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Variation of carbohydrate composition of two forms of fruit from jack tree (*Artocarpus heterophyllus* L.) with maturity and climatic conditions

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Abstract

Soft and *firm* varieties of jackfruit of three stages of maturity (7–8, 10–12, and 14–16 weeks), harvested from the central, western and eastern parts of Bangladesh, were analysed. The dry matter content of perianth and seed of the *soft* and *firm* varieties increased from 10.0 to 32.0% and 19.0 to 52.0%, respectively, while the ash content decreased from 5.7 to 2.0% and 4.9 to 1.5%, respectively, on a dry matter basis. The free sugars of jackfruit samples increased with maturity from 1.5 to 10.5% and 1.4 to 5.2% of their dry matter for the *soft* and *firm* varieties, respectively. In all cases varying proportions of glucose, fructose and sucrose were the major sugar constituents. The starch content of the perianth samples increased from 7.8 to 47.0% and from 9.0 to 50.5%, on a dry matter basis for the *soft* and *firm* varieties, respectively, whereas, that for seed increased up to 65.0 and 59.0%, respectively. Microscopic examination of the samples showed the perianth to contain thin-walled cells packed with starch granules, some organized into distinct clusters. From both the chemical and histological studies, it appeared that the starch content of both perianth and seed of *soft* and *firm* varieties of jackfruit samples gradually increased with the increase of maturity. The total dietary fibre varied from 42.0 to 55.0% in the perianth. However, that of seed changed very little. The results show that the starch and total dietary fibre contents of jackfruit are higher than those of other fruits and vegetables of Bangladesh.

Keywords: Carbohydrates; Free sugars; Dietary fibre (DF); Soluble DF; Insoluble DF; Starch; Jackfruit; Perianth; Seed; Soft; Firm; Mature; Immature

1. Introduction

Jacktree (*Artocarpus heterophyllus* L.) belongs to the family Moraceae (Bhattacherjee, 1986; Bose, 1985). It grows in many parts of Asia but is abundant in India and Bangladesh. Jackfruit, being a summer fruit, contributes substantially to the food supply of the people and their livestock when staple food grains are often in short supply during that time.

The perianth of jackfruit, which remains firm even at full ripeness is known as the *firm* variety and the other, in which the perianths become soft and pulpy on ripening is known as the *soft* variety. The vitamin content and some of the volatile components contributing to the flavour of the fruit have been reported (Ahmed, Malek, Jahan, & Salmatullah, 1986; Bhattacherjee, 1986; Bose, 1985; Narasimham, 1990). The water-soluble sugar content and some low molecular weight compounds were identified (Wills, Lim, & Greenfield, 1986; Selvaraj & Pal, 1989; Hossain, Azizur Rahman, Matior Rahman, & Jabbar Mian, 1990). Starch (25–40% of total solid) from immature perianth was also isolated (Bobbio, El-Dash, Bobbio, & Rodriguies, 1978). The low molecular weight carbohydrate and starch contents of immature (10–12 weeks) and ripe (14–16 weeks) jackfruit (Rahman, Haq, Mian, & Chesson, 1995) and the distribution of free sugar and fatty acid composition of different parts of ripe jackfruit (Chowdhury, Azizur Rahman, & Mian, 1997) have been recently reported. The presence of a high percentage of starch in jackfruit perianth and seed as revealed from chemical and histological studies (Rahman et al., 1995) has raised interest in evaluating the maximum starch content with respect to maturity, variety and different climatic and agronomic conditions for finding out its probable utilization as a staple food. No systematic work in this connection has so far been reported. The results of the present study on the variation of starch content and free sugar with maturity of the fruit of the *soft* and *firm* varieties are reported here.

