7. Biochemistry

7.1 Evaluation of important breeding materials for nutritional quality index (NQI) of oil.
Number of Parameters: 04

1. Fatty acid profiling **(Palmitic acid, stearic acid, Oleic acid, Linoleic acid, Linolenic acid, Eicosenoic acid, erucic acid)**
2. ω6/ω3,
3. Oil stability index,
4. SFA: MUFA: PUFA

Centers: Bharatpur, Ludhiana, Kangra, Pantnagar, and Hisar
KRANTI (National Check) and PDZ-1(Quality check)

7.1.1 Fatty Acid Profiling

Entries of IVT/AVT quality trials were analysed for fatty acid profile at Bharatpur, Kangra, Pantnagar, Hisar and Ludhiana. The fatty acid profile of thirty-one genotypes, as evaluated by gas chromatograph, revealed palmitic and stearic acid as major saturated fatty acids, Whereas, oleic, linoleic and linolenic acid constituted prominent unsaturated but desirable fatty acids from nutritional stand point. However, erucic acid was found less then 2% in some of the genotypes. The extent of variation in these fatty acids is depicted below for ready reference

RCH 1, GSH 16-99, LEC 61, PDZ 13, RH(OE) 1705, JC 21, GSH 1707, RH(OE) 1710, RH(OE) 1711, PDZ 1, PM 29, PM 30, LES 60, LES 59 and LES 54 had < 2 % erucic acid content. **Palmitic acid:** Mean values ranged from 2.71% (PT-2015-6) to 4.27 % (GSH-17-17). **Stearic acid**: 0.76 % (PT 2015-6) to 2.08% (PDZ 1). **Oleic acid:** 9.71 % (PRE 2017-5) to 43.62 % (GSH 1707). **Linoleic acid:** 15.04 % (PR 2016-8) to 40.05 % (LEC 61). **Linolenic acid:** 11.39 % (PT 2015-7) to 25.84 % (RH (OE) 1711). **Eicosanoic acid**: 4.76 % (RH (OE) 1711) to 11.50 % (GSH 21-80).

7.1.2 ω6:ω3 ratio ranged from 1.05 (PRE 2017-5) to 3.06 (LES 59).

7.1.3 Oil Stability Index of Quality

Oil stability index, which is the ratio of MUFA: PUFA was analyzed at five centres (Bharatpur, Ludhiana, Kangra, Pantnagar, and Hisar). On the basis of mean estimates, it ranged from 0.40 in PR 2016-4 to 1.57 in GSH 16-99 (Table 1).

7.1.4 The SFA: MUFA: PUFA ratio ranged between 1:07:09 (GSH 21-80) to 1:24:10 (PT 2015-6). (Table 2- 10)

7.2. Value addition screening in seed meal of promising breeding materials

Number of Parameters: 05

1. Protein content
2. methionine
3. tryptophan
4. β-carotene
5. Total Antioxidant content

Centres: Bharatpur, Kangra, Pantnagar, Hisar, Ludhiana

KRANTI (National Check) and PDZ 1(Quality check)

Thirty one genotypes of promising breeding materials from seed meal were evaluated for protein content. **Total Protein:** 28.42 (JC 21) to 35.53% (RH (OE) 1706). **Methionine:** 1.28 (JC-33) to 2.08 (LEC 61, RH (OE) 1711) g/100g protein. **Tryptophan:** 0.81 (LES 54) to 1.25 (PR 2017-7) g/100g protein (Table 11-15). **Total antioxidant capacity** ranged from 15.04 (PDZ 1) to 26.01 (JC 21) mg/g AAE. **β-carotene** ranges from 2.80 (PDZ 13) to 5.22 (PRC 2017-5).

7.3. Screening of anti-nutritional factors in quality breeding materials

Number of Parameters:

1. Total Glucosinolates
2. Phytic acid

Centres: Bharatpur, Kangra, Pantnagar, Hissar, Ludhiana

Entries of IVT/AVT quality trials were evaluated at Bharatpur, Ludhiana, Kangra, Pantnagar, and Hisar.

- **Total Glucosinolates**
  Variations in glucosinolate content were observed from 10.89 to 99.42 µmole/g defatted meal for five centres (Bharatpur, Pantnagar, Kangra, Ludhiana, Hisar). It was observed <30 µmol/g in GSH 21-80, GSH 17-17, RCH 1, GSH 16-99, PDZ 13, JC 21, GSH 1707 and JC 33 genotypes.
- **Phytic acid content** mean values were < 2% in LEC 61, JC 21, RH(OE) 1706, RH(OE)-1711, PRE 2017-5 and PRL 2017-5 (Table 16-17).

