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Evaluating of quality of groundnut seeds used for sowing by farmers in Saurashtra region of Gujarat

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Abstract

The present study was aimed to evaluate the quality of groundnut seeds used for sowing by farmers of Saurashtra region of Gujarat. One hundred nineteen seed samples of farmers saved seeds of groundnut were collected from 35 farmers of Devbhoomi Dwarka, 26 farmers of Jamnagar, 48 farmers of Morbi and 10 farmers of Rajkot districts of Gujarat. The study revealed that overall 83.20 per cent farmers' saved seed samples of groundnut was confirmed to the required seed standards for germination, moisture content, physical purity and seed health with respect to insect infestation; while, 90.00 per cent seed samples of groundnut had recorded equal or higher than 70 per cent field emergence. These suggested that the quality of groundnut seed used for sowing by farmers was satisfactory in Gujarat. Even though, seed quality was reflected in the yield performance of the crop. Hence, the farmers need to be more educated about the importance and advantages of using good quality seeds and be trained for maintaining the seed quality by adopting pre and post harvest measures so as to harvest good yields of the desired varieties.

Keywords: groundnut, seed quality, germination, moisture, physical purity, field emergence

Introduction

Groundnut (*Arachis hypogaea* L.) is an annual legume which is also known as peanut, earthnut, monkey-nut and goobers. It is the fourth most important oilseed crop of the world (Radha *et al.*, 2011) [13]. Groundnut crop is grown in more than 100 countries in the world. India, China, Nigeria, USA and Indonesia alone contribute to 74% of the total world production. China is the largest producer of groundnut followed by India. India contributes 19% of world production. It occupies an area of 6.41 million ha with a production of 9.82 million tonnes and possesses an average yield of 1.6 tonnes (Begum *et al.*, 2013) [3]. Gujarat is one of the largest groundnut producing state of India, with an area of 20 lakh hectare which is mostly grown under *Kharif* season and confined to Saurashtra and Kutch regions. Being a self-pollinated crop, groundnut seeds can be maintained for several generations without losing its genetic purity. In practice, however, progressive deterioration of original stock occurs through admixture with other varieties and species in cultivars' fields and in the threshing and processing yards. A small percentage of cross-pollination with other varieties cannot be ruled out. Farmers of Gujarat state generally use their own seeds for sowing of groundnut, harvested in the last season, which are stored in gunny bags and kept in common residential room, a traditional method of storage in the region. The groundnut seed are stored mostly in the form of pods and in small amount in kernels. Both are susceptible to attack of insects during storage. The primary damage in stored groundnut is mainly caused by the groundnut seed beetle, *Caryedon serratus* (Olivier), followed by secondary attack of other insect pests. Presently, *C. serratus* is occurring throughout India causing considerable damage to groundnut at farmers, traders and millers levels. In Gujarat state, this bruchid caused heavy losses up to 84 per cent during storage of groundnut (Anon., 1991) [1]. In Gujarat, majority of farmers are using Thiram, Captan or Diathan M-45 fungicides as a seed treatment at the time of sowing. Some farmers do not follow proper methods to maintain the purity of the seeds. Deterioration of seed quality takes place due to minor residual segregation, chance mutation, natural cross pollination and variety admixtures (Dahiya *et al.*, 1997) [4]. Therefore, a study was made to evaluate of quality of groundnut seeds used for sowing by farmers in Gujarat.

Materials and Methods

One hundred nineteen seed samples *viz.*, 35, 26, 48 and 10 samples of different varieties of groundnut were collected from different villages of Devbhoomi Dwarka, Jamnagar,

