Cultivar Differences in the Nutritional Attributes of *Colocasia* and *Amorphophallus*

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INTRODUCTION

- Taro(*Colocasia esculenta*) and Elephant foot yam (*Amorphophallus paeonifolius*) are important food crops of tropical countries. Nutritional profile of these crops indicate that in addition to the high energy content, they also contain moderate levels of proteins ,minerals and vitamins . However, these crops are generally considered only as a carbohydrate source and contribution of other nutrients to the human diet is not highlighted properly.
- Much of the nutritional data available on tropical tuber crops is obtained from the study of Bradbury and Holloway (1988). They have reported the chemical composition of all major tropical tuber crops grown in South Pacific countries. Presently , very little information only available on the nutritional profile of tuber crops grown in India.
- The present work is an investigation on the possible differences in the nutrient contents of some selected Indian cultivars of *Colocasia* and *Amorphophallus*

MATERIALS AND METHODS

MATERIALS

The cultivars used for the study were obtained from CTCRI farm , local farmers and markets

METHODS

- Sampling

The tubers were cleaned and for *Amorphophallus* sampling, three slices of about 100g each were taken (one from each end and one slice from the middle) . In case of taro, whole tubers about 200g were taken .The samples were cut into small pieces , pooled and triplicate samples were taken for each analysis.

- **Estimation**

Moisture

The samples were oven dried to constant weight at 60 ^{0} C.

Starch

After removal of sugars by 80% ethanol, the samples were hydrolyzed into glucose and estimated by phenol-sulphuric acid method.

Total sugars

The samples were extracted in 80% ethanol and estimated by phenol-sulphuric acid method.

Reducing sugars

The reducing sugars were determined by the Somogyi method (Nelson,N.1944)

Total phenolics

The method described by Swain and Hillis (1955) was used for estimation of total phenolics.

Ascorbic acid

The Ascorbic acid content of samples were determined by the titrimetric method using the dye 2,6 –Dichlro phenol indophenol sodium salt (Welcher,F.J.,1975)

Oxalates

Calcium oxalate and soluble oxalate were determined by the protocol used in AOAC (1984)

Minerals

Ca, P, Fe and K were determined by triacid digestion followed by appropriate spectroscopic methods

Crude protein

Total N content was determined by Kjeldahl method and the factor 6.25 was used to convert to protein.

Dry matter and starch content of *Amorphopallus* cultivars

samples	Dry Matter %	starch %
Sree Padma	22.0 ±0.64	17.0 ±0.24
Gajendra	22.5 ±0.80	16.1 ±0.28
Local - 1	13.5 ±0.40	11.5 ±0.18
Local - 2	15.0 ±0.70	12.0 ±0.20
Market -1	14.0 ±0.58	11.0 ±0.16
Market-2	23.5 ±0.82	20.5 ±0.18
Market -3	17.2 ±0.48	15.0 ±0.20

Total sugar and reducing sugar content in *Amorphophallus*

samples	Total sugars %	Reducing sugars %
Sree Padma	1.2 ±0.08	0.80 ±0.02
Gajendra	1.0 ±0.06	0.70 ±0.04
Local -1	0.60 ±0.03	0.35 ±0.02
Local -2	0.63 ±0.06	0.38 ±0.02
Market -1	0.70 ±0.06	0.47 ±0.04
Market- 2	1.40 ±0.08	0.85 ±0.08
Market -3	0.90 ±0.06	0.75 ±0.06

Vitamin C and total phenolics content in A*morphophallus* tubers

samples	Vitamin C g/100g	Total phenols mg/100g
Sree Padma	4.0 ±0.08	66 ±1.2
Gajendra	5.2 ±0.06	70 ±0.96
Local -1	8.0 ±0.04	86 ±1.4
Local -2	4.0 ±0.02	68 ±0.90
Market -1	4.7 ±0.04	74 ±1.6
Market-2	3.5 ±0.02	70 ±1.5
Market -3	6.1 ±0.05	78 ±1.2

Crude Protein Content of *Amorphophallus*

Samples	Crude protein %
Gajendra	3.83±0.08
Sreepadma	3.95±0.04
Local-1	2.31±0.05
Local-2	1.95±0.02