Table 1: Oil Stability Index (OSI)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	1.33	1.29	1.18	1.19	1.28	1.25
2	BIOCHEM-19-2	GSH 17-17	1.68	1.55	1.12	1.27	1.44	1.41
3	BIOCHEM-19-3	RCH 1	1.00	0.95	0.93	1.11	1.06	1.01
4	BIOCHEM-19-4	GSH 16-99	1.73	1.53	1.58	1.37	1.62	1.57
5	BIOCHEM-19-5	LEC 61	0.73	0.86	0.89	0.74	0.68	0.78
6	BIOCHEM-19-6	PDZ 13	0.84	0.91	0.75	0.85	0.80	0.83
7	BIOCHEM-19-7	RH9OE) 1705	1.17	1.16	0.66	1.11	1.09	1.04
8	BIOCHEM-19-8	JC 21	1.23	1.25	1.09	1.17	1.12	1.17
9	BIOCHEM-19-9	GSH 1707	1.24	1.39	1.42	1.29	1.29	1.33
10	BIOCHEM-19-10	JC 33	1.15	1.18	1.07	1.11	1.11	1.12
11	BIOCHEM-19-11	PM 29	1.06	1.12	0.83	1.12	1.13	1.05
12	BIOCHEM-19-12	PM 30	1.20	1.30	1.29	1.27	1.20	1.25
13	BIOCHEM-19-13	LES 60	0.76	0.86	0.91	0.82	0.73	0.82
14	BIOCHEM-19-14	LES 59	0.99	1.07	1.07	1.04	1.03	1.04
15	BIOCHEM-19-15	LES 54	0.97	0.90	0.76	1.04	0.99	0.93
16	BIOCHEM-19-16	PDZ 1	1.26	1.27	1.06	1.25	1.32	1.23
17	BIOCHEM-19-17	RH(OE) 1706	0.92	0.91	0.86	0.99	0.93	0.92
18	BIOCHEM-19-18	RH(OE) 1710	1.02	1.02	1.06	1.09	1.05	1.05
19	BIOCHEM-19-19	RH(OE) 1711	0.71	0.70	0.68	0.81	0.71	0.72
20	BIOCHEM-19-20	PDZ 1	1.29	1.32	1.15	1.28	1.22	1.25
21	BIOCHEM-19-21	Kranti	0.74	0.63	0.65	0.69	0.67	0.68
22	BIOCHEM-19-22	PRE 2017-5	0.44	0.54	0.62	0.59	0.54	0.55
23	BIOCHEM-19-23	PRE 2017-2	0.63	0.64	0.70	0.61	0.57	0.63
24	BIOCHEM-19-24	PRB 2015-2	0.39	0.56	0.65	0.60	0.52	0.54
25	BIOCHEM-19-25	PT 2015-6	0.73	0.81	0.59	0.77	0.65	0.71
26	BIOCHEM-19-26	PRL 2016-5	0.59	0.58	0.88	0.70	0.71	0.69
27	BIOCHEM-19-27	PR 2016-8	0.59	0.75	0.68	0.62	0.57	0.64
28	BIOCHEM-19-28	PRL 2017-5	0.69	0.84	0.82	0.66	0.65	0.73
29	BIOCHEM-19-29	PR 2017-7	0.49	0.40	0.64	0.53	0.40	0.49
30	BIOCHEM-19-30	PT 2015-7	1.05	0.87	0.62	0.64	0.87	0.81
31	BIOCHEM-19-31	PR 2016-4	0.45	0.39	0.38	0.42	0.37	0.40