Morbi and Rajkot districts of Gujarat, respectively, during 6th June to 17th July, 2017 (Table 1). The number of seed samples comprised eleven bunch type (two sample of GG-2, one sample of TG-99 and eight sample of TG-45) and one hundred eight semi-spreading (13 samples of GJG-22 and 95 samples of GG-20) varieties of groundnut. The collected seed samples of groundnut were first tested for insect infestation (% seed infested) by visual counting and later on for physical purity as per method used by Kant (2001)^[9] and moisture and germination percentage according to standard procedures and rules for testing (Anon., 2008)^[2] at Seed Technology Research Unit, National Seed Project, Pearl millet Research Station, Junagadh Agricultural University, Jamnagar. For evaluating of quality of the farmers' seed samples, germination, moisture content and physical purity percentage were compared with the Indian Minimum Seed Certification Standards (IMSCS) of certified seeds as prescribed by Tunwar and Singh (1988)^[15]. Two hundred seeds were counted from each sample and sown on 3rd July, 2017 in field in two rows each of 10 meter and containing 100 seeds with inter and intra row spacing of 60 cm and 10 cm, respectively. The field emergence percentage was recorded by adopting following formula.

$$\text{Field emergence (\%)} = \frac{\text{Number of seedlings emerged}}{\text{Number of seeds sown}} \times 100$$

Results and Discussion

The seed quality parameters of 119 farmers' saved seed samples of groundnut are presented in Table 1. The seed quality status of all the groundnut seeds samples were found good with respect to germination, moisture content, physical purity, insect damage and field emergence percentage during *Kharif* 2017 (Table 1). The maximum germination per cent (98.67 %) was observed in one samples of GG-20 from Ganeshpar village of Morbi district. While, germination per cent was to be found the minimum (62.00 %) in one sample of GG-20 from lakhatar village of Morbi district. One hundred eight farmers' seed samples recorded germination percentage as per prescribed minimum seed certification standard (70 %). The average germination percentage was observed good (88.55 %) in the farmers' saved seed samples studied. This was in line with the findings of Lukose *et al.*, (1998)^[10], Dhedhi *et al.*, (2007)^[7], Ghelani *et al.*, (2010)^[8], Dhedhi *et al.*, (2011)^[6] and Dhedhi *et al.*, (2017)^[5] who reported that majority farmers' saved groundnut seed samples studied were registered germination percentage up to desired level. Prasad *et al.* (1994)^[12] reported that 81 per cent of groundnut seed samples met the minimum requirement of prescribed limit for germination. Rajendra Kumar *et al.* (2005)^[14] have also drawn similar conclusion through their study that 99 per cent seed samples of groundnut had germination above prescribed limit. Seed vigor index was observed from 188.00 to 1308.58 with an average 655.92. In the present investigation, the minimum percentage of seed moisture content (3.53 %) was exhibited in one samples, whereas, the maximum percentage of seed moisture content (5.65 %) was found in the seed sample of GG-20 collected from Ganeshpar village of Morbi district. Therefore, 100 per cent seed samples depicted seed moisture percentage less than prescribed maximum seed standards (9.0 %). The average seed moisture percentage was to be found 4.68 per cent. Similarly, results were observed in groundnut by Dhedhi *et al.*, (2011)^[6] and Dhedhi *et al.*, (2017)^[5].

The physical seed purity varied from 92.00 to 100 per cent. From all the seed samples studied, 112 samples were conformed to the prescribed minimum seed certification standard for purity (96.00 %). Similarly, seven farmers' seed samples manifested inert materials more than prescribed maximum seed standards (4.0 %). The inert matter varied from 0.00 to 8.00 per cent. These results are in agreement with the results reported by Narayanaswamy *et al.*, (1996)^[11], Dhedhi *et al.*, (2011)^[6] and Dhedhi *et al.*, (2017)^[5] in groundnut for physical purity and inert matters. In the present investigation, number of seeds of other crops varied from 0.00 to 2.00. Similarly, the number of weed seeds varied from 0.00 to 1.00. Out of 119 seed samples, three had number of weed seeds (one each from Vanavad and Ambardi villages of D. Dwarka district and Prabhunagar village of Morbi district), as they do not meet the minimum (zero) requirement of seed certification standard. Hence, 97.47 per cent seed samples of groundnut were observed free from weed seeds as they conformed to the minimum requirement of seed certification standard. Similar, results were reported by Dhedhi *et al.*, (2011)^[6] and Dhedhi *et al.*, (2017)^[5] in groundnut for other crop seeds and weed seeds.