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2. Materials and methods

2.1. Fruit samples

Dhaka, Jessore and Comilla districts in Bangladesh, having different argonomical and slightly different climatic conditions were selected for collection of jackfruit. Two different jacktrees producing *soft* and *firm* varieties of jackfruit were fixed in each place. One jackfruit from each variety was collected from each place within a fixed time frame (Table 1). Thus a total of six jackfruits of three different stages (7–8, 10–12 and 14–16 weeks after anthesis) were collected from the same places according to their maturity.

Just after harvesting the jackfruit, the edible part was isolated manually. The edible parts, including the seed (100–150 g each) of 7–8 week old jackfruit, were sliced with a knife but for the 10–12 and 14–16 week old fruits the seeds were separated from the perianths and were sliced separately.

From six trees of three different places a total of 18 jackfruits were collected and 30 samples including 12 seed samples were obtained (Table 1). The sliced sample (100–200 g) was immediately immersed into aqueous 80% ethanol at room temperature for 24 h. The proportion of ethanol was adjusted, taking into consideration the water contents of the fruits, which were determined. The residual fruit material was filtered using a suction pump. This was air-dried and powdered in a grinding machine with 0.5 mm screen. The powdered jackfruit samples (20–30 g each) were separately refluxed with aqueous 80% ethanol (2×300 ml), followed by chloroform (2×200 ml) for 30 min each time. The ethanol extracts of each sample were combined, evaporated to remove ethanol and finally freeze-dried. The freeze-dried materials were used for analysis of free sugar.

The powder left after extraction with chloroform was air-dried and then used for determination of starch and dietary fibre throughout this investigation.

2.2. General methods

Freshly distilled solvents were always used and all solutions were concentrated under reduced pressure at a bath temperature not exceeding 40°C. Milling was performed on a cyclotec apparatus with 0.5 mm screen. Dry matter was determined by oven-drying at 105°C for 18 h if not otherwise stated. Gas–liquid chromatography was conducted on a Pye Unicam 4500 U instrument with flame ionization detector and a fused silica capillary column. Low molecular weight sugars were analysed as trimethylsilyl ethers (Sweely, Bentley, Makita, & Wells, 1963) on a Cp sil 88 (1250×0.02 cm i.d.) and OV 225 (200×0.02 cm i.d.) using programming from 170°C (5 min initial temperature) to 220°C at 4°C min^{-1}. The peak areas were calculated with a Hewlett–Packard 3390A integrator. Amyloglucosidase from *Aspergillus niger* (EC 144/mg) was purchased from Boehringer Mannheim (Germany) and bacterial amylase (Termamyl 120L) was obtained from NOVO AB Copenhagen, Denmark. The glucose–oxidase–

Table 1
Abbreviated names (used) of the samples

Maturity of jackfruit	Date of harvesting	Place of harvesting	Variety	Total weight of jackfruit (kg)	Abbreviated names used[a]	
7–8 weeks	16-4-1992	Jessore	*Soft*	1.75		JES
			Firm	2.48		JEF
	18-4-1992	Dhaka	*Soft*	1.44		DES
			Firm	1.16		DEF
	26-4-1992	Comilla	*Soft*	2.23		CES
			Firm	1.95		CEF
					Perianths	*Seeds*
10–12 weeks	28-4-1992	Jessore	*Soft*	4.50	JMS(P)	JMS(S)
			Firm	4.32	JMF(P)	JMF(S)
	6-5-1992	Dhaka	*Soft*	4.82	DMS(P)	DMS(S)
			Firm	2.90	DMF(P)	DMF(S)
	26-5-1992	Comilla	*Soft*	3.40	CMS(P)	CMS(S)
			Firm	3.52	CMF(P)	CMF(S)
14–16 weeks	19-6-1992	Jessore	*Soft*	4.52	JRS (P)	JRS(S)
			Firm	8.10	JRF(P)	JRF(S)
	25-6-1992	Dhaka	*Soft*	4.62	DRS(P)	DRS(S)
			Firm	4.71	DRF(P)	DRF(S)
	30-6-1992	Comilla	*Soft*	4.72	CRS(P)	CRS(S)
			Firm	4.72	CRF(P)	CRF(S)

[a] J = Jessore, D = Dhaka; C = Comilla; E = 7–8 weeks old; M = 10–12 weeks old; R = 14–16 weeks old; S = *soft* variety; F = *firm* variety; (P) = Perianth; (S) = seed.

peroxidase reagent (Merckotest 3395) was obtained from E. Merck (Darmstadt, Germany).

