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Development of a large seeded confectionery type peanut line through reselection

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Abstract

A large seeded confectionery type peanut line having medium crop duration has been developed at BRAC Agricultural Research and Development Centre, Gazipur. Initially, along with other germplasms an accession of introduced exotic peanut germplasm was evaluated in Bangladeshi agro-climatic condition for its suitability as a confectionery type peanut variety among the local peanut growers. After its introduction, selection procedure was operated on the exotic material and finally a promising peanut line with desirable characteristics was developed. This line is characterised by bunch type hardy erect plants with excellent vigour, strong and stout erect stem with sturdy branches, deep green thicker broad leaves with exceptionally large size seeds (100-seed wt = 100 – 110g) in its bigger 2-seeded pods. Pods could be harvested within 110 - 120 days and its yield was recorded as 2.20 – 2.50 Mt/ha. This particular high yielding line was also found to be tolerant to major diseases and pest attacks as well. Multilocational trial showed that it is a well adapted peanut line. Proximate analysis indicated that it is a nutrient rich line having balanced level of protein, fat, fibre and other minerals. Flavour and taste of its crunchy type nuts are also excellent.

Keywords: *Arachis hypogaea* L., confectionery type peanut, introduction, large seeded peanut, nutritional quality, proximate analysis and reselection.

INTRODUCTION

Peanut (*Arachis hypogaea* L.) is a leguminous grain food crop is being grown in Bangladesh traditionally for centuries after its introduction in this sub-continent from its centre of origin South America (Nigam, 2014). This particular cash crop of Bangladesh is being cultivated annually in 32, 000 hectares of land and on an average 40, 000 metric tons of peanuts are produced (Mondal *et al.*, 2011). It is also one of the most important crops of Bangladesh and its nutritious seeds are chiefly used as a source of edible oil, to make cake, biscuit and other baked foods in the food industries besides its use in homemade other food products as well (Deb and Pramanik, 2015). Its roasted nuts are very popular and fresh plants are used as cattle feed after snapping pods from the plants during the harvesting season. As the domestic production cannot meet the huge demand, naturally Bangladesh imports peanut oil and shelled peanut on a regular basis by spending hard earned foreign currency (Deb and Pramanik, 2015). It has been found that agro-climatic condition of Bangladesh is very much suitable for peanut production in Bangladesh and here it is cultivated mostly in sandy or sandy loam soil of the 'Char' areas i.e. in the lands raised from riverbeds (Nath and Alam, 2002). Thus peanut cultivation is playing a vital role in the improvement of livelihood of the 'Charland' people of Bangladesh. Very recently in Bangladesh the importance of large seeded peanut varieties has been increased significantly as huge quantities of the peanut seeds are being used as raw materials for making different confectionery products by the food manufacturing companies. Crop rotation with this legume crop is recommended for sustainable crop production as peanut

plants increases soil fertility by harbouring bacteria which fixes atmospheric nitrogen. Again, since peanut can be cultivated almost throughout the year and it can also be grown in the marginal lands as well without much care there is a huge scope to expand the peanut cultivation in Bangladesh (Islam *et al*., 2009). Considering the prospects of peanuts, national research institutes of Bangladesh has already developed a good number of improved peanut varieties yet their production is far lower than the varieties cultivated in major peanut growing countries. Realizing the importance of large seeded peanut varieties at the growers, food manufacturing companies and at the consumers level an exotic large seeded peanut germplasm was introduced and evaluated at BRAC Agricultural Research and Development Centre, Gazipur very recently (Islam *et al.,* 2012). After its introduction, improvement of the exotic germplasm has been done through reselection (Singh, 1996). And to determine the adaptibility and suitability of this newly developed improved large seeded confectionery type peanut in different parts of Bangladesh along with its demand among the farmers level as well as in the confectioneries its detailed observation was carried out. Bearing in the mind of dietary value of this newly developed advance line, nutritional composition of its seeds has also been analysed. A brief account of all these observations have been presented in the present communication.

