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Paper

## The quality of groundnut seeds used for sowing by farmers of Saurashtra and Kutch regions of Gujarat

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### ABSTRACT

The present study was aimed at testing the quality of seeds of groundnut used for sowing by farmers of Saurashtra and Kutch regions of Gujarat. Fifty six seed samples of farmers saved seeds of groundnut were collected from farmers of eight villages of Jamnagar, Rajkot and Kutch districts of Gujarat. The study revealed that 92.86 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, 82.14 per cent seed samples of groundnut had recorded higher than 70 per cent field emergence. These suggested that the quality of groundnut seed used for sowing by farmers was satisfactory in Saurashtra and Kutch regions of 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.

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**Key words :** Groundnut, Seed quality, Germination, Moisture, Physical purity

### INTRODUCTION

Gujarat is one of the main groundnut (*Arachis hypogaea* L.) producing state of India, with an area of 20 lakh hector which is mostly grown under *Kharif* 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. There is no special facility developed for seed storage. 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). Therefore, a study was made to determine the quality of groundnut seeds used for sowing by farmers of Saurashtra and Kutch regions of Gujarat.

### MATERIALS AND METHODS

Fifty six seed samples *viz.*, 8, 3, 4, 1, 3, 10, 16 and 11 samples of different varieties of groundnut were collected from farmers of Bhadra, Beru, Gunatitpur, Nakhatrana, Amardi, Kalyanpur, Jivapar and Ganeshapar villages, respectively, of different talukas of Jamnagar, Kutch and Rajkot districts before sowing of *Kharif* season of 2009 (Table 1). The number of seed samples were comprising three, thirty two and twenty one varieties of spreading (GG-13, Samudri and Western); semi-spreading (GG-20, Akshay-20); and bunch type groundnut (GG-2, GG-5, TG-26, TG-37 and Local varieties), respectively. 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)

and moisture and germination percentage according to standard procedures and rules for testing (ISTA, 1999) in laboratory at Seed Technology Research Unit, National Seed Project, Main Pearl millet Research Station, Junagadh Agricultural University, Jamnagar. For evaluating quality of the farmers' seed samples germination, moisture content and physical purity percentage were compared with the Indian Minimum Seed Certification Standards of certified seeds as prescribed by Tunwar and Singh (1988). Two hundred seeds were counted from each sample and sown on 13<sup>th</sup> July, 2009 in field in two rows each of 10 meter and containing 100 seeds with inter and intra row spacing of 50 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 status of 56 farmers' saved seed samples were observed and found very good with respect to germination, moisture content, physical purity, insect damage and field emergence percentage during *Kharif* 2009 (Table 1). The highest germination percentage (98 %) was observed in three samples of GG-20 of Bhadra village of Jodiya taluka (Jamnagar district). While, it was found lowest (75.50 %) in Akshay-20 of Jivapar village of Tankara taluka (Rajkot district). Hence, all the 56 farmers' seed samples recorded germination percentage more than prescribed minimum seed certification standard (70 %). The average germination percentage was observed very good (93.22 %) in the farmers' saved seed samples studied. The minimum percentage of seed moisture content (3.40 %) was exhibited in one sample of GG-2 from Bhadra village of Jamnagar district, whereas, the maximum percentage of seed moisture content (5.0 %) was found in three seed samples, one each from Beru (GG-2), Amardi (TG-37) and Jivapar village (GG-20). Therefore, all the 56 farmers' seed samples depicted seed moisture percentage less than prescribed maximum seed standards (9 %). The mean for moisture content was to be found 4.51 per cent. The physical seed purity varied from 95.10 to 100 per cent. Among the seed samples, two seed samples of GG-20, one each from Kalyanpur and Ganeshpar villages had fell below the certification standard (96 %) for purity. Thereby 96.43 per cent seed samples were conformed to the prescribed minimum seed certification standard for purity. Narayanaswamy *et al.*, (1996) also came to the same conclusion through his