2.3. Determination of dry matter and ash content of jackfruit samples

Dry matter and ash contents of all the jackfruit samples were determined (Table 2) following standard procedures (AOAC, 1977).

2.4. Analysis of free sugars

The freeze-dried aqueous 80% ethanol extracts (1–2 g) of each sample was separately dissolved in a minimum volume of water and the lipophilic materials were removed by extraction with chloroform (Theander & Aman, 1976). The free sugars were isolated (Nahar, Mosihuzzaman, & Dey, 1993) from aqueous ethanol extract and these were analysed by GLC (Tables 3 and 4) as their trimethylsilyl derivatives (Sweely, Bentley, Markital, & Wells, 1963).

2.5. Determination of soluble and insoluble dietary fibre (DF)

The DF was determined following the procedures previously used in this Laboratory (Nahar, Rahman, & Mosihuzzaman, 1990). The extractive-free fruit sample (2.5–3.0 g) was treated with termamyl (α-amylase) 120 L (NOVO AB Copenhagen) in acetate buffer (0.1 M, pH 5.0, 1 h) followed by amyloglucosidase (*A. niger*, Boehringer Mannheim) for 16 h at 96°C. The mixture was cooled and centrifuged. The supernatant was dialysed and freeze-dried, giving soluble DF (Tables 5 and 6). The centrifugate was suspended in water, dialysed and freeze-dried giving insoluble DF (Tables 5 and 6).

Table 2
Dry matter, ash content and aqueous ethanol extract of jackfruit samples

Sample	Dry matter[a]		Ash content[b]		Aq. 80% ethanol extracts[a]	
	Soft	*Firm*	*Soft*	*Firm*	*Soft*	*Firm*
JE	12.3	11.7	5.2	4.8	1.9	2.3
DE	11.8	10.7	3.6	3.8	2.1	2.6
CE	12.6	13.1	5.7	3.8	2.5	2.8
JM(P)	17.7	21.6	4.0	3.4	3.7	2.6
DM(P)	21.6	21.5	2.5	2.8	2.8	2.9
CM(P)	16.1	23.4	5.6	4.9	1.9	2.2
JR(P)	25.5	23.7	2.1	2.5	3.7	1.9
DR(P)	24.2	32.4	2.0	1.6	3.5	1.4
CR(P)	26.5	26.6	3.3	2.6	3.2	1.9
JM(S)	25.2	26.2	3.6	3.4	2.8	2.3
DM(S)	27.6	31.1	2.8	2.2	2.2	2.3
CM(S)	19.6	21.7	4.3	4.2	1.5	2.2
JR(S)	52.5	48.7	2.9	2.6	2.3	2.0
DR(S)	50.6	49.9	2.2	2.3	2.4	2.1
CR(S)	48.7	45.3	2.7	3.4	1.7	1.6

[a] Per cent of fresh fruit.
[b] Per cent of dry matter.

2.6. Determination of starch

Starch was determined according to the procedure of Salomonsson, Theander and Westerlund (1984). Duplicate portions (75–125 mg) of milled extractive-free fruit samples were incubated with α-amylase for 30 min at 96°C and then with amyloglucosidase for 16 h at 60°C. The glucose released was analysed by a glucose–oxidase–peroxidase reagent. Starch was calculated as glucose × 0.9 (Tables 5 and 6).

