minimum values of nitrogen were registered 0.41% (Acc. No.4) in first year, 0.43% (Pangong) in second year and 0.42% (Pangong) in pooled data. The pooled data (Table 1. and Fig.2) showed that Telia and Maming Khangdaba (Singdapaan) were next to Mukhi-2(Ingkholpaan) and recorded on same bar containing nitrogen 1.86% and. Nitrogen indicates the protein content of the tubers which has important role in growth and development. Tadera*et al.* (1984) studied the protein content in tubers of winged bean (*Psophocarpustetragonolobus* (L.) DC), and yam bean (*Pachyrrhizuserosus* (L.)Urban) which was determined by multiplying percent nitrogen by a factor 6.25. Studying 8 genotypes of sweet potato, Batistuti *et al.* (1992) reported that protein content ranged from 1.06 to 1.66%. Rajesh Kumar and Jain (1999) also observed wide variations in protein content (%) of 30 accessions of Colocasia. Gautam *et al.* (2000) reported wide genotypic variability in protein (7.44 to 10.51%) in *Colocasia* under mid hills of Himachal Pradesh.

1.3 Starch content:

Starch is a reservoir of carbohydrates; all digestible starches provide energy for human body after consumption. The starch content (%) was estimated from fresh cormels and mean values have been presented in Table 1. The genotype Acc. No.14 contained maximum values of starch in cormels i.e. 46.16% in first year, 44.22% in second year and 45.19% on pooled analysis (Table 1. and Fig.2). Minimum values of starch were registered in Acc. No.14 recording 17.01% in first year, 16.58% in second year and 16.79% in pooled data analysis (Table 1. andFig.2), genotypes Pangong, Pan Angangba, Mukhi-1 (Mukhipaanangangba), Mamingkhangdaba **(**Singdapaan)

1.4 Sugar content:

Sugars are simple form of carbohydrates are converted to starch as corms mature, and then is converted back to it when stored corms begin to sprout. Significant differences were observed for sugar content (%) of fresh weight of cormel and data have been shown in Table 1. The mean values ranged from 5.73% in Yerum Pan to 10.70% in Pan Angangba during first year and from 4.57% Kovvur to 11.04% Pan Angangba in second year. The pooled data (Table 1. and Fig.2) showed that highest in Pan Angangba (10.87%). The genotypes Pangong, MamingKhangdaba (singdapaan), Mukhi-2(Ingkholpaan) and Telia were found *at par* with Pan Angangba. On an average, colocasia contained 8.00% of sugar in fresh cormels. The present findings are confirmatory to Salunkhe*et al.* (1998); they reported genetic variation for sugar content in sweet potatoes.
Colocasia leaves are a good source of protein, minerals and vitamins i.e. β-carotene and ascorbic acid and have great potential to qualify as good vegetables for hypersensitive, diabetic and obese people due to their antioxidant properties (Thomas and Oyediran,2008). . The petiole juice of taro plant particularly, *Lam-paan* and *Yerum-paan* is applied on injuries and insect bites (Figure 6). The dried leaf petiole of *Paan-gong* is eaten as chutney locally called *Singju* and stored for use during off-season. In

Manipur, fresh leaf lamina of *Colocasia* is boiled with fresh milk and the soup is given to expecting women to enhance the chance of pregnancy(Singh et.al,2003).

IV:CONCLUSION:

Taro contain more than twice the carbohydrate of potato and contains 18 to 28% starch on fresh weight basis. Most rural people need nutritious food for their daily requirement, there must be a need to see impact of indigenous fresh crops as Taro for its production and food insecurity. There are atleast nine genotypes or cultivars of taro (*Colocasia esculenta* (L.) Schott) are grown in Manipur.The corms, cormels and leaves of *C. esculenta* are edible and used in preparation of various traditional cuisines of Manipur namely, *Paan-thongba*, *Paan-eronba* and *Paan-ootti* (including *Paan-khokla ootti*).Based on taste,nutritional value and crop yield, the four genotypes namely, *Mukhi-paan angouba*, *Mukhi-paan angangba*, *Paan-angangba* and *Ingkhol-paan* are identified as preferred types for large-scale cultivation and production.

fig.(1): Singda paan

fig.(2): Pangong

fig.(3): Pan angangba

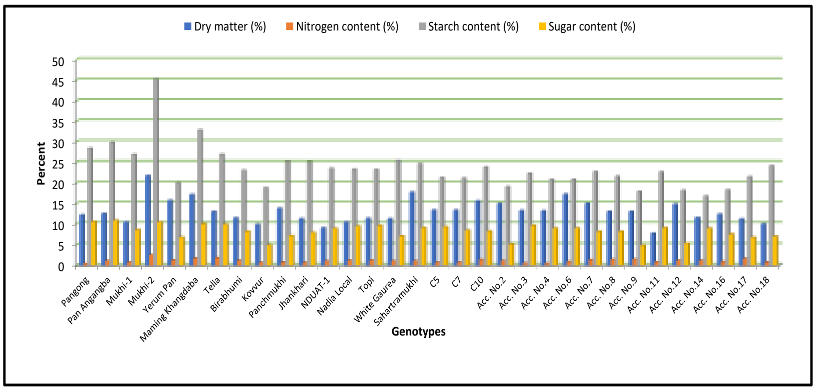
fig.(4): Ingkhol paan

fig.(5): Hao paan

fig.(6): Yerum paan

Table Figure **: (1)&(2)**

Genotypes	(%)	content	content	content
Pangong	12.19	0.42	28.4	10.59
Pan Angangba	12.54	1.09	29.84	10.87
Mukhi-1	10.46	0.72	26.89	8.59
Mukhi-2	21.83	2.53	45.19	10.49
Yerum Pan	15.76	1.25	20	6.85
Maming Khangdaba	17.17	1.73	32.88	10.04
Telia	13.04	1.86	26.93	9.88
Birabhumi	11.46	1.17	23.1	8.18
Kovvur	9.86	0.66	18.84	4.92
Panchmukhi	13.82	0.77	25.22	7.24
Jhankhari	11.27	0.66	25.1	7.87
NDUAT-1	9.02	1.04	23.58	8.89
Nadia Local	10.47	1.18	23.4	9.43
Topi	11.34	1.23	23.28	9.59
White Gaurea	11.25	1.04	25.43	7.14
Sahartramukhi	17.75	1.05	24.69	9.07
C5	13.36	0.71	21.34	9.27
C7	13.34	0.72	21.17	8.44
C10	15.62	1.39	23.92	8.23
Acc. No.2	14.96	1.09	19.1	5.18
Acc. No.3	13.24	0.53	22.37	9.62
Acc. No.4	13.18	0.46	20.85	8.94
Acc. No.6	17.26	0.93	20.88	8.96
Acc. No.7	15	1.34	22.77	8.17
Acc. No.8	13.04	1.45	21.64	8.17
Acc. No.9	13.04	1.49	17.93	4.84
Acc. No.11	7.7	0.85	22.71	9.06
Acc. No.12	14.8	1.17	18.17	5.38
Acc. No.14	11.5	1.16	16.79	8.94
Acc. No.16	12.36	0.9	18.3	7.56
Acc. No.17	11.2	1.65	21.54	6.84
Acc. No.18	9.97	0.79	24.24	7.09



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