

ANKGN3, a new large seeded (Jumbo) peanut (*Arachis hypogaea* L.) variety for confectionary industry in Sri Lanka

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Abstract

Development of suitable genotypes for confectionery purposes is one of the important objectives in peanut breeding. An effort was made to develop medium duration and large seeded peanut variety through hybridization and selection, with two peanut lines, namely, ICGV 98396 (large seeded and longer crop duration) and ICGV 10663 (small seeded and medium crop duration) resulting a new Jumbo peanut line maturing in 3½ months. It was tested in different locations in the Dry and Intermediate Zones of Sri Lanka. The average yield of new peanut line was (3.13±0.19 t ha⁻¹), higher than that of Lanka Jumbo (2.52±0.15 t ha⁻¹) and Walawa (2.17±0.15 t ha⁻¹), and the potential yield was 4.04 t ha⁻¹. It was resistant to collar rot while moderately resistant to bud necrosis disease and rust. Fatty acid profile tested for the new line revealed that it has high oleic/linoleic ratio (2.0) than the small seeded variety, Tissa. Higher oleic/linoleic ratio greater than 1.6 offers a longer shelf-life of processed foods, health benefits to consumers and increases profitability to farmers through higher yield compared to normal peanuts. Furthermore, keeping quality of the candidate variety was superior compared to other small seeded varieties. This new peanut nominee is well fitted to the cropping pattern of the country. Hence, candidate line ICGV 98396 × ICGV 10663 was released by the Variety Releasing Committee of The Department of Agriculture in 2020, renaming it as ANKGN3 considering its suitability for confectionary industry and greater potential for increasing productivity of peanut in Sri Lanka.

Keywords: Fatty acid profile, Hybridization, Jumbo peanut, Medium duration, Oleic/Linoleic ratio

Introduction

Peanut (*Arachis hypogaea* L.), is a major oil seed and food crop grown on nearly 28.2 million ha lands across the world with a global production of 47.4 million metric tons during 2017 (FAO stat, 2017). Globally, peanut is consumed as nutritionally unique and healthy cooking oil, confectionery and in various food products. In Sri Lanka, it is mostly used to prepare confectionaries and consumed as a snack.

High oleic acid content of peanut has emerged in recent years as a key market trait in the world. It improves shelf life, enhances the oil quality and offers health benefits to consumers (Shasidhar *et al.*, 2019). Peanut oil and peanut-based food products with the high-oleic content have 5 to 10 times longer shelf life than that of normal peanut (Braddock *et al.*, 1995; O’Keefe *et al.*, 1993). A diet with high oleic acid and low palmitic acid is an exceptional way to reduce the risk of cardio-vascular diseases, promotes a healthier ratio of High Density Lipo-protein (HDL) to Low Density Lipo-protein (LDL), and reduces triacylglycerol and blood glucose levels (Sabate *et al.*, 2001; Kris-Etherton *et al.*, 1999). High-quality peanut products with oleic acid rich kernels will generate sustainable income and livelihood to resource-poor farmers as well as ensure the supply of quality peanut to the consumers and industry.

In Sri Lanka, peanut crop is mainly cultivated in Dry and Intermediate Zones and the annual cultivation extent was 15,752 ha with the production of 27,602 t pods. Meanwhile, Sri Lanka has imported 4,300 t of peanut in 2018 and the majority belonged to large seeded or Jumbo peanut category (Agstat, 2019). Peanuts having a seed mass of more than 70 g per 100 seeds are considered as Jumbo peanuts.

Six peanut varieties, namely, Tissa, Walawa, Indi, Tikiri, ANKG1 and Lanka Jumbo have been recommended by the Department of Agriculture (DOA) for general cultivation and all those varieties have been developed at Grain Legumes and Oil Crops Research and Development Centre, (GLORDC) Angunakolapelessa. The yield potential of these varieties ranged from 2-3 t ha⁻¹ under well managed conditions and the average yield in the country is 1.75 t ha⁻¹. Among them, Tissa, ANKG1 and Lanka Jumbo are widely grown. Though the large seeded variety Walawa has been released in 1993, it is not popular among the farmers due to longer crop duration (4½ months) and yield loss due to weakened pegs.