Mineral content of *Amorphophallus* tubers

samples	Ca mg/100g	Fe mg/100g	K mg/100g	P mg/100g
Gajendra	68±1.2	1.35 ±0.06	353 ±2.8	99 ±1.2
Sreepadma	72 ±1.4	1.73 ±0.08	397 ±2.1	144 ±1.6
Local- 1	84 ±1.4	1.20 ±0.04	512 ±2.8	96 ±1.2
Local -2	46 ±0.90	1.12 ±0.05	248 ±2.6	77 ±1.6

Oxalate profile of *Amorphophallus* tubers

samples	Total oxalate %	Soluble oxalate %	Calcium oxalate %
Sree Padma	0.25 ±0.02	0.04 ±0.006	0.21 ±0.03
Gajendra	0.14 ±0.04	0.03 ±0.008	0.11 ±0.04
Local-1	0.31 ±0.06	0.04 ±0.006	0.27 ±0.06
Local-2	0.51 ±0.02	0.09 ±0.006	0.42 ±0.04
Market-1	0.22 ±0.06	0.04 ±0.004	0.18 ±0.02
Market-2	0.37 ±0.03	0.07 ±0.005	0.30 ±0.06
Market-3	0.17 ±0.08	0.05 ±0.002	0.12 ±0.03

Dry Matter and Starch content of *Colocasia*

samples	Dry Matter %	starch %
Sree Rashmi	22.5 ±0.85	16.0 ±0.24
Muktakeshi	23.0 ±0.90	14.0 ±0.42
Local -1	24.5 ±0.58	19.0 ±0.38
Local -2	18.5 ±0.46	15.5 ±0.50
Market-1	20.2 ±0.86	14.0 ±0.64
Market -2	17.5 ±0.84	13.6 ±0.74

Total sugar and reducing sugar content of *Colocasia*

samples	Total sugars %	Reducing sugars %
Sree Rashmi	1.4 ±0.05	0.75 ±0.04
Muktakeshi	1.2 ±0.08	0.60 ±0.08
Local -1	0.70 ±0.04	0.40 ±0.05
Local -2	0.62 ±0.08	0.43 ±0.07
Market-1	0.69 ±0.06	0.53 ±0.05
Market -2	0.75 ±0.04	0.61 ±0.04

Vitamin C and total phenolics content in *Colocasia* tubers

samples	Vitamin C mg/100g	total phenols mg/100g
Sree Rashmi	5.2 ±0.06	42 ±1.0
Muktakeshi	7.0 ±0.08	46 ±0.95
Local- 1	6.0 ±0.05	53 ±0.86
Local -2	3.5 ±0.01	47 ±1.4
Market-1	4.0 ±0.06	60 ±1.5
Market -2	5.2 ±0.08	45 ±0.84

Oxalate profile of Colocasia tubers

samples	Total oxalate %	Sol .oxalate %	Ca. oxalate %
Sree Rashmi	0.40 ±0.08	0.25 ±0.04	0.15 ±0.06
Muktakeshi	0.42 ±0.06	0.15 ±0.06	0.27 ±0.08
Local -1	0.35 ±0.04	0.22 ±0.02	0.13 ±0.02
Local -2	0.54 ±0.08	0.29 ±0.04	0.25 ±0.06
Market -1	0.38 ±0.04	0.25 ±0.02	0.13 ±0.08
Market- 2	0.64 ±0.06	0.34 ± 0.02	0.30 ±0.05

Summary of results

- Wide variations in the nutrient contents were observed in tubers of different cultivars of *colocasia* and *Amorphophallus.*
- Starch content in A*morphophallus* Cultivars varied from 11.0-20.5%.The variations in C*olocasia* cultivars were 13.6-19.0 %
- Vit C content in A*morphophallus* varied from 3.5-8.0.(mg/100g) and in Colocasia 3.5-7.0.(mg/100g)
- Total phenols showed a range of 66-86(mg/100g) in *Amorphophallus* and 42-60.0(mg/100g) in *Colocasia.*

- The calcium oxalate content varied from 0.11- 0.42 % in *Amorphophallus* and 0.13- 0.30 % in *Colocasia*
- Significant cutivar variations in the content of Ca, K, P and Fe were observed in *Amorphophallus* tubers
- The crude protein in *Amorphophallus* cultvars varied from 1.95-3.95 %