In the present studied, insect seed damage ranged from 0.00 to 16.00 per cent. Among all the seed samples studied, 81 had free from insect damage and 38 samples shown incidence of groundnut seed beetle (*Caryedon serratus* (Oliver)). The highest percentage (16.00 %) of insect infestation (*C. serratus* infestation) was recorded in one seed samples (GG-20) from Navi pipar of Jamnagar district, which was manifested the lowest field emergence (59.00 %). Therefore, 32.00 per cent groundnut samples were infested with *C. serratus* and 68.00 per cent were absolutely free from bruchid damage. The average seed damage was observed 2.95 per cent in the farmers' saved seed samples. Ghelani *et al.*, (2010)^[8] observed that 48.5, 87.9, 63.6 and 87.5 per cent groundnut seed samples were found with infested of *C. serratus* during the year 2006, 2007, 2008 and 2009, respectively. Dhedhi *et al.*, (2017)^[5] reported that 81.71 per cent seed samples of groundnut were damaged with *C. serratus* during *Kharif* 2015.

The highest percentage of field emergence (93 %) was registered in one seed sample of GG-20 from Savdi village of Morbi district. The lowest percentage of field emergence (46.50 %) was recorded in GG-20 from Vanavad village of Devbhoomi Dwarka district. Among the 119 farmers' seed samples, only 10 samples recorded less than 70 per cent field emergence during the studied. The lower field emergence in these farmers' saved seed may be the result of relatively higher insect damage coupled with poor vigour because most of seed samples had more than the minimum requirement of 70 per cent germination in laboratory during the study. Similar results were reported by Ghelani *et al.*, (2010)^[8], Dhedhi *et al.*, (2011)^[6] and Dhedhi *et al.*, (2017)^[5] in groundnut.

In Gujarat, majority of farmers use their own saved seeds for sowing of groundnut crop in every year. The present study clearly showed that out of 119 farmers' seed samples, four samples for germination in laboratory, seven for physical purity and inert matter, seven for other crops seeds, three for weed seeds and eleven for field emergence were failed to meet the minimum requirement of certified seed standards. Overall, 83.20 per cent seed samples were conformed to meet the minimum requirement of certified seed standards for germination, seed moisture content, physical purity, inert matter, other crops seeds, weed seeds and field emergence.

Thus, the seeds of groundnut used for sowing by farmers of Devbhoomi Dwarka, Jamnagar, Morbi and Rajkot districts of Saurashtra region of Gujarat were of good quality with respect to germination, moisture content, physical purity, seed health (Insect infestation) and field emergence. Even though, seed quality was reflected in the yield performance of the

crop. Hence, the farmers of Gujarat state need to be more educated about the importance and advantages of using good quality seeds and be trained for maintaining the seed quality by adopting pre and post harvest measures so as to harvest good yields of the desired varieties.

Table 1: The seed quality parameters of farmers saved seeds of groundnut in Saurashtra region of Gujarat during *Kharif* 2017