In recent years, Jumbo peanut has become popular in the country. However, nearly the total requirement of the Jumbo peanut is imported. In 2015, GLORDC, Angunakolapelessa has released one medium duration Jumbo peanut variety, named as Lanka Jumbo, and it is becoming popular among farming communities and Jumbo peanut exporters. In order to limit Jumbo peanut importation from other countries and to cater the huge demand for confectionary type peanut variety from the farmers, further development of high yielding Jumbo peanut varieties, acceptable for local cropping pattern is a timely need. Hence, a hybridization and selection program was initiated between ICGV 98396 and ICGV 10663 peanut lines with the objective of developing a new medium duration (3½ months) Jumbo peanut variety. As the nutrient value of peanut and its products are closely associated with the fatty acid composition of the nut, fatty acid profile and oleic to linoleic ratio of new line was determined.

Materials and Methods

Peanut lines ICGV 98396 and ICGV 10663 which were received from ICRISAT, India were artificially hybridized during 2011/12 *Maha* season at the GLORDC, Angunakolapelessa, Sri Lanka. The line ICGV 98396 is a large seeded line with longer crop duration (4½ months) and erect type plants while ICGV 10663 recorded small size seeds with medium crop duration (3½ months) and semi spreading type plants. The advancement of F₁ to F₇ generations was carried out from the 2012 *Yala* to 2015 *Yala* seasons. Plants were selected based on the modified bulk method of selection using plant and seed morphology and crop duration. The selected line was named as ANKGL3 and evaluated with several other similar lines developed by hybridization and selection by the peanut breeding program of GLORDC (ICGV 98396 × Red Spanish, Walawa × Red Spanish, ICGV 98396 × ICGV 10667 and ICGV 97045 × Red Spanish) along with the check varieties of Indi and Walawa for their yield and other important agronomic traits during 2014 *Yala* and 2014/15 *Maha* seasons at GLORDC, Angunakolapelessa.

The selected promising lines were evaluated for their yield and other important agronomic traits and crop duration at different research stations of the DOA in different agro ecological regions. Hence, the National Coordinated Varietal Testing Trial (NCVT) was conducted in GLORDC, Angunakolapelessa, Field Crops Research and Development Institute (FCRDI), Mahailuppallama, and five Agriculture Research Stations, namely,

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Aralaganvila, Killinochchi, Tirunelveli, Weeravila and Maduruketiya, over the three seasons from the 2015/16 *Maha* with Walawa and Lanka Jumbo as check varieties. The variety Lanka Jumbo has not been used as a check variety during 2015/16 *Maha* as it was not released as a recommended variety at that time. The variety Walawa has been released as a 4½ months variety initially and it was used as the check variety as it also belongs to the Jumbo peanut category. The experiments were conducted in a Randomized Complete Block Design (RCBD) with three replicates.

The Variety Adaptability Testing (VAT) trial was continued in the 2018 *Yala* season and 2018/19 *Maha* seasons along with Walawa and Lanka Jumbo varieties in six farmer fields at Maduruketiya, Handapanagala, Komari, Angunakolapelessa, Karadiyanaru, Jadura in a RCBD with two replicates. Data were collected on yield, crop duration, seed characters and pest and disease scores. Selected new line, ANKGL3 was characterized according to the groundnut (peanut) descriptors developed by ICRISAT (IBPGR and ICRISAT, 1992). The experiments were conducted providing recommended fertilizer and spacing by DOA. Yield data were analyzed using SAS and variance component methods (Abey Siriwardena *et al.*, 1991) and the treatment means were compared using Least Significant Difference (LSD) at $p = 0.05$.