observations that 92 per cent of groundnut samples were met the minimum requirement of seed standard for physical purity. Among the 56 farmers' seed samples, two samples of GG-20 exhibited inert matter more than the certification limits of 4.00 per cent. Thirteen seed samples (seven of GG-20, two of GG-5, one sample each from GG-13, GG-2, TG-26 and TG-37) had not shown any inert matter in their samples *i.e.* free from inert materials. From all the seed samples studied, one sample of GG-20 from Bhadra village of Jamnagar district and one sample of Local variety from Kalyanpur village of Rajkot district had more number of seeds of other crops, as they do not meet the minimum requirement of seed certification standard. In the present study, all the seed samples were observed free from weed seeds as they conformed to the minimum requirement of seed certification standard. All the seed samples had shown low incidence of groundnut seed beetle (*Caryedon serratus* (Oliver)) during the studied. The highest percentage of insect infestation (6.00 %) was recorded in two samples *viz.*, GG-5 and Akshay-20 from Beru village (Kutch district) and Jivapar village (Rajkot district), respectively, during the study. Among all the seed samples, six samples (four from GG-20, one each from GG-2 and TG-37) from different villages were observed free from insect-pest damage during the study.

The highest percentage of field emergence (80 %) was registered in GG-2 from Jivapar village of Rajkot district. While, the lowest percentage of field emergence (61.50 %) was recorded in two seed samples *viz.*, Samudri and Akshay-20, from Bhadra and Jivapar villages, respectively. Among the 56 farmers' seed samples, only ten (17.86 %) seed samples recorded less than 70 per cent field emergence during the study. The lower field emergence in these farmers' saved seed may be the result of relatively higher insect damage coupled with poor vigour because all the seed samples had more than the minimum requirement of 70 per cent germination in laboratory during the study. The present results are in close correspondence with findings of Lukose *et al.* (1998) and Dhedhi *et al.* (2007) who reported that majority farmers' saved seed samples studied were registered germination percentage up to desired level in groundnut. Prasad *et al.* (1994) reported that 81 per cent of groundnut seed samples met the minimum requirement of prescribed limit for germination. Rajendra Kumar *et al.* (2005) have also drawn similar conclusion through their study that 99 per cent seed samples of groundnut had germination above prescribed limit.

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 56 farmers' seed

No.	Number of Farmers	District	Village	Farmer's Seed	Common Seed	Moisture Content (%)	Physiological purity (%)	Infestation by Mites (%)	Seeds of other crops (No.)	Wood seeds (No.)	Seed Damage (%)	Seed Impurity (%)
1.	2	Jamsheder	3	1	6	1	8	9	10	11	12	13
1.	1	Jamsheder	Jodhya	CC 20	98.0	3.60	99.50	0.50	0	0	0	76.5
2.	2	"	"	CC 2	96.5	3.70	99.70	0.30	0	0	1	73.5
3.	3	"	"	CC 20	96.0	3.70	99.80	0.20	0	0	2	76.0
4.	4	"	"	CC 20	98.0	3.70	100	0	30	0	2	77.5
5.	5	"	"	CC 20	98.0	3.85	100	0	0	0	0	77.0
6.	6	"	"	CC 20	95.5	3.97	100	0	0	0	2	75.0
7.	7	"	"	Samant*	85.0	3.80	97.30	2.70	0	0	5	61.5
8.	8	"	"	CC 20	97.0	3.80	99.00	1.00	0	0	3	77.5
9.	9	Kolan	Nakarna	CC 2	93.0	5.00	98.30	1.70	0	0	2	77.5
10.	10	"	"	CC 2	96.0	4.70	97.80	2.20	0	0	2	75.0
11.	11	"	"	CC 5	82.0	4.00	100	0	0	0	6	68.5
12.	12	"	Bhadra	CC 5	97.0	4.00	100	0	0	0	2	77.0
13.	13	"	"	CC 2	87.0	4.70	98.50	1.50	0	0	5	68.0
14.	14	"	"	CC 37	83.0	4.50	99.50	0.50	0	0	7	66.5
15.	15	"	"	CC 37	97.0	4.70	99.60	0.70	0	0	2	77.5
16.	16	"	Nakarna	CC 37	86.0	4.70	100	0	0	0	3	65.0
17.	17	"	Bhadra	CC 37	88.0	4.50	99.70	0.60	0	0	2	66.0
18.	18	"	"	CC 2	97.0	4.70	96.70	3.60	0	0	1	77.0
19.	19	"	"	CC 37	95.0	5.00	99.50	0.50	0	0	0	75.5
20.	20	Rayachoti	Chandera	CC 20	97.0	4.70	100	0	0	0	1	70.0
21.	21	"	"	CC 20	97.0	4.55	95.10	1.90	0	0	0	76.0
22.	22	"	"	CC 20	96.5	4.30	99.20	0.80	0	0	1	75.5
23.	23	"	"	CC 20	87.5	4.59	97.70	2.60	0	0	7	66.0
24.	24	"	"	CC 20	96.5	4.50	100	0	0	0	2	77.0
25.	25	"	"	CC 20	92.5	4.67	99.60	0.70	0	0	1	72.5
26.	26	"	"	Nakay 20*	95.5	4.70	98.30	1.70	0	0	1	75.5
27.	27	"	"	CC 20*	91.5	4.67	99.70	0.30	70	0	2	69.5
28.	28	"	"	CC 20	93.5	4.77	97.20	2.80	0	0	2	75.0
29.	29	"	"	CC 26	95.5	4.70	100	0	0	0	1	75.5

Table 1 contd....