S. No.	District	Taluka	Village	Name of farmer	Variety	Seed germination (%)	Seed moisture content (%)	Physical Purity				Insect damage (%)	Field emergence (%)	Seed vigour index
								Pure Seed (%)	Inert matter (%)	Other Crop Seeds (No.)	Weed seeds (No.)			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Jamnagar	Jodiya	Keshiya	Prfulbhai Dharamshibhai	GG 20	89.33	4.86	96	4	0	0	0.00	80.00	605.66
2	Jamnagar	Jodiya	Keshiya	Ramnkbhai Dharamshibhai	GG 20	89.67	4.48	95	5	0	0	6.00	73.00	285.15
3	Jamnagar	Jodiya	Lakhtar	Dharmendrabhai Kanjibhai	GG 20	90.00	4.22	98.5	1.5	0	0	4.00	74.50	835.20
4	Jamnagar	Jodiya	Lakhtar	Laljbhai Muljibhai	GG 20	83.33	4.8	99	1	0	0	1.00	75.50	681.64
5	Jamnagar	Jodiya	Lakhtar	Valiben Kanjibhai	GG 20	93.00	4.51	99	1	0	0	2.00	87.50	485.46
6	Jamnagar	Jodiya	Lakhtar	Govindbhai Muljibhai	GG 20	89.33	4.71	100	0	0	0	3.00	81.00	650.32
7	Jamnagar	Jodiya	Lakhtar	Vajiben Dhanjibhai	GG 20	84.00	4.69	100	0	0	0	1.00	76.50	233.52
8	Jamnagar	Jodiya	Lakhtar	Manjulaben Dhanjibhai	GG 20	62.00	4.52	99	1	0	0	2.00	64.50	198.40
9	Jamnagar	Jodiya	Lakhtar	Tarsibhai Dharsibhai Dalsa	GG 20	79.67	4.56	98	2	0	0	0.00	74.50	328.24
10	Jamnagar	Jodiya	Lakhtar	Tapu Nathabhai Chauhan	GG 20	78.33	4.67	100	0	0	0	2.00	65.00	374.42
11	Jamnagar	Dhrol	Motalata	Amarshi Dhanjibhai	GG 20	84.00	4.32	97	3	0	0	0.00	76.00	577.92
12	Jamnagar	Dhrol	MotaIntala	Rameshbhai Aambabhai	GG 20	83.67	4.29	100	0	0	0	1.00	75.00	322.97
13	Jamnagar	Dhrol	MotaGaredia	Arvindbhai Vallabhbbhai	GG 20	87.00	4.68	100	0	0	0	3.00	76.00	375.84
14	Jamnagar	Dhrol	MotaGaredia	Vallabhbbhai Meghjibhai	GG 20	90.67	4.37	99.5	0.5	0	0	0.00	83.00	380.81
15	Jamnagar	Dhrol	Mavapar	Chandrikaben Amarshibhai	GG 20	87.33	4.49	99	1	0	0	1	74.5	366.79
16	Jamnagar	Dhrol	MotaIntala	Mansambhai Dhanjibhai	GG 20	80.00	3.9	98	2	0	0	2.00	71.00	353.60
17	Jamnagar	Dhrol	Dhrol	Arvindbhai Dansrajbhai	GG 20	88.33	4.55	93	7	0	0	0.00	80.00	386.89
18	Jamnagar	Dhrol	Motavagudad	Amarshibhai Dhanjibhai	GG 20	76.67	4.52	97	3	0	0	0.00	70.00	320.48
19	Jamnagar	Dhrol	Nana Garedia	Bharatbhai Khimjibhai	GG 20	67.67	4.73	96	4	0	0	1.00	58.00	327.52
20	Jamnagar	Dhrol	Mavapar	Yogeshbhai Khimjibhai	GG 20	80.00	4.44	99	1	0	0	0.00	70.00	443.20