Table 2: Palmitic acid (%) (C16:0)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	4.31	5.01	3.1	3.93	4.14	4.10
2	BIOCHEM-19-2	GSH 17-17	3.89	4.79	3.4	4.37	4.9	4.27
3	BIOCHEM-19-3	RCH 1	4.01	3.88	2.8	3.94	3.29	3.58
4	BIOCHEM-19-4	GSH 16-99	3.88	4.1	3.6	4.11	3.61	3.86
5	BIOCHEM-19-5	LEC 61	3.13	4.27	3.6	3.47	2.93	3.48
6	BIOCHEM-19-6	PDZ 13	3.41	4.19	0.9	4.37	4.6	3.49
7	BIOCHEM-19-7	RH9OE) 1705	3.3	3.74	3.3	4.40	3.05	3.56
8	BIOCHEM-19-8	JC 21	3.16	4.1	2.3	4.28	3.92	3.55
9	BIOCHEM-19-9	GSH 1707	3.6	4.1	3.6	4.44	3.4	3.83
10	BIOCHEM-19-10	JC 33	4.05	3.51	2.3	3.78	3.77	3.48
11	BIOCHEM-19-11	PM 29	3.1	3.35	2.6	4.54	4.11	3.54
12	BIOCHEM-19-12	PM 30	3.56	4.23	3.2	3.88	3.47	3.67
13	BIOCHEM-19-13	LES 60	3.34	4.1	3.2	4.18	3.49	3.66
14	BIOCHEM-19-14	LES 59	4.09	3.92	3.4	4.79	4.21	4.08
15	BIOCHEM-19-15	LES 54	3.21	4.12	3	3.04	3.48	3.37
16	BIOCHEM-19-16	PDZ 1	3.84	3.26	0.4	4.51	4.07	3.22
17	BIOCHEM-19-17	RH(OE) 1706	3.56	4.1	3.3	3.65	3.33	3.59
18	BIOCHEM-19-18	RH(OE) 1710	3.2	3.28	3.3	3.98	4.43	3.64
19	BIOCHEM-19-19	RH(OE) 1711	4.01	3.56	3.4	3.92	3.17	3.61
20	BIOCHEM-19-20	PDZ 1	3.88	4.21	0.1	4.52	4	3.34
21	BIOCHEM-19-21	Kranti	3.1	2.8	2.8	2.70	2.66	2.81
22	BIOCHEM-19-22	PRE 2017-5	3.17	3.36	2.8	3.65	3.2	3.24
23	BIOCHEM-19-23	PRE 2017-2	3.29	3.44	2.7	3.73	3.72	3.38
24	BIOCHEM-19-24	PRB 2015-2	3.55	3.79	2.8	2.40	3.36	3.18
25	BIOCHEM-19-25	PT 2015-6	3.07	2.53	2.8	2.40	2.76	2.71
26	BIOCHEM-19-26	PRL 2016-5	3.14	3.54	2.6	2.58	2.72	2.92
27	BIOCHEM-19-27	PR 2016-8	3.56	3.26	2.8	2.84	2.74	3.04
28	BIOCHEM-19-28	PRL 2017-5	3.06	3.1	2.6	2.48	2.97	2.84
29	BIOCHEM-19-29	PR 2017-7	2.39	3.34	3.1	2.69	2.22	2.75
30	BIOCHEM-19-30	PT 2015-7	3.86	4.1	2.8	2.47	3.19	3.28
31	BIOCHEM-19-31	PR 2016-4	3.38	3.45	3.2	4.35	3.01	3.48

Table 3: Stearic acid (%)