Table 1. (Continue...)

1	2	3	4	5	6	7	8	9	10	11	12	13
30.	Reg'ed	1	1	CC 20	97.5	1/6	98.70	1.30	0	0	2	69.5
31.	"	"	"	CC 2	93.5	1/1	99.50	0.50	0	0	2	75.0
32.	"	"	"	Arisey 20*	75.5	1/82	99.00	1.00	0	0	6	61.5
33.	"	"	"	CC 2	96.5	1/83	1.00	0	0	0	1	75.0
34.	"	"	"	CC 20	95.5	1/70	99.70	0.30	0	0	2	77.5
35.	"	"	"	CC 20	97.5	1/70	98.70	1.30	0	0	2	78.0
36.	"	"	"	CC 20	96.5	1/50	99.60	0.70	0	0	3	77.0
37.	"	"	"	Arisey 20*	96.5	1/25	97.50	2.50	0	0	3	78.5
38.	"	"	"	CC 20	86.5	1/20	99.80	0.20	0	0	2	73.5
39.	"	"	"	CC 20	95.5	1/50	99.10	0.90	0	0	2	78.0
40.	"	"	"	CC 2	97.5	1/90	99.20	0.80	0	0	2	80.0
41.	"	"	"	CC 20	93.5	5/60	97.90	2.10	0	0	2	73.5
42.	"	"	"	CC 20	92.5	1/72	99.00	1.00	0	0	3	76.5
43.	"	"	"	Arisey 20*	97.5	1/90	99.20	0.80	0	0	2	77.5
44.	"	"	"	Wardham*	96.5	1/90	99.00	1.00	0	0	1	79.0
45.	"	"	"	CC 20	97.5	1/80	1.00	0	0	0	2	79.0
46.	"	"	"	CC 20	88.5	1/70	99.00	1.00	0	0	2	75.5
47.	"	"	"	CC 2	96.5	1/95	98.70	1.60	0	0	0	77.5
48.	"	"	"	CC 20	95.5	1/80	99.20	0.80	0	0	0	75.0
49.	"	"	"	CC 20	96.5	1/96	95.50 <sup>0</sup>	1.50 <sup>0</sup>	0	0	1	72.0
50.	"	"	"	CC 13	93.5	1/65	1.00	0	0	0	2	75.5
51.	"	"	"	CC 20	97.5	1/98	1.00	0	0	0	1	77.5
52.	"	"	"	CC 20	95.5	1/95	99.70	0.30	0	0	1	77.5
53.	"	"	"	CC 20	95.5	1/90	99.00	1.00	0	0	2	77.5
54.	"	"	"	CC 2	97.5	1/70	96.50	3.50	0	0	3	72.5
55.	"	"	"	CC 20	96.5	1/50	99.80	0.20	0	0	2	73.5
56.	"	"	"	CC 20	97.5	1/50	99.00	1.00	0	0	3	72.5
				Average	93.22	1/51	98.98	1.02	0.18	0.00	2.02	73.73
				Range	75.50	3/0	95.10	0.00	0.00	0.00	0.00	61.50
				CVSCS limits	98.00	5/00	1.00	1.90	7.00	0.00	6.00	80.00
				Number of samples conforming to standard	70.00	9/00	96.00	1.00	N/A	N/A	N/A	N/A
				CVSCS limits	56	5/6	57	57	57	57	56	56

\* Arisey 20, Wardham, CVSCS limits, Range, Average, Number of samples conforming to standard, CVSCS limits, Range, Average, Number of samples conforming to standard

samples, only four samples, two for physical purity (GG-20) and two for other crops seeds (GG-20, Local variety) were failed to meet the minimum requirement of certified seed standards. Thus, the seeds of groundnut used for sowing by farmers of Saurashtra and Kutch regions 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.

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