21	Jamnagar	Dhrol	MotaIntala	Vallabhbbhai Karsanbhai	GG-2	79.00	5.29	100	0	0	0	0.00	73.00	259.12
22	Jamnagar	Lalpur	NaviPipar	Sarojben Pruthviraj Chauhan	GG 20	73.00	5.35	98	2	0	0	16.00	59.00	283.24
23	Jamnagar	Lalpur	NaviPipar	Kanjibhai JesangbhaiGohel	GG 20	74.67	4.75	98	2	2	0	8.00	60.00	215.05
24	Jamnagar	Lalpur	NaviPipar	Arunaben Dilipsing	GG 20	74.67	5.61	99	1	0	0	2.00	64.50	370.36
25	Jamnagar	Lalpur	NaviPipar	Rameshk Kanjibhai Gohel	GG 20	87.33	4.44	96	4	0	0	9.00	73.50	342.33
26	Jamnagar	Lalpur	NaviPipar	Balu Vaghjibhai Chauhan	GG 20	75.00	5.11	100	0	0	0	0.00	68.00	286.50
27	D. Dwarka	Bhanvad	Dudhala	Devsibhai Jesabhai Solanki	GJG-22	78.67	4.98	96	4	0	0	1.00	73.50	333.56
28	D. Dwarka	Bhanvad	Dudhala	Ashokbhai Jesabhai Solanki	GJG-22	74.00	5.3	99	1	0	0	1.00	71.00	307.84
29	D. Dwarka	Bhanvad	Bhuvneshwar	Bharatbhai Zinabhai	GG 20	88.33	4.68	96	4	0	0	2.00	74.50	332.12
30	D. Dwarka	Bhanvad	Rentakalavad	Ashokbhai Arsibhai	GG 20	90.00	4.34	94	6	0	0	0.00	78.00	392.40
31	D. Dwarka	Bhanvad	Dudhala	Govabhai Veerabhai	GG 20	84.33	4.32	99	1	0	0	1.00	72.00	229.38
32	D. Dwarka	Bhanvad	Vanavad	NarendraBhai Naranbhai	GG 20	84.33	4.89	99	1	0	1	12.0	75.50	242.87
33	D. Dwarka	Bhanvad	Vanavad	Naranbhai Nathabhai Rathod	GG 20	86.67	4.56	99	1	0	0	4.00	76.00	294.68
34	D. Dwarka	Bhanvad	Vanavad	Nagjibhai Laljbhai Rathod	GG 20	89.67	5.07	98	2	0	0	1.00	75.50	430.42
35	D. Dwarka	Bhanvad	Vanavad	Dinesh Gopalbhai Rathod	GG 20	89.33	4.49	99	1	0	0	6.00	82.00	487.74
36	D. Dwarka	Bhanvad	Vanavad	Priykanth Devjibhai Rathod	GG 20	85.00	4.91	98	2	0	0	7.00	72.50	346.80
37	D. Dwarka	Bhanvad	Vanavad	GovindThakarshi madhudiya	GJG 22	84.33	4.94	98	2	0	0	3.00	76.00	364.31
38	D. Dwarka	Bhanvad	Vanavad	PravinsinhKalubhaJadeja	GG 20	81.67	5.44	100	0	0	0	4.00	72.00	316.88
39	D. Dwarka	Bhanvad	Vanavad	GovindbhaiJethabhai Rathod	GG 20	86.67	5.02	99	1	0	0	0.00	71.00	329.35
40	D. Dwarka	Bhanvad	Vanavad	Ramnik Meyabhai Rathod	GG 20	66.67	4.79	99	1	0	0	7.00	46.50	188.01
41	D. Dwarka	Bhanvad	Vanavad	ManilalManjibhai Parmar	GG 20	88.00	4.8	98	2	0	0	7.00	74.50	364.32
42	D. Dwarka	Bhanvad	Vanavad	Jamnaben Hardasbhai	GJG 22	86.67	4.85	99	1	0	0	5.00	71.00	372.68
43	D. Dwarka	Bhanvad	Vanavad	HemrajbhaiJerajbhai	GJG 22	77.67	4.91	98	2	1	0	2.00	70.50	507.96