(C18:0)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean *
1	BIOCHEM-19-1	GSH 21-80	0.66	0.48	2.4	0.88	0.56	1.00
2	BIOCHEM-19-2	GSH 17-17	0.31	0.56	2.6	0.99	0.64	1.02
3	BIOCHEM-19-3	RCH 1	0.29	0.61	2.8	0.66	0.37	0.95
4	BIOCHEM-19-4	GSH 16-99	0.49	0.39	2.2	0.77	0.56	0.88
5	BIOCHEM-19-5	LEC 61	0.34	0.64	2.5	0.85	0.53	0.97
6	BIOCHEM-19-6	PDZ 13	0.55	1.01	6.3	0.72	0.66	1.85
7	BIOCHEM-19-7	RH9OE) 1705	0.51	0.35	3	0.79	0.71	1.07
8	BIOCHEM-19-8	JC 21	0.37	0.23	3	0.70	0.56	0.97
9	BIOCHEM-19-9	GSH 1707	0.65	0.38	2.5	0.64	0.56	0.95
10	BIOCHEM-19-10	JC 33	0.38	0.58	2.6	0.60	0.63	0.96
11	BIOCHEM-19-11	PM 29	0.6	0.66	3	1.05	0.9	1.24
12	BIOCHEM-19-12	PM 30	0.33	0.71	2.7	1.18	0.96	1.18
13	BIOCHEM-19-13	LES 60	0.29	0.39	2.9	0.61	0.51	0.94
14	BIOCHEM-19-14	LES 59	0.48	1.49	2.5	1.54	1.06	1.41
15	BIOCHEM-19-15	LES 54	0.33	1.01	3	0.95	1.07	1.27
16	BIOCHEM-19-16	PDZ 1	0.24	0.31	5.7	1.42	0.64	1.66
17	BIOCHEM-19-17	RH(OE) 1706	0.47	1.05	2.7	0.92	0.94	1.22
18	BIOCHEM-19-18	RH(OE) 1710	0.27	0.34	3	0.41	0.26	0.86
19	BIOCHEM-19-19	RH(OE) 1711	0.35	0.7	3	0.69	0.41	1.03
20	BIOCHEM-19-20	PDZ 1	0.44	0.91	6.5	1.60	0.96	2.08
21	BIOCHEM-19-21	Kranti	0.29	0.89	1.8	1.36	0.81	1.03
22	BIOCHEM-19-22	PRE 2017-5	0.42	0.43	1.8	0.88	0.46	0.80
23	BIOCHEM-19-23	PRE 2017-2	0.96	0.36	1.9	1.03	0.42	0.93
24	BIOCHEM-19-24	PRB 2015-2	0.28	0.69	1.8	0.97	0.57	0.86
25	BIOCHEM-19-25	PT 2015-6	0.3	0.24	1.7	0.95	0.59	0.76
26	BIOCHEM-19-26	PRL 2016-5	0.81	0.35	1.8	0.97	0.39	0.86
27	BIOCHEM-19-27	PR 2016-8	0.4	0.33	1.8	1.05	0.48	0.81
28	BIOCHEM-19-28	PRL 2017-5	1.01	0.49	1.7	0.84	0.3	0.87
29	BIOCHEM-19-29	PR 2017-7	0.3	0.56	2	1.08	0.45	0.88
30	BIOCHEM-19-30	PT 2015-7	0.49	0.69	1.7	0.89	0.51	0.86
31	BIOCHEM-19-31	PR 2016-4	0.36	0.81	2	1.45	0.85	1.09

Table 4: Oleic acid (%)

(C18:1)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean *
1	BIOCHEM-19-1	GSH 21-80	37.85	38.19	34.5	35.50	36.44	36.99
2	BIOCHEM-19-2	GSH 17-17	44.12	45.29	36	41.63	43.24	43.33
3	BIOCHEM-19-3	RCH 1	35.31	32.62	40.3	37.26	36.56	35.94
4	BIOCHEM-19-4	GSH 16-99	43.98	42.32	35	42.18	45.88	43.21
5	BIOCHEM-19-5	LEC 61	30.1	33.85	32.89	29.29	27.68	32.48
6	BIOCHEM-19-6	PDZ 13	30.21	33.15	36.92	32.87	31.31	33.14
7	BIOCHEM-19-7	RH9OE) 1705	36.49	36.66	40.35	37.39	37.13	36.92
8	BIOCHEM-19-8	JC 21	40.96	42.55	40.4	40.67	40.26	41.11
9	BIOCHEM-19-9	GSH 1707	43.49	45.1	33	42.54	44.84	43.62
10	BIOCHEM-19-10	JC 33	40.45	41.56	39.43	37.93	39.09	39.13
11	BIOCHEM-19-11	PM 29	37.32	39.15	38.09	40.23	39.81	39.13
12	BIOCHEM-19-12	PM 30	38.44	39.1	40	38.49	37.05	38.27
13	BIOCHEM-19-13	LES 60	28.35	30.44	31.78	29.72	27.28	31.45
14	BIOCHEM-19-14	LES 59	38.31	40.56	13.56	38.02	39.23	39.53
15	BIOCHEM-19-15	LES 54	34.98	35.29	39	35.01	37.03	36.83
16	BIOCHEM-19-16	PDZ 1	42.45	42.16	40	41.15	43.68	41.87
17	BIOCHEM-19-17	RH(OE) 1706	30.39	31.13	39	32.86	32.46	33.34
18	BIOCHEM-19-18	RH(OE) 1710	36.41	35.76	36.5	38.51	37.18	36.97
19	BIOCHEM-19-19	RH(OE) 1711	24.65	25.33	39.5	26.95	24.51	27.86
20	BIOCHEM-19-20	PDZ 1	42.81	45.8	41.73	41.37	44.33	43.33
21	BIOCHEM-19-21	Kranti	15.21	10.92	10.67	12.50	13.23	12.97
22	BIOCHEM-19-22	PRE 2017-5	8.34	9.96	10.33	10.09	8.93	9.71
23	BIOCHEM-19-23	PRE 2017-2	10.28	9.88	11.67	11.57	10.28	10.49
24	BIOCHEM-19-24	PRB 2015-2	7.91	10.79	11	11.13	9.92	10.49
25	BIOCHEM-19-25	PT 2015-6	12.21	12.76	9	13.37	12.23	12.64
26	BIOCHEM-19-26	PRL 2016-5	10.14	10.99	13.67	11.77	11.48	11.10
27	BIOCHEM-19-27	PR 2016-8	8.91	10.12	11.33	10.03	8.92	9.74
28	BIOCHEM-19-28	PRL 2017-5	10.45	12.33	12.67	11.33	10.75	11.21
29	BIOCHEM-19-29	PR 2017-7	10.19	9.86	11	10.78	9.19	10.00
30	BIOCHEM-19-30	PT 2015-7	16.11	15.21	9.67	11.36	13.35	14.01
31	BIOCHEM-19-31	PR 2016-4	11.31	10.48	10.33	10.83	9.15	10.20