MATERIALS AND METHODS

Major experiments of the peanut variety development were carried out in BRAC Agricultural Research & Development Centre (BARDC) Gazipur, Bangladesh while the field trials were conducted at BRAC seed farm, Dinajpur and Meherpur respectively. To accelerate the generation advancement cycle, two seasons per year were utilized. Standard agronomic practices were followed to raise a good crop in each case and data were collected accordingly. In all the experiments 2 seeds per hole were planted in 3m × 1m size beds giving the space 30cm between plants and 90cm between the rows and finally one plant per hill was maintained. For different trials, the experiments were laid out in a randomized complete block design with three replications and BARI chinabadam-8 was used as check variety. Fertilizers were applied @ 20kg N, 70kg P_2O_5, 40kg MoP, 80kg gypsum per hectare respectively in all the locations selected for trial. For field level demonstration a progressive famer was selected from Sirajganj district and to determine its industrial value its seeds were sent to a reputed food manufacturing company 'Pran Food Companies Ltd. Bangladesh. Proximate analysis was done following standard procedure (AOAC, 2012).

Germplasm collection & evaluation: In order to develop an improved variety several peanut germplasms were collected and their accession numbers were given as BRC-001, BRC-002, BRC-003, BRC-004, BRC-005 and BRC-006 accordingly. These germplasms were evaluated at BARDC in the Kharif-1 season during the year 2009 (sowing date: 23.04.09) and characterizations of these germplasms were completed for their utilization in the breeding program. But as both the pods and seeds of BRC-005 were found to be exceptionally larger than the other accessions, seeds of this particular innovative exotic germplasm was separated from other germplasms and subjected to reselection followed by successive evaluation leading to the development of new improved type large seeded variety.

Reselection of the introduced large seeded exotic variety: Seeds of the introduced exotic germplasm BRC 005 were sown in a separate plot on 18.08.09 in the experimental field of BARDC for operating selection method. Normal care was taken and at 110 DAS the crop was found to become ready for harvesting. As slight variations in the plant populations of BRC 005 were noticed and few plants were found to be affected by leaf spot disease the whole population was subjected to selection process. At the harvesting period ten best plants were selected having higher no. of matured pods with bigger fruit size and having good fruit shape. Data on yield and yield related characteristics of these 10 isolated plants were recorded separately, pods were collected individually and preserved accordingly. Rest of the plants were harvested at the end of the season, their pods were bulked together and preserved for further use.

Growing selected plants for progeny testing: Seeds of the 10 selected plants were sown on 02.10.10 in 3m × 1m beds separately to raise the progenies of the selected plants separately. Critical observations were carried out to find out variations between the families raised from selected plants and the variations in the plant populations within the family level. Again, ten best plants from each of the families were selected and pods were collected separately at the harvesting period except the family raised from the seeds of plant no.7 as almost all the plants were found to be affected by leaf spot disease. After thorough drying of all the pods of selected plants belong to different families, the seeds were composited to constitute the base population.

Raising the plant population from bulk seeds: In the next season, seed bulks were planted in the experimental field of BARDC. Critical observation was carried out to identify off type plants in this generation as well and when identified these plants were eliminated from the field through rouging. Again at the harvesting period best healthy plants were selected and seeds of these plants were bulked together to advance the generation.

Generation advancement phase: To generate a uniform population and to create a stable line, bulked seeds were planted in each season and off type plants were eradicated from the every successive generation. Finally the improved line was developed after a series of selection and repeated cultivation for 6 generations.

Yield trials: To determine the performance of the newly developed improved line, Preliminary Yield Trial (PYT), Advance Yield Trial (AYT) and Multi location Yield Trial (MLT) were conducted using BARI chinabadam-8 as a suitable check variety.

Characters studied: During the course of study different plant characters viz., plant height per plant, plant spreading, no. of branches per plant, no. of leaves per plant, length and width of leaflet per leaflet, days taken to 1st flowering, total no. of pods per plant, percentage of matured pods per plant, pod length per pod, total pod wt. per plant, kernel length per kernel, 100-seed wt., shelling percentage, seed yield per plant, yield per hectare, percentage of virus incidence etc. were considered.