Furthermore, the selected line along with check varieties were tested for the composition by proximate analysis. Fatty acid profile and the oleic to linoleic ratio was tested by Gas Chromatography (GC) analysis at Industrial Technology Institute, Colombo, using Shimadzu 2010 gas chromatograph equipped with a flame ionization detector. Fatty acid peaks in lipid samples were identified with comparing the retention time of fatty acids in the standard mixture, and of fatty acid percentage was calculated relatively to total peak area of fatty acids present in the chromatograph (Davis *et al.*, 2008). The minor peak area values were omitted. Fatty acid percentage was determined using the formula;

$$\text{Oleic to Linoleic ratio} = \frac{\text{Average value of Oleic content (\%)}}{\text{Average value of Linoleic content (\%)}}$$

Based on the obtained results of the GC analysis, oleic to linoleic ratio was calculated using following the formula;

$$\text{Fatty acid (\%)} = \frac{\text{Peak area for identified Fatty Acid Methyl Ester}}{\text{Total peak area of all the fatty acids considered for analysis}} \times 100$$

Five point hedonic test was conducted using 30 untrained panelists to check the preference for color, size of the nut, crunchiness, taste and overall acceptability (Meilgaard *et al.*, 1999). Data from sensory evaluation were analyzed using Friedman non-parametric technique using SPSS windows 16.1 (Morris *et al.*, 2013).

Results and Discussion

All F₁ seeds from the cross between peanut lines ICGV 98396 and ICGV 10663 produced large seeds indicating that the large seed size is a dominant trait (Singh and Oswalt, 1991). Further, all the F₁ plants exhibited semi spreading growth habit indicating spreading type is dominant to erect or bunch type (Balaiah *et al.*, 1977). Large seeded plants which were having semi spreading growth habit were collected and advanced from F₂ to F₇ generations. Semi spreading plants were selected as they could be easily distinguished from maternal plants and the semi spreading plants were usually higher yielding than bunch or erect types (Jasani, 2009). Meanwhile, several other similar type of crosses were made using other peanut lines as mentioned in the methodology and were advanced up to F₇ generation. The selected hybridized lines were named as ANKGL1 to ANKGL7 (Table 1). All seven lines tested, matured within 3½ months period. Data on pod yield at station yield trials of GLORDC, Angunakolapelessa in 2014 *Yala* season revealed that the line developed by crossing ICGV 98396 with ICGV 10663 (ANKGL3) was significantly higher ($p < 0.05$) than all the other tested lines and check varieties. In 2014/15 *Maha* season also, it performed well when compared with other tested lines (Table1). Considering the yield and other agronomic traits, ANKGL2, ANKGL3 and ANKGL7 lines were selected for NCVT trials.

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Table 1. Average pod yield of selected peanut lines at GLORDC, Angunakolapelessa

Variety/line	Average pod yield (kg ha ⁻¹)	
	Yala 2014	Maha 2014/15
ANKGL1 (ICGV 98396 × Red Spanish-R)	1940 ^{ede}	1663 ^c
ANKGL2 (ICGV 98396 × Red Spanish)	2370 ^c	3421 ^a
ANKGL3 (ICGV 98396 × ICGV 10663)	4040 ^a	3082 ^{ab}
ANKGL4 (Walawa × Red Spanish-R)	1879 ^{ede}	2282 ^{bc}
ANKGL5 (Walawa × Red Spanish)	2192 ^c	1927 ^c
ANKGL6 (ICGV 98396 × ICGV 10667)	1307 ^e	3325 ^a
ANKGL7 (ICGV 97045 × Red Spanish)	3155 ^b	3238 ^a
Indi	2161 ^{cd}	2996 ^{ab}
Walawa	1434 ^{de}	2553 ^{abc}
LSD	734.58	945.02
CV%	18.6	20.0

Means followed by the same letter within a column are similar at $p = 0.05$

The lines tested in three seasons from 2015/16 *Maha* to 2017/18 *Maha* at seven research stations revealed that the pod yield ranged from 2.2-3.4 t ha⁻¹ for ANKGL3 (Table 2). Average ranking data on pod yield revealed that ANKGL3 was superior to other tested lines and check varieties except in 2015/16 *Maha*. The ANKGL3 line recorded higher yields due to its higher genetic potential than other tested lines.