(* mean is excluding Kangra centre)

Table 5: Linoleic acid (%)

(C18:2)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	28.49	29.56	29.16	29.75	28.4	29.05
2	BIOCHEM-19-2	GSH 17-17	26.34	29.06	32.04	32.68	30.12	29.55
3	BIOCHEM-19-3	RCH 1	35.14	34.09	37.81	33.6	34.43	34.32
4	BIOCHEM-19-4	GSH 16-99	25.39	27.53	28.56	30.88	28.25	28.01
5	BIOCHEM-19-5	LEC 61	41.05	39.13	37.05	39.39	40.61	40.05
6	BIOCHEM-19-6	PDZ 13	35.76	36.06	42	38.49	38.91	37.30
7	BIOCHEM-19-7	RH9OE) 1705	31.14	31.38	38.57	33.69	34.22	32.61
8	BIOCHEM-19-8	JC 21	33.39	33.96	37	34.68	35.82	34.46
9	BIOCHEM-19-9	GSH 1707	35.13	32.22	30.24	32.87	34.88	33.78
10	BIOCHEM-19-10	JC 33	35.1	34.95	37	34.20	35.36	34.90
11	BIOCHEM-19-11	PM 29	35.24	34.85	37.6	35.96	35.22	35.32
12	BIOCHEM-19-12	PM 30	31.96	29.96	37	30.39	30.89	30.80
13	BIOCHEM-19-13	LES 60	37.12	35.23	38	36.12	37.44	36.48
14	BIOCHEM-19-14	LES 59	38.89	37.77	19.2	36.5	38.21	37.84
15	BIOCHEM-19-15	LES 54	36.13	38.91	38.38	33.54	37.52	36.52
16	BIOCHEM-19-16	PDZ 1	33.82	32.98	33.6	32.83	33.02	33.16
17	BIOCHEM-19-17	RH(OE) 1706	32.98	34.01	31.79	33.08	34.98	33.76
18	BIOCHEM-19-18	RH(OE) 1710	35.77	34.91	37.43	35.36	35.53	35.39
19	BIOCHEM-19-19	RH(OE) 1711	34.88	36.11	38.95	33.44	34.43	34.71
20	BIOCHEM-19-20	PDZ 1	33.21	34.45	36.4	32.31	36.28	34.06
21	BIOCHEM-19-21	Kranti	20.49	17.14	16.4	18.10	19.69	18.85
22	BIOCHEM-19-22	PRE 2017-5	18.89	18.18	16.6	17.07	16.58	17.68
23	BIOCHEM-19-23	PRE 2017-2	16.31	15.21	16.6	18.98	18.19	17.17
24	BIOCHEM-19-24	PRB 2015-2	20.11	18.94	16.8	18.51	19.04	19.15
25	BIOCHEM-19-25	PT 2015-6	16.84	15.6	15.2	17.4	18.68	17.13
26	BIOCHEM-19-26	PRL 2016-5	17.25	18.75	15.6	16.79	16.11	17.23
27	BIOCHEM-19-27	PR 2016-8	15.07	13.4	16.6	16.15	15.52	15.04
28	BIOCHEM-19-28	PRL 2017-5	15.21	14.61	15.5	17.2	16.52	15.89
29	BIOCHEM-19-29	PR 2017-7	20.95	24.48	17.2	20.36	22.92	22.18
30	BIOCHEM-19-30	PT 2015-7	15.39	17.44	15.7	17.845	15.4	16.52
31	BIOCHEM-19-31	PR 2016-4	25.29	26.31	17	25.79	24.56	25.49