Analysis of data: All the relevant data collected during the course of study were analysed using standard statistical technique (Singh and Chaudhary, 1985).

RESULTS AND DISCUSSION

Germplasm evaluation and selection

Basically, the robust type plants of the BRC 005 exhibited moderate plant height with well-developed branching system. Although the total no. of pods of this accession was close to local germplasms (44.20) pod size of the newly introduced exotic genotype was found to be exceptionally high and the seeds were also noticed as larger and heavier seeds (Table 1, Figs. 4 & 5)). Hence the 100-seed wt. of the exotic germplasm had higher value (74.11 g). One of the striking features of this exotic variety was that it had relatively fewer immature pods (Table 1). BRC 005 took almost 102 days to reach at harvesting stage and it was found to be relatively free from the attack of major diseases as well as pest attack besides the attack of leaf spot disease at the later stages of growth and development which was finally eliminated through selection. For genetic improvement in peanuts, introduction has been recommended as one of the most important breeding methods (Singh 1996). Haunold (1981) holds the same view and argued that along with introduction, reselection is a less expensive breeding technique through which a variety can be improved in a relatively shorter time.

Table 1. Performance of accession BRC 005 against the local germplasms

Accession name	Plant height (cm)	No. of braches/ plant	Total no. of pods/ plant	Percentage of matured pods/ plant	Pod length/ pod (mm)	Pod wt./ plant (g)	100-seed wt. (g)	Seed yield/ plant (g)	Yield/ ha (Mt)
BRC 005	68.60	9.10	44.20	77.35	38.00	64.11	74.17	37.13	3.76
Mean values of important traits of local germplasms	108.95	8.87	41.59	26.64	31.00	32.48	47.72	23.26	1.90
% increased or decreased over local germplasm	-58.82	+2.59	+6.27	+190.35	+22.58	+97.38	+55.42	+59.63	+97.89

Growing selected plants for progeny testing

Almost all the selected 10 plants produced normal plants and generated 10 different families with considerable differences in their phenotype (Table 2). It is interesting to note that all the progenies of plant no.7 (P_7) was found to be affected by leaf spot disease at the time of flowering. And this is why all the plants raised from seeds of plant no.7 were eradicated through rouging. Table 2 also shows that there were differences in the plant progenies belonging to different families but there was a good uniformity within the progenies raised from different selected plants. Among the different families

plants raised from seeds of P_1 had higher values in almost all the characters except percentage of 2-seeded fruit.

Table 2. Comparative study of morphological characters of different families raised from selected plants in the Kh-2 season

Plant no.	Plant height/plant (cm)	No. of branches/plant	Total no. of pods/plant	% of 2 seeded pods/plant	% of matured pods/plant	Pod wt. (g)	Seed yield/ plant (g)	Total no. of seeds/ plant	Fresh pod wt./family (kg)
P_1	50.33	10.00	78.33	72.92	82.78	139.32	93.70	82.78	3.00
P_2	47.00	10.00	75.33	72.51	79.42	124.30	66.02	79.42	2.30
P_3	45.67	7.33	66.00	71.33	78.32	119.94	75.27	78.32	2.30
P_4	38.67	10.00	59.33	62.80	83.11	96.52	63.01	63.33	2.30
P_5	44.00	7.67	47.33	-	78.16	53.56	34.56	57.00	0.30
P_6	42.67	9.33	75.00	80.91	72.94	90.35	55.25	71.67	2.30
P_8	43.67	8.67	59.67	-	65.92	75.58	52.95	78.00	2.00
P_9	43.67	6.00	41.00	-	72.58	49.67	32.54	44.33	1.00
P_{10}	47.00	8.67	46.00	-	61.20	44.71	28.38	38.00	2.50
Mean (range)	44.53 (38.67-50.33)	8.57 (6.00-10.00)	58.29 (41.00-78.33)	72.09 (0 -80.91)	75.10 (61.20-83.11)	83.50 (44.71-139.32)	52.82 (28.38-93.70)	63.28 (38.00-82.78)	1.85 (1.00-3.00)

Creation of new line and its important features

The new peanut population so created by compositing the seeds of nine separate families was found to be relatively disease free and consisting of improved type of almost identical plants with desirable characteristics.

