Proximate Composition of the Flesh and the Peel of Sri Lankan Cassava Variety “MU-51”


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Abstract- Cassava (Manihot esculenta) is a tropical perennial plant and starchy root of cassava is the major source of carbohydrates for approximately 800 million people in developing regions of the tropics. Although cassava production has increased drastically in last decade in Sri Lanka still there are no significant studies have been conducted to analyse the proximate compositions of recommended cassava varieties in Sri Lanka. The purpose of the current study was to analyse the proximate in the flesh and peel of the Cassava variety “MU-51”. The root peel had significantly high amount (p<0.05) of moisture (70.80±0.09), fat (0.42±0.06) and fibre(1.74±0.03) content than the flesh. The root flesh contain high amount of ash(1.26±0.04) and protein(1.13±0.19) than the peel even though the difference was not significant (P>0.05). There was significant negative correlation(p<0.05) exist in between Moisture flesh versus carbohydrate flesh and moisture peel versus protein flesh, fat flesh versus protein flesh and significantly positive correlation ship (p<0.05) exist among moisture peel versus fat flesh.

Index terms- Cassava, Proximate composition, Macro nutrients, MU 51 , Cassava peel, Cassava flesh

INTRODUCTION

Tropical perennial plant cassava which can grow on poor depleted soils is one of the most efficient crops in terms of carbohydrate production [1]. The roots of cassava enlarge to form starchy storage roots are the major source of carbohydrates for approximately 800 million people in developing regions of the tropics [2-4]. Phelloderm(peel), paranchymathe bulk) and central vascular core are the three distinctive areas of raw cassava root [5]. Cassava is an important economic crop of Sri Lanka having high demand in both local and export markets [6, 7]. The recent records have shown that, the estimated annual production of cassava in year 2014 is 302,767 Metric tons and the area of land under cultivation of cassava is 23,970 Hectares [8]. Although cassava production has increase drastically in last decade still the highest demand is for domestic purpose in raw form [6] and there are no significant studies have been conducted to analyse the proximate compositions of recommended cassava varieties in Sri Lanka.

The purpose of the current study was to analyse the proximate (moisture, ash, total fat, crude fibre, protein and carbohydrate) in the flesh and peel of the Cassava variety “MU-51”. Such baseline information will be useful for increasing the food use and the industrial utilization of selected cassava variety.

MATERIALS AND METHODS

Sample collection
Six healthy plants in the same maturity stage of cassava variety “MU-51” was randomly selected from the experimental fields of Horticultural Crop Research and Development Institute (HORDI), Gannoruwa, Sri Lanka. The samples of roots at the age of twelve months from plantation were collected by harvesting without causing any damage to the roots.

Sample preparation
Harvested samples were immediately transported to the laboratory at the Department of Food Science and Technology, University of Sri Jayewardenepura with packing in labelled shallow, rigid, ventilated plastic crates. The samples were then cleaned by dry brushing, packed in to polyethylene bags and stored in refrigerated condition (Temperature 4oC to 0oC) until taken to analysis (Maximum duration 2 weeks). Proximate composition analysis of samples
The samples stored in refrigerator were taken and the peel was removed carefully from the flesh. The peels were separately collected and upper epidermis of the peel was removed carefully. The rest of the peels and flesh of the tubers were ground using mortar and the pestle to decrease the particle size and taken in to analysis.

The proximate composition (moisture, ash, crude fibre, protein and total fat) of the six samples was determined using AOAC standard methods (1980) with three replicates [9]. The carbohydrate content was calculated by the difference of the entire proximate parameters. (Carbohydrate content= 100 – (moisture% + ash% + protein% + fat% + crude fibre %))

Statistical analysis

The data were subjected to normality test and paired t test at 95% confident level was used to indicate significant difference among proximate compositions of the peel and the flesh. Simple linear correlation coefficients were determined for proximate composition parameters. The relationship between significant proximate composition parameters of the peel and the flesh was predicted using a linear regression model[10].

RESULTS

Table 01: Proximate compositions in the root flesh and the root peel of Cassava variety “MU-51” wet basis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Flesh</th>
<th>Peel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>62.25± 0.38a</td>
<td>70.80± 0.09b</td>
</tr>
<tr>
<td>Ash</td>
<td>1.26± 0.04a</td>
<td>1.22±0.03a</td>
</tr>
<tr>
<td>Fat</td>
<td>0.29±0.04a</td>
<td>0.42±0.06b</td>
</tr>
<tr>
<td>Protein</td>
<td>1.13±0.19a</td>
<td>0.97±0.01a</td>
</tr>
<tr>
<td>Fibre</td>
<td>0.89±0.02a</td>
<td>1.74±0.03b</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>34.19±0.32a</td>
<td>24.85±0.12b</td>
</tr>
</tbody>
</table>

Data are expressed as mean±SD; Means±SD followed by the same letter, within a row, are not significantly different (p>0.05).

As all the observations of proximate analysis in the flesh and the peel were normally distributed (P>0.05) the paired t test was performed. Table 1 shows the proximate compositions of the flesh and the peel of “MU-51” variety.

DISCUSSION

The moisture content of “MU51” cassava variety flesh and peel were 62.25± 0.38% and 70.80±0.09% respectively. The values were compared to the observations of Sri Lankan cassava variety “Kirikawadi” (flesh 61.07-67.44% and peel 71.96-73.3%) [7] and the study of wheatley and cuzel(1993) on four cassava cultivars which was 65 to 74%[11].
The ash content (04-1.7%), protein content (0.3-3.5%), fat content (0.03-0.5%), fibre content (1.5%) and carbohydrate content (25.3-35.7%) of the cassava flesh described by the study of Mantagnec et al.,(2009) tallied with the proximate composition observations of the current study on cassava variety “MU-51” (table 01)[12].

According to the results of paired t test (p<0.05) there was a significant high amount of moisture, fat and fibre in the peel of cassava “MU-51” variety than in the flesh. Those observations are comparable with the results of Mantagnec et al.,(2009) Somendrika et al., (2017) and Somendrika et al., (2016) [7, 12, 14]. Even though the “MU-51” cassava variety peel contain low amount of protein in the peel than in the flesh there was no significant difference(p>0.05) exist between the flesh and peel protein content (figure 01).

According to the regression analysis There was significant negative correlationship(p<0.05) exist in between Moisture flesh versus carbohydrate flesh and moisture peel versus protein flesh, fat flesh versus protein flesh. There was a significant positive correlationship (p<0.05) exist among moisture peel versus fat flesh (table 02).

### CONCLUSION

The root peel had significantly high amount (p<0.05) of moisture, fat and fibre content than the flesh. The root flesh contain high amount of ash and protein than the peel even though the difference was not significant (P>0.05). There was significant negative correlationship(p<0.05) exist in between Moisture flesh versus carbohydrate flesh and moisture peel versus protein flesh, fat flesh versus protein flesh and significantly positive correlationship (p<0.05) exist among moisture peel versus fat flesh.

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### REFERENCES