Table 6: Linolenic acid (%)
(C18:3)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	12.31	16.38	12	13.76	14.04	14.12
2	BIOCHEM-19-2	GSH 17-17	10.61	12.27	12.03	12.50	10.86	11.56
3	BIOCHEM-19-3	RCH 1	15.39	18.1	13.48	16.29	17.75	16.88
4	BIOCHEM-19-4	GSH 16-99	12.71	10.41	12	14.56	14.48	13.04
5	BIOCHEM-19-5	LEC 61	16.28	12.51	10.96	18.71	20.34	17.96
6	BIOCHEM-19-6	PDZ 13	18.49	20.78	9.6	18.44	20.65	19.59
7	BIOCHEM-19-7	RH9OE) 1705	17.89	16.41	11.04	14.86	15.57	16.18
8	BIOCHEM-19-8	JC 21	12.34	10.41	16.4	13.97	14.8	12.88
9	BIOCHEM-19-9	GSH 1707	12.21	11.45	10.93	13.33	14.16	12.79
10	BIOCHEM-19-10	JC 33	14.21	12.71	16.3	14.39	15.35	14.17
11	BIOCHEM-19-11	PM 29	15.25	10.11	14.35	11.24	10.89	11.87
12	BIOCHEM-19-12	PM 30	17.21	20.24	11.07	17.04	19.33	18.46
13	BIOCHEM-19-13	LES 60	18.56	21.28	12.18	18.75	20.38	19.74
14	BIOCHEM-19-14	LES 59	10.81	13.81	10.9	11.60	15.32	12.89
15	BIOCHEM-19-15	LES 54	18.94	20.12	12.32	20.35	21.26	20.17
16	BIOCHEM-19-16	PDZ 1	12.1	11.31	10.5	12.80	10.49	11.68
17	BIOCHEM-19-17	RH(OE) 1706	18.2	21.14	12	20.10	20.69	20.03
18	BIOCHEM-19-18	RH(OE) 1710	18.56	19.22	11.1	16.25	17.56	17.90
19	BIOCHEM-19-19	RH(OE) 1711	25.1	25.88	11.1	25.03	27.34	25.84
20	BIOCHEM-19-20	PDZ 1	12.61	12.39	10.7	12.56	10.92	12.12
21	BIOCHEM-19-21	Kranti	18.21	14.16	13.5	13.87	15.36	15.40
22	BIOCHEM-19-22	PRE 2017-5	20.13	16.7	14.52	16.07	16.44	17.34
23	BIOCHEM-19-23	PRE 2017-2	18.24	14.58	14.5	13.90	13.54	15.07
24	BIOCHEM-19-24	PRB 2015-2	15.44	16.23	14.5	15.57	17.09	16.08
25	BIOCHEM-19-25	PT 2015-6	10.36	11.07	13.5	12.77	13.88	12.02
26	BIOCHEM-19-26	PRL 2016-5	12.88	15.36	14.85	13.75	14.57	14.14
27	BIOCHEM-19-27	PR 2016-8	13.19	14.31	13.48	14.81	15.79	14.53
28	BIOCHEM-19-28	PRL 2017-5	11.11	11.96	14.7	14.46	13.83	12.84
29	BIOCHEM-19-29	PR 2017-7	21.49	18.75	12	16.63	17.46	18.58
30	BIOCHEM-19-30	PT 2015-7	12.28	10.31	13.33	12.48	10.5	11.39
31	BIOCHEM-19-31	PR 2016-4	26.41	20.04	13.3	17.84	17.18	20.37

Table 7: Eicosanoic acid (%)