Important features of the newly developed improved line (Figs.1, 2, 3, 4, 5 and Table 3)***:***

- High yielding improved type large seeded line with good adaptability.
- Robust, erect type bushy plant with moderate plant height and excellent vigour.
- Hardy type plant; stem as well as branches are stout and sturdy, relatively large size thick leaves, bright yellow coloured flowers & bigger size pods.
- Besides few1-seeded pods, most of the pods are 2-seeded, hence the seeds are also larger.
- Near about 175- 200 g of pods can be harvested from a single plant while seed yield/plant is 100-130 gm.
- Hundred seed wt. is around 100-105 g while in the other varieties it is only 45-50 g.
- Uniform maturity and free from major diseases and pest attacks.
- It is an all- season type line suitable for year round production.
- Medium crop duration and yield/ha 2.50-3.00 metric tons.
- Easier to pull on, because the pods cluster around the tap root with strong pegs.
- Crunchy type nuts with good flavour and taste.

Table 3. Main features of the improved line BRC 005

Main characteristics	$\overline{X}$ ± **S.D**
Plant height/plant (cm)	45.30 ± 11.93
No. of branches/plant	8.15 ± 1.31
Days taken to flowering	31.80 ± 1.45
Crop duration	115.00 ± 0.75
Total no. of pods/plant	52. 73 ± 14.75
Total pod wt./plant (g)	81.30 ± 15.72
100- pod wt. (g)	145.07 ± 13.21
100-seed wt. (g)	104.61 ± 15.99
Matured pod percentage (%)	77.08 ± 6.81
Matured sound seed (%)	76.50 ± 7.92
Shelling (%)	60.5 ± 5.10
Seed yield/plant (g)	34.30 ± 13.55
Yield /ha (Mt)	2.20 ± 8.67
Harvest Index (%)	58.63 ± 29.47

Seed protein (%)	30.53	± 0.63
Total fat (%)	41.81	± 1.12
Fibre (%)	13.91	± 0.23
Ash (%)	2.82	± 0.01

The recently introduced and developed improved type peanut line at BRAC Agricultural Research and Development Centre BRC 005 is characterised by healthier peanut plants with excellent vigour, thicker leaves, and bigger pods with exceptionally large size seeds and rarely suffer from major diseases. In contrast, a peanut variant with white coloured testa was isolated from a high yielding variety exhibited poor yield than its parent stock (Islam *et al.*, 2012). Again, as BRC 005 is characterized by erect plant habit; it also provides the farmer an opportunity easy earthing up process (mulching) which is a normal practice of the peanut growers. Furthermore, as most of the pods of the new line are arranged very close to the tap root and had stronger pegs it also facilitates easy harvesting of nuts during the pulling of plants.

Fig. 1. Pod bearing plants of BRC 005

Fig. 2. Pods of BRC 005

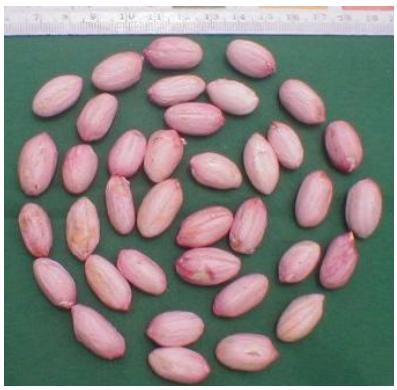

Fig. 3. Kernels of BRC 005

Fig. 4. Pods of BRC 005 (left) and BARI chinabadm-8 (right)

Fig. 5. Kernels of BRC 005 (left) and BARI chinabadm-8 (right)

Figs. 1-5. Pods and kernels of peanuts of BRC 005 and BARI chinabadam-8.