2.7. Preparation of samples for microscopy

Fresh samples (0.5–1 g each) were fixed in fixative solution containing formalin (40%, 10 ml), glacial acetic acid (100%, 5 ml) ethanol (95%, 50 ml) and distilled water (35 ml). A thin part of the material was stained with erythrosine (1 mg in 13 ml) and dehydrated with increasing concentrations of *t*-butanol. The material was then embedded in bees' wax. Transverse 10 μm sections were cut from the embedded sample using a hand microtome (no. 3676, Spencer Lens Co., Buffalo, NY). The sectioned thin material was then passed through xylol and ethanol in the ratio of 3:1, 1:1, 1:3 followed by successively passing through saffranin, ethanol, fast green, ethanol and the clove oil. Stained slides were viewed and photographed using an Ortholux Research microscope (Ernst Leitz Gmbtt Wetzlar, Germany).

3. Results and discussion

The dry matter content of jackfruit perianth and seed (Table 2) gradually increased from 10.0 to 26.0% and 19.0 to 52.0%, respectively, with the increase of maturity for both the *soft* and *firm* (Table 2) varieties. The dry matter of the perianth of the *soft* variety (Table 2) was found to be lowest in DES (11.8%) and highest in CRS (26.5%) and the same of the seed was lowest in CMS(S) (19.5%) and highest in JRS(S) (52.5%). On the other hand, the dry matter content of the perianth of the *firm* variety was lowest in DEF (10.7%) and highest in DRF(P) (32.4%) but for seed it was lowest in CMF(S) (21.7%) and highest in DRF(S) (49.9%). Slight variation of dry matter of perianth and seed of both the varieties were also observed with the variation of localities. These values are slightly higher than the previously reported values (Rahman et al., 1995).

The dry matter content of jackfruit perianth and seed was found to be higher than other fruits (Nahar et al., 1990; Rahman, Mosihuzzaman, & Westerlund, 1991; Wills et al., 1986) and vegetables (Nahar et al., 1993) of Bangladesh. In the earlier reports, all the fruits have been analysed in their ripened stage. In the present study all the samples (Table 1) were analysed before they were ripe. Due to this significant variation of fruit condition, the dry matter content of the ripe fruits is expected to be higher than the juicy ripe fruits.

The ash content of all the samples decreased with the increase of maturity (Table 2). The gradual decrease of ash content may be due to increase of relative percentages of dry matter content. The values of ash content varied from 5.7 to 2.0% and 4.9 to 1.6% in *soft* and *firm* varieties, respectively. The ash contents of jackfruit samples are comparable to the reported values for other fruits (Nahar et al., 1990).

The amounts of aqueous 80% ethanol extracts were found to be higher in the *soft* variety than the *firm* variety of the same maturity. It appeared from this report (Table 2) that the ethanol extracts of jackfruit samples were lower than the reported values for other fruits (Rahman et al., 1991).

3.1. Free sugars

The neutral low molecular weight sugars present in the jackfruit samples were identified and quantified by means of GLC as their trimethylsilyl derivatives. The results (Tables 3 and 4) indicated that the free sugars of jackfruit samples increased with maturity from 1.2 to 10.5% and 1.4 to 5.5% of their dry matter for the *soft* and *firm* varieties, respectively. The maximum free sugar content (10.5 %) was found in DRS(P) followed by that in CEF (5.5%). The overall total free sugar contents of the perianth samples were found to be higher in the *soft* variety than the *firm* variety.

In seeds, the proportions of individual and total free sugars were very low compared to the perianth and these were very similar in both *soft* and *firm* varieties. Individual sugar analysis revealed that, for the jackfruit samples 7–8 weeks old, the main sugars were glucose and fructose (69–148 and 63–110 mg per 100 g fresh fruit) with trace amounts of sucrose in the *soft* variety. In the corresponding samples of the *firm* variety, the same trend was found but the quantity was higher than that of the *soft* variety. For 10–12 week and 14–16 week old jackfruit perianth of *soft* and *firm* varieties, the amount of sucrose was found to increase gradually with the maturity but, in all the cases, glucose, fructose and sucrose were found to be the major sugar constituents. *myo*-Inositol was detected either in very minor quantity or in trace amounts.