(C20:1)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean *
1	BIOCHEM-19-1	GSH 21-80	14.07	10.51	2.98	9.70	11.73	11.50
2	BIOCHEM-19-2	GSH 17-17	7.33	7.38	1.67	6.06	6.74	6.88
3	BIOCHEM-19-3	RCH 1	7.06	6.47	0.63	6.29	6.08	6.48
4	BIOCHEM-19-4	GSH 16-99	7.24	6.76	3.3	5.98	6.74	6.68
5	BIOCHEM-19-5	LEC 61	7.54	8.2	1.38	7.20	8.75	7.92
6	BIOCHEM-19-6	PDZ 13	6.31	6.91	3.12	4.20	5.81	5.81
7	BIOCHEM-19-7	RH9OE) 1705	6.21	5.55	0.6	7.58	7.33	6.67
8	BIOCHEM-19-8	JC 21	5.49	7.55	0	4.65	3.81	5.38
9	BIOCHEM-19-9	GSH 1707	6.43	7.19	4	5.21	6.96	6.45
10	BIOCHEM-19-10	JC 33	5.33	8.11	0.71	4.18	3.71	5.33
11	BIOCHEM-19-11	PM 29	7.04	7.55	0.71	5.10	6.13	6.46
12	BIOCHEM-19-12	PM 30	8.56	8.86	0.63	8.20	10.26	8.97
13	BIOCHEM-19-13	LES 60	10.1	10.36	0.72	9.10	11.19	10.19
14	BIOCHEM-19-14	LES 59	8.29	9.21	1.33	6.05	7.54	7.77
15	BIOCHEM-19-15	LES 54	8.88	8.01	0.68	6.00	7.51	7.60
16	BIOCHEM-19-16	PDZ 1	6.23	8.55	3.18	6.00	6.68	6.87
17	BIOCHEM-19-17	RH(OE) 1706	7.36	7.23	1.09	5.95	6.86	6.85
18	BIOCHEM-19-18	RH(OE) 1710	4.3	6.13	0.95	4.61	3.98	4.76
19	BIOCHEM-19-19	RH(OE) 1711	10.36	11.65	0.58	8.73	10.41	10.29
20	BIOCHEM-19-20	PDZ 1	6.11	6.21	3	6.40	5.69	6.10
21	BIOCHEM-19-21	Kranti	7.75	8.23	3.5	8.10	5.95	7.51
22	BIOCHEM-19-22	PRE 2017-5	10.19	9.48	2.6	7.39	8.22	8.82
23	BIOCHEM-19-23	PRE 2017-2	10.71	8.34	2.37	7.66	7.16	8.47
24	BIOCHEM-19-24	PRB 2015-2	11.33	10.17	1.87	9.60	9.36	10.12
25	BIOCHEM-19-25	PT 2015-6	10.27	10.27	7	9.70	11.53	10.44
26	BIOCHEM-19-26	PRL 2016-5	10.1	9.4	0.85	8.67	9.52	9.42
27	BIOCHEM-19-27	PR 2016-8	11.44	10.89	2.8	7.93	8.74	9.75
28	BIOCHEM-19-28	PRL 2017-5	9.55	10.31	1.8	8.70	8.8	9.34
29	BIOCHEM-19-29	PR 2017-7	9.36	7.86	1.9	7.14	6.33	7.67
30	BIOCHEM-19-30	PT 2015-7	10.1	9.22	5.9	8.19	9.57	9.27
31	BIOCHEM-19-31	PR 2016-4	10.38	10.81	1.8	10.46	9.22	10.22

(*Mean is excluding Kangra centre)

Table 8: Erucic acid (%)