	Dwarka			Rathod										
44	D. Dwarka	Bhanvad	Aambardi	SandipbhaiDevjibhai Parmar	GG 20	86.33	4.7	92	8	0	0	0.00	74.00	631.94
45	D. Dwarka	Bhanvad	Aambardi	Ghelabhai Virjibhai	GG 20	74.00	4.71	100	0	0	0	5.00	60.00	565.36
46	D. Dwarka	Bhanvad	Aambardi	HirjibhaiVastabhai Parmar	GG 20	91.00	5	97	3	0	0	0.00	80.50	706.16
47	D. Dwarka	Bhanvad	Aambardi	VitthalbhaiVastabhai Parmar	GG-2	73.33	5.38	96	4	0	0	0.00	59.00	470.78
48	D. Dwarka	Bhanvad	Aambardi	Bhikha Naranbhai Chauhan	GG 20	90.67	4.51	98	2	0	0	3.00	81.50	952.04
49	D. Dwarka	Bhanvad	Aambardi	Amrutlal Naranbhai chauhan	GG 20	83.00	4.58	99	1	0	1	0.00	75.00	509.62
50	D. Dwarka	Bhanvad	Aambardi	Babubhai Narshibhai	GG 20	87.33	4.64	99	1	0	0	6.00	72.00	415.69
51	D. Dwarka	Bhanvad	Aambardi	VitthalbhaiThakarshibhai	GG 20	62.33	4.4	98	2	0	0	7.00	79.50	499.89
52	D. Dwarka	Bhanvad	Aambardi	Kanabhai Narshibhai	GJG 22	87.00	5	100	0	0	0	0.00	73.50	650.76
53	D. Dwarka	Bhanvad	Verad	Natvarlal Ramjibhai Rathod	GJG 22	96.00	4.6	98	2	0	0	4.00	86.50	881.28
54	D. Dwarka	Bhanvad	Verad	Subhash Ramjibhai rathod	GJG 22	94.67	5.08	99	1	0	0	4.00	78.50	931.55
55	D. Dwarka	Bhanvad	Verad	Kacharabhai Muljibhai	GG 20	92.67	5.14	100	0	0	0	4.00	76.00	997.13
56	D. Dwarka	Bhanvad	Verad	Rameshbhai Bhanjibhai	GG 20	91.33	3.96	98	2	0	0	0.00	72.00	851.20
57	D. Dwarka	Bhanvad	Verad	Karamshibhai Bhanjibhai	GG 20	98.00	4	98	2	0	0	5.00	89.50	1123.08
58	D. Dwarka	Bhanvad	Verad	MaheshbhaiKacharabhai	GG 20	95.67	3.96	96	4	0	0	3.00	82.00	841.90
59	D. Dwarka	Bhanvad	Verad	Yogeshbhai Vallabbhai	GG 20	92.00	4.89	97	3	0	0	5.00	80.50	770.96
60	D. Dwarka	Bhanvad	Verad	Bavanjibhai Harjibhai	GG 20	96.67	5.03	98.5	1.5	0	0	0.00	85.50	827.50
61	D. Dwarka	Bhanvad	Verad	Vinodbhai Jivanbhai	GG 20	96.33	4.47	100	0	0	0	4.00	81.00	708.99
62	Morbi	Tankara	Ganeshpar	Ganeshbhai Savjibhai	GJG 22	94.67	5.32	98	2	0	0	0.00	83.50	772.51
63	Morbi	Tankara	Ganeshpar	Ganeshbhai Damjibhai	GJG 22	94.67	4.41	99	1	0	0	9.00	80.50	829.31
64	Morbi	Tankara	Ganeshpar	Vinodbhai Lavjibhai Dhedhi	GG 20	98.67	5.28	99	1	0	0	0.00	86.50	712.40
65	Morbi	Tankara	Ganeshpar	Gordhanbhai Narshibhai	GG 20	94.67	4.91	98	2	0	0	0.00	86.50	876.64
66	Morbi	Tankara	Ganeshpar	Balvantbhai Devjibhai	GG 20	95.33	4.51	98	2	0	0	1.00	84.50	964.74
67	Morbi	Tankara	Ganeshpar	Dhanjibhai Savjibhai i	GG 20	92.00	4.33	99.5	0.5	0	0	1.00	83.00	798.56
68	Morbi	Tankara	Ganeshpar	Kantilal Karsanbhai Bhagiya	GG 20	91.00	4.44	99	1	0	0	6.00	83.50	873.60
69	Morbi	Tankara	Ganeshpar	Aswin Karsanbhai Bhagiya	GG 20	95.33	4.7	100	0	0	0	1.00	85.50	943.77