The total free sugars of 10–12 week and 14–16 week old jackfruit perianth samples of *soft* and *firm* varieties were found to be 2.4 to 4.4% and 5.1 to 10.5%, and 1.4 to 5.3% and 2.2 to 4.8%, respectively, on a dry matter basis. This indicated that the free sugar contents of 10–12 week old jackfruit perianth were slightly higher than the previous findings (Rahman et al., 1995). But for the free sugar content of 14–16 week old jackfruit perianth the values were much lower than the reported values (Chowdhury et al., 1997; Rahman et al., 1995).

This variation of total free sugars may be due to the differences in isolation procedure for free sugars. In the present study, the usual method for isolation of free sugars (Theander & Aman, 1976) was followed. However, Rahman et al. (1995) followed a completely different extraction procedure. In addition to the isolation

Table 3
Free sugar in different jackfruit samples (*soft* variety) (mg 100/g fresh fruit)

Samples	Glucose	Fructose	Sucrose	Inositol	Total free sugars	
					mg 100/g fresh fruit	Per cent dry basis
JES	69	63	8	Trace	141	1.2
DES	158	104	Trace	6	268	2.3
CES	148	96	Trace	Trace	245	1.9
JMS(P)	213	288	275	7	783	4.4
DMS(P)	221	144	115	36	517	2.4
CMS(P)	213	280	113	24	630	3.9
JRS(P)	717	460	381	7	1567	6.1
DRS(P)	264	349	1928	Nd	2541	10.5
CRS(P)	368	220	748	Nd	1337	5.1
JMS(S)	6	8	63	5	82	0.3
DMS(S)	48	43	131	6	228	0.8
CMS(S)	ND	—	—	—	—	—
JRS(S)	21	19	97	6	142	0.3
DRS(S)	35	22	103	Trace	160	0.3
CRS(S)	18	10	116	3	148	0.3

Nd = not detected; ND = not done.

Table 4
Free sugars of different jackfruit samples (*firm* variety) (mg 100/g fresh fruit)

Samples	Glucose	Fructose	Sucrose	Inositol	Total free sugars	
					mg 100/g fresh fruit	Per cent dry basis
JEF	ND	—	—	—	—	—
DEF	101	159	63	36	360	3.3
CEF	381	302	18	18	719	5.5
JMF(P)	151	312	103	6	572	2.7
DMF(P)	112	142	45	11	310	1.4
CMF(P)	514	556	138	20	1228	5.3
JRF(P)	348	273	284	Trace	905	3.8
DRF(P)	333	209	160	Nd	702	2.2
CRF(P)	462	485	297	Nd	1243	4.8
JMF(S)	19	88	38	5	70	0.3
DMF(S)	61	105	231	19	417	1.3
CMF(S)	66	188	155	8	418	1.8
JRF(S)	23	20	90	7	140	0.3
DRF(S)	15	17	88	Trace	121	0.2
CRF(S)	19	13	29	3	65	0.1

Nd = not detected; ND = not done.

procedure for free sugars, the variation of maturity and other agronomic conditions for the growth of the jackfruit may also be responsible for the variation of free sugar content.

Most fruits in their ripening stages contain high percentages of glucose, fructose and sucrose while these sugars may remain absent or present in very minor proportions in their immature stages. Therefore, in this finding, the gradual increase of these sugars with the maturity of jackfruit is quite consistent with the findings for other fruits. The presence of high percentages of sucrose, glucose and fructose is comparable with the findings from other fruits (Chan & Kwok, 1975; Moriguchi, Ishizawa, & Sanada, 1990; Nahar et al., 1990; Rahman et al., 1991; Wills et al., 1986) but higher than plant materials (Mosihuzzaman, Quddus, & Nahar, 1989) and vegetables (Nahar et al., 1993).