Table 2. Average pod yield (t ha⁻¹) and adaptability rank (R) of selected Jumbo peanut lines compared to Walawa and Lanka Jumbo in NCVT trials

Season	No. of locations tested	Variety/line									
		ANKGL2		ANKGL3		ANKGL7		Walawa		Lanka Jumbo	
		Yield	R	Yield	R	Yield	R	Yield	R	Yield	R
2015/16 <i>Maha</i>	5	2.15	3	2.24	2	1.754	4	2.3	1		
2016 <i>Yala</i>	3	2.54	3	3.4	1	2.47	4	2	5	3	2
2017/18 <i>Maha</i>	3	1.4	3	2.8	1	0.73	4			2.5	2

R – Rank given by average ranking method

The NCVT data were analyzed separately for each location in each season using average ranking method (Table 2) and variance component method of analysis (Tables 3 to 5). In both 2016 *Yala* and 2017/18 *Maha* seasons, number of locations tested were limited due to several reasons including severe drought prevailed during the cropping seasons.

During 2015/16 *Maha*, both Walawa and ANKGL3 recorded the best adaptability rank than the other tested lines (Table 3). In 2016 *Yala*, the check variety Lanka Jumbo recorded the highest adaptability rank and ANKGL3 recorded the second highest adaptability rank (Table 4) while in 2017/18 *Maha* season, ANKGL3 recorded the highest adaptability rank over the other tested lines and check variety (Table 5). Variety with higher number of positive deviations, lower mean deviation and non-significant variance in deviations across locations was selected as the most adaptable variety in the test (Abey Siriwardena *et al.*, 1991). Hence, ANKGL3 showed higher adaptability than other tested lines and higher or similar adaptability than tested varieties.

Table 3. Adaptability parameters derived on variance component method in NCVT during 2015/16 *Maha* season

Variety/line	Average yield over 5 locations (t ha ⁻¹)	Adaptability parameters			
		No. of (+) deviations out of 5	Mean deviation over locations	Interaction variance	Adaptability rank
ANKGL2	2.154	3	0.033 ^a	0.033	3
ANKGL3	2.242	4	0.114 ^a	0.019	1
ANKGL7	1.754	1	0.366 ^b	0.101	4
Walawa	2.34	4	0.219 ^a	0.115	1

Means in each column followed by the same letter are not significantly different at p = 0.05

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Table 4. Adaptability parameters derived on variance component method in NCVT during 2016 Yala season

Variety/line	Average yield over 3 locations (t ha ⁻¹)	Adaptability parameters			
		Number of (+) deviations out of 3	Mean deviation over locations	Interaction variance	Adaptability rank
ANKGL2	2.54	0	-0.718 ^d	0.298	4
ANKGL3	3.36	1	0.307 ^b	0.260	2
ANKGL7	2.47	0	-0.142 ^c	0.162	4
Walawa	2.3	1	0.167 ^{bc}	0.199	3
Lanka Jumbo	3.04	3	1.031 ^a	0.189	1

Means in each column followed by the same letter are not significantly different at $p = 0.05$

Table 5. Adaptability parameters derived on variance component method in NCVT during 2017/18 Maha season

Variety/Line	Average yield over 3 locations (t ha ⁻¹)	Adaptability parameters			
		Number of (+) deviations out of 3	Mean deviation over locations	Interaction variance	Adaptability rank
ANKGL2	1.3994	0	-0.510 ^c	0.331*	3
ANKGL3	2.8057	2	0.897 ^a	1.375*	1
ANKGL7	0.7304	1	-0.993 ^d	1.761*	4
Lanka Jumbo	2.5137	2	0.606 ^b	1.030*	2

Mean in each column followed by the same letter are not significantly different at $p = 0.05$

*Significant interaction variance

When all data from different locations were considered, it was proved that ANKGL3 line performed similar or superior to the check varieties of Walawa and Lanka Jumbo. Hence, ANKGL3 peanut line was selected for VAT trial at farmer fields at different agro-ecological regions of the country.