70	Morbi	Tankara	Ganeshpar	Ghelabhai Mohanbhai	GG 20	96.00	4.79	97	3	0	0	0.00	88.50	869.76
71	Morbi	Tankara	Ganeshpar	Hirabhai Savjibhai ipalariya	GJG 22	93.67	4.4	96	4	0	0	0.00	84.50	839.28
72	Morbi	Tankara	Ganeshpar	Gordhanbhai Damjibhai	GJG 22	91.67	5.1	95	5	0	0	6.00	87.00	702.19
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
73	Morbi	Tankara	Ganeshpar	Aambabhai Jadabhai	GG 20	96.33	4.58	98	2	0	0	0.00	88.00	851.56
74	Morbi	Tankara	Ganeshpar	Ashokbhai Arjanbhai	GG 20	94.67	4.42	96	4	0	0	2.00	89.00	931.55
75	Morbi	Tankara	Ganeshpar	Hashmukhbhai Laxmanbhai	GG 20	75.00	5.65	97	3	1	0	0.00	67.00	720.00
76	Morbi	Tankara	Savdi	Jagdishbhai Tarshibhai	GG 20	93.67	4.77	98	2	0	0	4.00	90.00	893.61
77	Morbi	Tankara	Savdi	Dilipbhai Chakubhai	GG 20	92.33	4.55	99	1	0	0	0.00	86.00	878.98
78	Morbi	Tankara	Savdi	Pravin Veljibhai Bhagiya	GG 20	93.67	4.42	100	0	0	0	0.00	81.50	766.22
79	Morbi	Tankara	Savdi	Bhagvanjibhai Nanjibhai	GG 20	95.00	5.06	100	0	0	0	0.00	83.00	794.20
80	Morbi	Tankara	Savdi	Atulbhai Kuvarjibhai Devda	GG 20	95.33	4.27	99	1	1	0	1.00	83.50	676.84
81	Morbi	Tankara	Savdi	Valjibhai Tapubhai Palariya	GG 20	97.00	4.63	100	0	0	0	0.00	86.50	805.10
82	Morbi	Tankara	Savdi	Meghjibhai Karamshibhai	GG 20	98.33	4.65	99	1	0	0	0.00	93.00	1073.76
83	Morbi	Tankara	Prabhunagar	Bansibhai Aambabhai	GG 20	83.67	4.5	96	4	0	0	4.00	75.50	587.36
84	Morbi	Tankara	Prabhunagar	Shaileshbhai Dharamshibhai	GG 20	94.67	4.53	99	1	0	0	5.00	84.50	515.00
85	Morbi	Tankara	Prabhunagar	Haribhai Ramjibhai Bhagiya	GG 20	88.33	4.29	96	4	1	0	4.00	81.50	909.80
86	Morbi	Tankara	Prabhunagar	Vitthalbhai Ramjibhai	GG 20	86.67	4.56	97	3	0	1	0.00	77.00	736.70
87	Morbi	Tankara	Prabhunagar	Govini Pitambarbhai Devda	GG 20	92.33	4.83	100	0	0	0	4.00	84.50	598.30
88	Morbi	Tankara	Prabhunagar	Vasta Devjibhai Bhagiya	GG 20	94.33	4.44	98	2	0	0	0.00	87.00	581.07
89	Morbi	Tankara	Prabhunagar	AmarshiTarshibhai Bhagiya	GG 20	93.33	4.73	99	1	0	0	2.00	89.00	606.65
90	Morbi	Tankara	Prabhunagar	Pitambarbhai Dharamshibhai	GG 20	90.67	4.49	100	0	0	0	3.00	80.00	732.61
91	Morbi	Tankara	Prabhunagar	Popatbhai Dharamshibhai	GG 20	90.00	4.46	98	2	0	0	2.00	77.50	873.00
92	Morbi	Tankara	Prabhunagar	Damji Mohanbhai Bhagiya	GG 20	94.00	3.92	98	2	0	0	0.00	85.00	744.48
93	Morbi	Tankara	Prabhunagar	Savji Jadavjibhai Bhagiya	GG 20	93.33	4.2	100	0	0	0	0.00	85.50	860.50
94	Morbi	Tankara	Prabhunagar	Hitesh Sundarjibhai Devda	GG 20	94.33	4.6	97	3	0	0	0.00	82.00	1025.56