3.2. Starch

The starch contents of jackfruit samples were determined by the Salomonsson et al. (1984) method. From the results (Tables 5 and 6), it appeared that the starch content of the perianth and seed of both the *soft* and *firm* varieties of jackfruit samples increased gradually with the increase of maturity. In the case of the perianth samples the starch content increased from 7.8 to 47.0% and 9.0 to 50.6 % on a dry matter basis for the *soft* and *firm* varieties, respectively. Starch content of seed was found to increase up to 65.7 and 59.1% on a dry matter basis for the *soft* and *firm* varieties, respectively. Starch content of the perianth was found to be maximum for 14–16 week old jackfruit and values were found to be 47.0 and 50.6% for JRS and DRF, respectively. At every stage, the range of variation of starch content with the localities remained within 2% in the case of the *soft* variety and within 5% for the *firm* variety.

For seeds the starch content was studied for 10–12 week and 14–16 week old jackfruit, since in the case of 7–8 week old jackfruits the seeds were inseparable from the perianth. Starch content (Tables 5 and 6) was found to increase from 45.1 to 65.7% and from 39.0 to 59.1% on a dry matter basis for the *soft* and *firm* varieties, respectively. It was found to be highest for jackfruits of 14–16 weeks old. For the *soft* variety, starch content was found to be maximal (65.7%) in the sample collected from Jessore district and for the *firm* variety it was found to be 59.1% in the sample collected from Dhaka district. It was revealed (Tables 5 and 6), that jackfruit of *soft* and *firm* varieties harvested from Jessore and Dhaka district, respectively contained, as a whole, higher amounts of starch.

The microscopic studies of the jackfruit perianth samples showed that the samples consisted predominantly of thin-walled cells closely packed with starch granules, some granules occurring in well-defined clusters. It was also observed, in the photographs, that the number and size of starch granules gradually increased with increasing maturity and these became significant in the samples of 14–16 week old jackfruit. These findings were quite consistent with the analytical results (Tables 5 and 6).

Bobbio et al. (1978) isolated starch (25–40% of the total solid) from immature perianth of jackfruit. Rahman et al. (1995) determined starch form *soft* and *firm* varieties of jackfruit perianth of immature (10–12 weeks after anthesis) and ripe fruits (14–16 weeks after anthesis). Starch content was reported as 31.6 and 29.8% for 10–12 week old jackfruit perianth, and 2.2 and 9.9% for 14–16 week old ripe jackfruit perianth

on a dry matter basis for the *soft* and *firm* varieties, respectively. The samples were extracted with water, followed by CDTA, and the mature fruits were stored for 1–2 days so that those could be consumed as full ripe jackfruit. Since, in this case, the process of extraction of the samples was different from the procedure used in the present study, and the mature samples used were fully ripe, the hydrolysis of starch and generation of free sugars and other soluble carbohydrates has started during ripening (Chacon, Viquez, & Chacon, 1987; MacRae, Lalla, Searle, & Bowen, 1989; Selvaraj & Pal, 1989). So, in the experiment of Rahman et al. (1995) starch content of the mature samples decreased drastically compared to the immature sample.

In the present study, all the samples were extracted immediately after harvesting from the tree; as a result the enzymatic action for ripening could not start and hence the starch content was highest (Tables 5 and 6) in full mature stage (14–16 weeks). It is clear from all these results that starch content of jackfruit perianth in its mature stage is highest among all the fruits of Bangladesh (Nahar et al, 1990; Rahman et al, 1991) studied so far.