The lines tested in two seasons at nine farmers' fields revealed that the pod yield ranged from 2.2 t ha⁻¹ to 4 t ha⁻¹ for ANKGL3 and 1.4 to 3.9 t ha⁻¹ for Lanka Jumbo (Table 6). Average yield of ANKGL3 at farmer fields was always superior to Lanka Jumbo and Walawa. Adaptability ranks which were given for each variety/line considering the distance from the maximum response and average yield discovered that ANKGL3 was superior to the check varieties (Tables 6 to 8).

Table 6. Average pod yield (t ha⁻¹) of ANKGL3 when compared with standard varieties Lanka Jumbo and Walawa at farmer fields in 2018 Yala and 2018/19 Maha seasons

Variety	2018 Yala				2018/19 Maha						Avg. yield
	L1	L2	L3	Avg. yield	L4	L5	L6	L7	L8	L9	
ANKGL3	3.6	2.9	2.2	3.2	2.5	2.2	3.5	3.2	3.0	4.0	3.07
Lanka Jumbo	2.7	1.9	1.6	2.1	2.5	1.8	2.7	2.2	1.4	3.9	2.43
Walawa					1.8	1.4	-	2.7	2.2	3.1	2.24

L1-Ampara, L2-Rajanganaya, L3- Siyambalanduwa, L4- Maduruketiya, L5- Handapanagala, L6- Komari, L7- Angunakolapelessa, L8- Karadiyanaru, L9- Jadura

Table 7. Mean and variance of the distance from the maximum response and the adaptability ranks of ANKGL3 and Lanka Jumbo in VAT under farmer field conditions during 2018 Yala season

Line/variety	Distance from maximum response		Average yield (t ha ⁻¹)	Adaptability rank
	Mean	Variance		
ANKGL3	0.06 ^b	0.0064	3.27	1
Lanka Jumbo	0.89 ^a	0.07148	2.09	2

Means followed by the same letter are not significantly different at p = 0.05

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Table 8. Mean and variance of the distance from the maximum response and the adaptability ranks of ANKGL3 and Lanka Jumbo in VAT under farmer field conditions during 2018/19 Maha season

Line/variety	Distance from maximum response		Average yield (t ha ⁻¹)	Adaptability rank
	Mean	Variance		
ANKGL3	0.3183 ^b	0.166215	3.07	1
Walawa	0.7920 ^{ab}	0.148196	2.24	3
Lanka Jumbo	0.9633 ^a	0.672061	2.43	2

Means followed by the same letter are not significantly different at p = 0.05

Overall, ANKGL3 has recorded 3.125 t ha⁻¹ average pod yield while that of Lanka Jumbo and Walawa was 2.52 t ha⁻¹ and 2.17 t ha⁻¹, respectively. As ANKGL3 recorded higher average yield than other peanut varieties.

Quality parameters of pods and seed maturity duration of ANKGL3 were compared with other large seeded varieties released for cultivation and it revealed that both Lanka Jumbo and ANKGL3 is ideal for confectionary industry while perfect matching with the existing cropping pattern of Sri Lanka (Table 9).