95	Morbi	Tankara	Prabhunagar	Ajay Chhaganbhai Devda	GG 20	98.33	4.2	100	0	0	0	3.00	91.50	843.67
96	Morbi	Tankara	Jivapar	Madha Savabhai Hapaliya	GG 20	94.33	4.3	98	2	0	0	2.00	84.00	899.91
97	Morbi	Tankara	Jivapar	Bhurabhai Ramjibhai	GG 20	95.00	4	99	1	0	0	4.00	81.50	1033.60
98	Morbi	Tankara	Jivapar	Ramjibhai Devabhai Daka	GG 20	93.00	4.2	100	0	0	0	0.00	82.50	1223.88
99	Morbi	Tankara	Jivapar	Sava Laxmanbhai Dhedhi	GG 20	89.67	4.29	99	1	0	0	13.00	84.50	663.56
100	Morbi	Tankara	Jivapar	Anilbhai Devshibhai Dhedhi	GG 20	95.00	4.32	100	0	0	0	4.00	83.00	976.60
101	Morbi	Tankara	Jivapar	Mohan Velabhai Hapaliya	GG 20	96.67	4.33	99	1	0	0	4.00	92.50	1003.44
102	Morbi	Tankara	Jivapar	Ravjibhai Savabhai Hapaliya	GG 20	95.33	4.82	100	0	0	0	3.00	87.00	844.62
103	Morbi	Tankara	Jivapar	Odhavji Mohanbhai Dhedhi	GG 20	93.00	3.53	98	2	0	0	12.00	85.00	660.30
104	Morbi	Tankara	Jivapar	Jasmat Mohanbhai Hapaliya	GJG 22	91.33	4.14	98	2	0	0	4.00	81.00	600.95
105	Morbi	Tankara	Jivapar	Jayaben Jasmatbhai	TG- 99	85.00	4.8	99	1	0	0	5.00	75.50	617.10
106	Morbi	Tankara	Jivapar	Kalyanji Devjibhai Daka	GG 20	97.00	4.25	97	3	0	0	8.00	92.00	1129.08
107	Morbi	Tankara	Jivapar	Mansukh Devjibhai Daka	GG 20	97.33	3.84	96	4	0	0	6.00	90.00	1099.83
108	Morbi	Tankara	Jivapar	Hemantbhai Devjibhai Daka	GG 20	92.67	3.79	92	8	0	0	7.00	81.00	502.27
109	Morbi	Tankara	Jivapar	Damjibhai Meghjibhai	GG 20	98.00	4.75	93	7	1	0	4.00	86.50	950.60
110	Rajkot	kandorana	Boriya	Dinesh Panchabhai Satasiya	GG 20	92.33	5.22	99	1	0	0	8.00	80.50	681.40
111	Rajkot	kandorana	Boriya	PanchaUkabhai Satasiya	GG 20	96.00	5.48	100	0	0	0	7.00	86.00	961.92
112	Rajkot	kandorana	Boriya	DigneshSavjibhaiBarvadiya	TG-45	86.00	5.61	100	0	0	0	0.00	76.00	908.16
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
113	Rajkot	kandorana	Boriya	Savji Madhabhai Barvadiya	TG-45	82.33	5.59	96	4	0	0	0.00	74.50	596.07
114	Rajkot	kandorana	Boriya	Kantibhai ambabhai satasiya	TG-45	93.67	5.59	99	1	0	0	0.00	83.50	1021.00
115	Rajkot	kandorana	Boriya	Ambabhai dudabhai satasiya	TG-45	97.33	5.34	97	3	0	0	2.00	92.50	1031.70
116	Rajkot	kandorana	Boriya	Veljibhai lavjibhai patoliya	TG-45	96.00	5.39	98	2	0	0	5.00	86.50	1004.16
117	Rajkot	kandorana	Boriya	Ranjanben veljibhai patoliya	TG-45	91.00	5.23	99	1	0	0	6.00	78.00	1308.58
118	Rajkot	kandorana	Boriya	Nanji gangdasbhai patoliya	TG-45	93.00	5.11	99	1	1	0	4.00	79.50	745.86
119	Rajkot	kandorana	Boriya	Vijaybhai Nanjibhai Patoliya	TG-45	96.00	5.35	98	2	0	0	8.00	85.00	933.12
Mean					--	88.55	4.68	98.16	1.84	0.07	0.03	2.95	78.55	655.92
Range					--	62.00 to 98.67	3.53 to 5.65	92.00 to 100	0.00 to 8.00	0.00 to 2.00	0.00 to 1.00	0.00 to 16.00	46.50 to 92.50	188.00 to 1308.58
Indian Minimum Seed Certification Standard (IMSCS) limits					--	70.00	9.00	96.00	4.00	Nil	Nil	--	70.00	--
No. of samples conforming to IMSCS					--	115	119	112	112	112	116	--	108	--

Where: GG= Gujarat Groundnut, GJG= Gujarat Junagadh Groundnut, TG= Trombay Groundnut, Note: Figure in parenthesis indicates number of farmers.

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