3.3. Dietary fibre

The dietary fibres of the jackfruit samples were determined by the Nahar et al. (1993) method. The

Table 5
Starch and dietary fibre content of jackfruit samples (*soft* variety)

Samples	Starch		SDF (per cent dry matter)	IDF (per cent dry matter)	Total dietary fibre	
	Per cent fresh fruit	Per cent dry matter			Per cent fresh fruit	Per cent dry matter
JES	1.0	7.8	4.8	38.6	5.3	43.4
DES	1.0	8.7	3.8	39.9	5.2	43.7
CES	1.3	9.9	4.9	42.2	6.0	47.1
JMS(P)	3.1	17.8	4.7	44.4	8.7	49.1
DMS(P)	4.3	19.8	4.9	46.8	11.2	51.7
CMS(P)	2.7	18.9	3.9	46.2	7.0	50.1
JRS(P)	12.2	47.0	5.1	47.7	13.8	52.8
DRS(P)	11.3	46.8	5.6	44.6	12.1	50.1
CRS(P)	12.3	45.2	4.1	50.6	15.2	54.7
JMS(S)	14.0	55.4	1.6	25.2	6.8	26.8
DMS(S)	16.7	60.5	1.4	27.3	7.9	28.7
CMS(S)	8.9	45.1	2.0	21.8	4.7	23.9
JRS(S)	34.5	65.7	1.9	25.8	14.6	27.7
DRS(S)	32.3	63.7	2.1	25.3	13.9	27.4
CRS(S)	30.6	62.9	1.9	26.6	13.9	28.5

Table 6
Starch and dietary fibre of jackfruit samples (*firm* variety)

Samples	Starch		SDF (per cent dry matter)	IDF (per cent dry matter)	Total dietary fibre	
	Per cent fresh fruit	Per cent dry matter			Per cent fresh fruit	Per cent dry matter
JEF	1.1	9.0	3.5	38.9	5.0	42.5
DEF	1.2	11.1	3.3	41.7	4.8	45.0
CEF	1.5	11.1	3.5	42.6	6.0	46.0
JMF(P)	4.2	19.5	4.3	48.2	11.3	52.4
DMF(P)	4.4	20.4	4.5	51.1	11.9	55.6
CMF(P)	2.1	15.6	4.3	46.1	6.8	50.4
JRF(P)	11.9	50.3	5.2	48.2	12.7	53.4
DRF(P)	16.4	50.6	5.2	44.3	16.0	49.5
CRF(P)	12.7	47.8	5.1	47.1	13.9	52.2
JMF(S)	12.5	47.6	2.3	29.0	8.2	31.2
DMF(S)	16.0	51.5	2.0	29.0	9.7	31.0
CMF(S)	8.5	39.0	2.1	28.4	9.5	30.4
JRF(S)	28.0	57.5	1.9	29.8	15.4	31.6
DRF(S)	29.5	59.1	2.2	28.1	15.1	30.3
CRF(S)	24.9	55.1	2.3	22.3	11.1	24.6

results (Table 5 and Table 6) indicated that the total dietary fibre of the perianths were almost similar in *soft* and *firm* varieties while, in seed, they were a little lower in the *soft* variety than the *firm* variety. The range of variation of soluble, insoluble and total dietary fibre with the maturity was found to be similar for both varieties. It is interesting to note that no significant change of total dietary fibre was observed in the 10–12 and 14–16 week old jackfruit samples.

The SDF of perianth samples were comparable to other fruits of Bangladesh (Nahar et al., 1990; Rahman et al., 1991). The amount of polymeric carbohydrate in IDF was always higher than that of SDF. This is due to the cellulosic material, which is not soluble in water and remains in the insoluble portion.

The analytical results for SDF and IDF of jackfruit samples are likely to make this fruit nutritionally and physiologically important. The different medicinal preparations from jackfruit used against various ailments such as leprosy, ulcer, constipation, heart diseases, rheumatism, etc., and as a tonic in various weaknesses (Kirtikar, Basu, & an ICS, 1980) by the renowned Ayurveda and Yunani (Devaraj, 1985; Mukherjee, 1993) practitioners of the Indian sub-continent may be due to its significant dietary fibre content.

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