Table 9. Seed maturity duration and quality parameters of peanut pods

Parameter	ANKGL3	Lanka Jumbo	Walawa
No. of days to mature			
<i>Yala</i>	105	110	120
<i>Maha</i>	115	117	135
Shelling %	75	70	70-72
Pod size	Large	Large	Large
Seed size	Large	Large	Large
100 seed weight (g)	85-88	75-78	69-71
Sound mature seed (%)	70-72	68-70	72-74
Seed dormancy (weeks)	6	7	7

ANKGL3 line was screened for major pests and diseases under the field conditions along with the check varieties during 2018/19 *Maha* and 2019 *Yala* seasons. The diseases tested were collar rot, Bud Necrosis Disease (BND), leaf spot and rust, while the considered pests were aphids and thrips. It confirmed that ANKGL3 is resistant to collar rot while moderately resistant to BND and rust under field conditions. Furthermore, it was moderately resistant to thrips.

Proximate analysis indicated that ANKGL3 had higher crude fat percentage as 46.8 while for Lanka Jumbo it was 43.6 (Table 10).

Table 10. Proximate analysis of peanut

Variety	Moisture (%)	Fat (%) (Dry basis)	Ash (%)	Crude protein (%)	Crude fiber (%)	Carbohydrates (%)
ANKGL3	6.27±0.25	46.89±0.81	2.52±0.01	28.88±0.80	2.57±0.45	19.14
Lanka Jumbo	7.79±0.15	43.62±0.75	2.44±0.03	30.31±0.25	2.33±0.01	21.21
Walawa	6.10±0.01	47.24±0.86	2.57±0.01	29.70±0.79	3.35±0.29	17.14

Fatty acid profile of peanut varieties is shown in the Table 11. Peanut oil contains eight fatty acids, the two main fatty acids i.e. oleic and linoleic acids which are mono and poly-unsaturated fatty acids, respectively are present in ~2:1 ratio in normal peanuts and together these two fatty acids contributes about 80-85% of the total fatty acids (Moore and Knauff, 1989). Present study also showed similar results with the published data of peanut (Escobedo *et al.*, 2015; Moore and Knauff, 1989) (Table 11). Percentage of Unsaturated Fatty Acid (UFA) of ANKGL3 was 83.6 while 83.9, 82.2 and 81.1 for Lanka Jumbo, Walawa and Tissa, respectively. Data revealed that the higher UFA in ANKGL3 and other confectionary type peanut when compared to small seeded peanut variety, Tissa.

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Table 11. The average fatty acid values (%) of ANKGL3 with other peanut varieties

Variety/ line	Saturated fatty acid				Unsaturated fatty acid			
	C 16:0 Palmitic	C 18:0 Stearic	C 20:0 Arachidic	C 22:0 Behenic	C 24:0 Lignoceric	C 18:1 Oleic	C 18:2 Linoleic	C 20:1 Gadoleic
ANKGL3	10.31	2.55	1.27	1.24	0.91	55.23	27.35	1.09
Lanka Jumbo	10.91	2.45	1.12	1.05	0.49	58.02	24.91	1.04
Walawa	8.99	4.36	1.80	1.75	0.90	57.28	23.97	0.95
Tissa	12.34	3.26	1.40	1.22	0.67	45.16	35.15	0.80

The most abundant fatty acid in peanut is oleic acid, which was detected in the range of 45.2% for Tissa as the lowest to 58.0 % for Lanka Jumbo as the highest. The stability or shelf life of the oil and the oil crop products are highly dependent on its fatty acid composition, especially the oleic to linoleic ratio (O/L) and the proportion of unsaturated to saturated fatty acids (Bakal and Ariogluh, 2019). The O/L ratio had been identified as an indication for the stability of oil and the oil crop products. Hence, to identify the most suitable cultivar for the food industry, basically for confectionaries and snacks, this O/L ratio parameter determination is an important factor. As Jambunathan *et al.* (1992) suggested, O/L ratio of 1.6 or above is desirable for longer shelf life or high keeping quality. Walawa has shown the highest O/L value of 2.4 while the new candidate line ANKGL3 also recorded a value of 2 which was higher than 1.6 value showing its suitability for confectionary industry (Figure 1).