Preliminary Yield Trial (PYT)

For the comprehensive and effective study during the preliminary yield trial, critical observation was carried out among the plants of BRC 005 and BARI chinabadam-8. Data on morphological characters were recorded at 45 DAS and no. of flowers per plant up to that date is presented in Table. 4 while the data on yield related characteristics collected during the harvesting period are presented in Table 5.

Data on plant characters at 45 DAS:

Data on morphological characters recorded at 45 DAS has been presented in Table 4. Relevant data on morphological characters viz., plant height per plant, plant spreading per plant, number of branches per plant, number of leaves per plant, length and width of leaflet at 45 DAS and no. of opened flowers per plant were recorded and are presented in Table 4. BRC 005 could be identified easily by its distinctive characters like vigorous erect type compact plant with thicker deep green leaves and slightly lower no. of branches per plant was recorded in BRC 005 than BARI chinabadam-8. Leaf dimension of the two respective entries was recorded and almost similar size of leaflet per leaves was noticed in BARI chinabadam-8 and BRC 005. It is interesting to note that both the entries started to flower almost during the same period (at 26 DAS). Total number of flowers per plant at 45 DAS was also counted in the 2 entries and BARI chinabadam-8 had higher number of flower per plant (13.57). Virus incidence was recorded in BRC 005 as well as BARI variety and higher percentage of virus affected plants was noticed in BARI chinabadam-8.

Table 4. Morphological characters and virus incidence (%) of two entries of peanut at 45 days after sowing (PYT)

Variety/ line	Plant height (cm)	Plant spreading (cm)	No. of branches/ plant	No. of leaves/ plant	Length of leaflets (cm)	Width of leaflets (cm)	Total no. of flowers/plant	Leaf colour	Virus Incidence (%)
BRC 005 (range)	30.43±5.17 24-41	40.48±4.09 30-47	11.86±4.53 6-20	46.05±13.29 17-73	6.93±0.61 6-8	3.33±0.34 2.8-4	10.33±3.06 2-12	Deep green	2.32
BARI china-badam-8 (range)	33.42±2.71 28-40	46.33±4.52 37-56	14.09±5.46 6-36	58.76±19.87 22-138	6.99±0.51 6-8	3.55±0.22 3-4	13.57±5.08 3-22	Green	5.00

Table 5. Mean values with range of yield related characters of two peanut varieties (PYT)

Variety/ line	Plant height/ plant (cm)	No. of branches/ plant	Days taken to 1st flowering	Total no. of pods/plant	No. of matured pods/plant	Pod length/ pod (cm)	Pod wt./ plant (g)	Shelling (%)	100- seed wt. (g)	Seed yield/ plant (g)	Harvest index (%)	Crop duration	Yield (Mt/ha)

BRC 005	46.9±4.99 (36-60)	9.83±1.89 (7-19)	26.00±1.39 (25-27)	54.7±16.15 30-86	40.97±11.19 (23-61)	4.25±0.18 (3.9-4.93)	80.39±20.86 (44.4-129.9)	64.26±5.10 (46.10-64.90)	120.11±13.4 (98-145)	55.09±16.37 (30.2-89.7)	101.91± 42.79 (47.13-204.81)	116± 0.34 (112-118)	3.95±0.63 (2.96-4.14)
BARI-China badam-8	52.6±4.72 (42-65)	8.67±1.36 (5-11)	26.67±1.07 (26-27)	50.17±15.58 (5-90)	41.13±13.57 (0-80)	2.89±0.12 (2.67-3.33)	50.57±11.18 (28-80.9)	58.53±3.39 (52.14-64.33)	59.33±2.92 (56-63)	38.18±7.65 (21-59.9)	69.12±17.95 (30.38-121.17)	128± 0.524 (124-132)	1.63±0.45 (1.20-2.10)

Yield and yield related characteristics:

Data on yield and yield related characteristics of the two entries are presented in Table 5. Relatively taller plants with higher number of branches were observed in BARI chinabadam-8. However, higher no. of pods with increased fruit size was noticed in BRC 005 (Fig. 4 & Table 5). Almost double seed wt. was recorded in the BARDC developed improved line compared to BARI chinabadam variety. Seed yield per plant, harvest index and yield/ha in BRC 005 was also much higher than BARI chinabadam-8. Though peanut is being cultivated in Bangladesh for many years up until now there is no released large seeded confectionery type peanut variety. Practically large seeded peanuts not only increase the yield of peanuts but also enhance its quality as well. Large seeded variety also has several agronomical advantages such as; larger seeds usually produce vigorous seedlings, relatively healthier sturdy uniform size plants and bigger pods with bold seeds.

Advance Yield Trial (AYT)

Results of the advance yield trial are presented in Table 6. Almost similar plant height was recorded in both the entries although the plants of BRC 005 were more erect and the stem was more sturdy which gave the plant as a bushy type structure. As expected BRC 005 exhibited higher values in most of the yield related characters viz. pod length per pod, pod wt. per plant, kernel length per kernel, seed yield per plant and yield per hectare.

Multilocational Yield Trial (MLT) & Other Activities

Results of the multilocational trial of BRC 005 and BARI chinabadam-8 are presented in Table 7. Advance line BRC 005 performed well in both the locations. In Dinajpur its yield was recorded as 2.79 Mt/ha while its production was 2.19 Mt/ha in Meherpur district. This line was also found to be free from major diseases and there were no pest attacks as well. A farmer's demostration plot was also set by a progressive farmer in Sirajganj district after MLT to ascertain the suitability of the peanut line among the farmers and very good response was obtained from the peanut growers of that region. He got 9.00 kg of pods by cultivating 1 decimal of land (2.22 Mt/ha). It can also be mentioned here that near about 2 kg of peanut pods of BRC 005 was sent to a reputed food product manufacturing company PRAN Food Ltd., Bangladesh and they also appreciated for its better quality pods and large size seeds. They also agreed that it can be a suitable variety for making peanut based confectionery products.

Table 6. Advance yield trial (AYT) of the newly developed improved type peanut line

Variety/line	Plant height (cm)	No. of branches/ plant	Total no. of pods/plant	Pod length/pod (cm)	Pod wt/plant (g)	Shelling (%)	Kernel length/ kernel (cm)	Seed yield/ plant (g)	Crop duration	Yield/ha (Mt)
BRC 005	52.37±3.47 (47-60)	10.41±1.81 (8-14)	52.41±11.68 (27-91)	4.93±0.41 (4.4-5.5)	109.13±33.73 (36-222)	60.53±5.10 (46.10-64.90)	2.21±0.14 (2-2.4)	62.87±31.00 (49-71)	114±1.21 (112-116)	2.20 ± 8.67 (1.78-2.38)
BARI china-badam 8	52.10±3.73 (44-60)	10.70±3.58 (5-18)	57.44±12.09 (40-76)	2.95±0.10 (2.8-3.2)	59.00±9.67 (41-79)	55.18±3.39 (52.14-64.39)	1.65±0.21 (1.4-2.5)	45.87±9.58 (26-53)	123±1.61 (121-126)	1.85±10.24 (1.67-1.98)

Table 7. Multilocation yield trial (MLT) of the peanut advance line (BRC 005) during the year 2013

Name of the line/ variety	Location	Plant height (cm)	No. of branches/ plant	Total no. of pods/ plant	Pod wt/plant (g)	Crop duration	Yield/ ha (Mt)	Disease reaction
BRC 005	Dinajpur	129.00±8.92	6.00±0.95	63.00±11.58	170.00±16.59	112.00± 0.84	2.79±3.98	No major disease
	Meherpur	83.00± 7.48	12.00± 1.01	52.00± 12.56	83.00±18.67	118.00±1.34	2.19±4.56	No major disease
BARI china-badam-8	Dinajpur	125.00±8.96	6.00±1.05	73.00±13.29	140.00±11.17	122.00±0.97	1.82±4.67	Fusarium wilt
	Meherpur	72.00±8.64	10.00±1.48	71.00±12.97	71.00±15.89	130.00±1.87	1.45±5.12	Leaf spot