One of the characteristic feature identified through all these data were the medium size kernels (ANKG1 and Tissa) contained lower O/L ratio while the large kernels (Walawa, Lanka Jumbo and ANKGL3) contained higher O/L ratios. This may be a result of the genetic influence on the size of the kernel and the oleic and linoleic content. Further, Onemli (2012) suggested that late maturing types were generally higher in oleic and lower in linoleic acid levels. Hence, the keeping quality of the peanut products from large seeded varieties will be superior compared to other small seeded varieties.

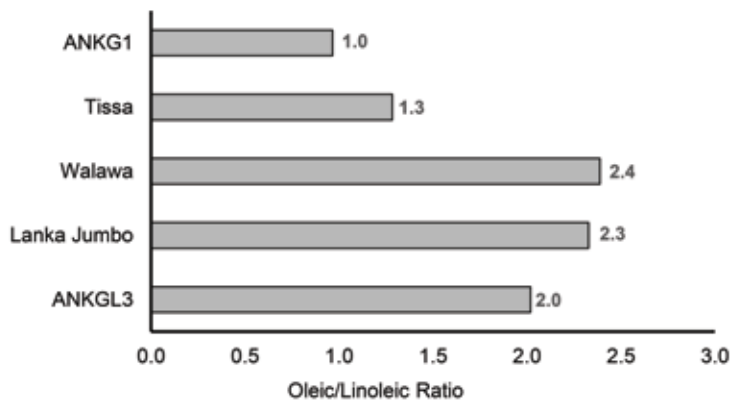


Figure 1. Oleic/Linoleic ratio of peanut varieties

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Consumer preference for the new candidate line ANKGL3 was tested and given in Table 12. Results indicated that both ANKGL3 and Lanka Jumbo were not significantly different when compared to imported Jumbo peanut products in the market. Color was more favorable in ANKGL3 and Lanka Jumbo than the commercial Jumbo peanut. Size, crunchiness and taste were similar to the commercial market product. Overall, all the varieties gave similar acceptability.

Table 12. Consumer preference on the taste and other related factors

Variety/Product	Color	Size of the nut	Crunchiness	Taste	Overall acceptability
Lanka Jumbo	2.00 ^a	2.00 ^a	2.00 ^a	2.00 ^a	1.90 ^a
ANKGL3	2.00 ^a	2.00 ^a	2.00 ^a	2.00 ^a	2.25 ^a
Market product	1.50 ^b	1.78 ^a	2.00 ^a	1.93 ^a	1.85 ^a
<i>Significance</i>	<i>0.014</i>	<i>0.159</i>	<i>0.779</i>	<i>0.863</i>	<i>0.387</i>

Means followed by the same letter within a coloum are not significantly different at p = 0.05

Considering the yield, physical and chemical attributes and fatty acid profile, ANKGL3 (ICGV 98396 × ICGV 10663) breeding line was identified as a superior peanut line for the confectionary industry and nominated to the variety releasing committee of the DOA in 2020 and it was released as a recommended peanut variety for general cultivation by renaming it as ANKGN3.

Conclusion

A promising Jumbo peanut line was developed by crossing ICGV 98396 peanut line with ICGV 10663 followed by the modified bulk method of selection. The new Jumbo peanut line matured at 3½ months with a potential yield of 4 t ha⁻¹ and the average yield >3 t ha⁻¹. It is a healthy Jumbo peanut type which has high oleic/linoleic ratio and higher unsaturated fatty acids. The keeping quality of the peanut products will be superior compared to other small seeded varieties. Further, the new line was resistant to collar rot and moderately resistant to bud necrosis disease and rust. ANKGL3 is well fitted in to the cropping pattern of the country. So that the candidate variety ANKGL3 has been released

by the variety releasing committee in 2020 by renaming it is as ANKGN3 considering its greater potential for increasing productivity of peanut farming systems in Sri Lanka.

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