Nutritional Quality of BARDC Developed Large Seeded Peanut

The nutritional quality of normal dry seeds of BRC 005 and BARI chinabadam-8 was assessed through proximate analysis and the data are presented in Table 8. Critical analysis of the nutritional composition revealed the fact that the improved line BRC 005 had higher amount of fibre (13.91%) and ash elements compared to check variety BARI chinabadam-8. Relatively lower amount of protein, moderate level of fat and lower level of moisture were also recorded in BARDC developed line.

Table 8. Proximate analysis of BRC 005 and BARI chinabadam-8

Variety/ line	CP (%)	Fat (%)	Ash (%)	Fibre (%)	Moisture (%)
BRC 005	30.53±0.63	41.81±1.12	2.82±0.01	13.91±0.23	5.32±0.15
BARI chinabadam-8	34.03±0.50	42.68±0.92	2.62±0.01	11.63±0.31	6.04±0.52

Large seeded improved peanut line BRC 005 contains huge amount of fibre but had relatively lower amount of protein and fat compared to medium size seeded variety BARI chinabadam-8. This was in agreement with similar previous report which supports the view that a fibre rich dietary product is lower in energy density, often has lower fat content, is larger in volume and is richer in micronutrients (Dhingra *et. al.*, 2012). Peanuts are the valuable sources of protein, energy and minerals (Abu Assar *et. al.*, 2008). Therefore, regular intake of balanced quantity of roasted peanuts and peanut based homemade as well as confectionery food products provide high quality nutrition. For confectionery type peanuts larger grain is prime importance. It should posses' longer shelf life and it should also have good nutritional quality as well. The newly developed improved type large seeded peanut line BRC 005 with 13.53% lower moisture than BARI chinabadam-8 can ensure longer shelf life and coupled with this advantage reduced level of moisture indicates lower energy requirement for roasting kernels and proves its suitability as a good confectionery type peanut. It can be mentioned here that proper roasting is critical to flavour and texture development as well as nutritional content of the final peanut products. And roasting again reduces moisture content and modifies the internal microstructure of peanuts to create the characteristic crunchy and crispy texture of roasted peanuts (Lee and Resurreccion 2006). Now the peoples are very much health conscious and the food manufacturing companies are searching for nutrient dense raw materials for the preparation of nutrition rich food products. The promising peanut line BRC 005 has higher amount of minerals than BARI chinabadam-8 (Table 8). Its larger seed contains huge amount of dietary fibres as well (13.91%). Soluble as well as insoluble fibre helps in maintaining healthy bowel movements (Takahashi *et al.*, 1994). It is recommended that if the dietary fibres are eaten in the right quantity, it helps in cleansing the digestive tract and regular bowel movements are also associated with a lowered risk of colon cancer (Graham *et al.*, 1978). Therefore, it is expected that relatively fair amount of fat, protein, fibre and other minerals in the improved line BRC 005 will ensure better peanut based food and food products for the confectioneries and bakeries.

CONCLUSION

One of the major constraints of peanut cultivation in Bangladesh is the poor availability of seeds of good

quality variety having higher yield. Although a good number of peanut varieties have been released by the National Research Institutes of Bangladesh (BARI and BINA) but in all these varieties the seed sizes are relatively smaller than the BRAC developed improved line BRC 005. Since there is a very good demand of large seeded variety to the farmers due to the heavy consumption of food processing industries and ever increasing peanut loving consumers it is expected that BRC 005 will be a suitable large seeded variety for those growers and also for the profit making confectionary industries as well. From the observation it has also been found that this BRC 005 line gives near about 25-30% increased yield than BARI chinabadam-8 and ensures higher yield to the farmers with relatively lower production cost as this variety also exhibited tolerance to the major diseases and pest attacks. Nutritional composition of the peanuts also revealed that BRC 005 will be a suitable line for the fast food making industries as well.

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