(C22:1)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean *
1	BIOCHEM-19-1	GSH 21-80	5.98	5.34	2.04	6.55	5.17	5.76
2	BIOCHEM-19-2	GSH 17-17	3.01	2.14	1.2	1.98	2.81	2.49
3	BIOCHEM-19-3	RCH 1	1.98	1.76	0.3	2.01	1.94	1.92
4	BIOCHEM-19-4	GSH 16-99	1.35	1.64	1.67	1.53	1.01	1.38
5	BIOCHEM-19-5	LEC 61	2.13	2.46	10.38	1.35	1.59	1.88
6	BIOCHEM-19-6	PDZ 13	1.97	1.26	0.54	0.92	1.34	1.37
7	BIOCHEM-19-7	RH9OE) 1705	1.66	1.94	1.61	1.30	1.11	1.50
8	BIOCHEM-19-8	JC 21	1.8	2.05	0.25	1.05	1.18	1.52
9	BIOCHEM-19-9	GSH 1707	2.71	2.29	1.44	1.14	1.73	1.97
10	BIOCHEM-19-10	JC 33	3.29	3.13	0.48	4.93	3.53	3.72
11	BIOCHEM-19-11	PM 29	2.01	1.86	1.75	1.88	2.07	1.96
12	BIOCHEM-19-12	PM 30	1.31	2.76	1.81	1.08	1.1	1.56
13	BIOCHEM-19-13	LES 60	1.69	2.11	7.39	1.60	1.43	1.71
14	BIOCHEM-19-14	LES 59	2.1	1.97	40.5	1.50	1.08	1.66
15	BIOCHEM-19-15	LES 54	2.81	2.07	1.49	1.10	1.24	1.81
16	BIOCHEM-19-16	PDZ 1	2.64	1.05	0.78	1.45	1.19	1.58
17	BIOCHEM-19-17	RH(OE) 1706	4.21	5.01	1.49	3.50	3.38	4.03
18	BIOCHEM-19-18	RH(OE) 1710	1.94	2.15	1.02	0.91	1.26	1.57
19	BIOCHEM-19-19	RH(OE) 1711	1.77	0.9	1.53	1.25	1.1	1.26
20	BIOCHEM-19-20	PDZ 1	2.1	1.01	0.3	1.30	1.33	1.44
21	BIOCHEM-19-21	Kranti	36.13	38.86	41	43.49	44.86	40.84
22	BIOCHEM-19-22	PRE 2017-5	45.86	43.39	41.7	44.88	45.35	44.87
23	BIOCHEM-19-23	PRE 2017-2	39.54	40.21	41.5	43.13	37.33	40.05
24	BIOCHEM-19-24	PRB 2015-2	40.91	42.36	42.3	42.04	40.97	41.57
25	BIOCHEM-19-25	PT 2015-6	42.37	44.31	44.4	43.46	40.4	42.64
26	BIOCHEM-19-26	PRL 2016-5	43.56	41.65	37.7	45.48	43.17	43.47
27	BIOCHEM-19-27	PR 2016-8	47.56	45.22	40.7	47.43	48.91	47.28
28	BIOCHEM-19-28	PRL 2017-5	45.1	42.56	37.9	45.05	44.62	44.33
29	BIOCHEM-19-29	PR 2017-7	40.75	41.91	39.1	41.35	40.24	41.06
30	BIOCHEM-19-30	PT 2015-7	45.26	43.69	40.3	46.89	46.54	45.60
31	BIOCHEM-19-31	PR 2016-4	29.1	28.47	39.9	29.28	26.19	28.26

(*Mean is excluding Kangra data)

Table 9: ω6 and ω3 ratio

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	2.31	1.80	2.43	2.16	2.02	2.14
2	BIOCHEM-19-2	GSH 17-17	2.48	2.36	2.66	2.62	2.77	2.58
3	BIOCHEM-19-3	RCH 1	2.28	1.88	2.17	2.06	1.94	2.07
4	BIOCHEM-19-4	GSH 16-99	2.00	2.64	2.38	2.12	1.95	2.22
5	BIOCHEM-19-5	LEC 61	2.52	3.12	3.38	2.11	2.00	2.63
6	BIOCHEM-19-6	PDZ 13	1.93	1.73	1.84	2.09	1.88	1.89
7	BIOCHEM-19-7	RH9OE) 1705	1.74	1.91	1.83	2.27	2.20	1.99
8	BIOCHEM-19-8	JC 21	2.71	3.26	2.26	2.49	2.42	2.63
9	BIOCHEM-19-9	GSH 1707	2.88	2.81	2.77	2.47	2.46	2.68
10	BIOCHEM-19-10	JC 33	2.47	2.74	2.27	2.38	2.30	2.43
11	BIOCHEM-19-11	PM 29	2.31	3.44	1.99	3.20	3.23	2.83
12	BIOCHEM-19-12	PM 30	1.86	1.48	1.63	1.78	1.60	1.67
13	BIOCHEM-19-13	LES 60	2.00	1.65	1.65	1.93	1.84	1.81
14	BIOCHEM-19-14	LES 59	3.60	2.73	3.32	3.15	2.49	3.06
15	BIOCHEM-19-15	LES 54	1.91	1.93	2.09	1.65	1.76	1.87
16	BIOCHEM-19-16	PDZ 1	2.80	2.91	3.58	2.57	3.15	3.00
17	BIOCHEM-19-17	RH(OE) 1706	1.81	1.60	1.69	1.65	1.69	1.69
18	BIOCHEM-19-18	RH(OE) 1710	1.93	1.81	1.80	2.18	2.02	1.95
19	BIOCHEM-19-19	RH(OE) 1711	1.39	1.39	1.70	1.34	1.26	1.42
20	BIOCHEM-19-20	PDZ 1	2.63	2.78	3.40	2.58	3.32	2.94
21	BIOCHEM-19-21	Kranti	1.13	1.21	1.21	1.30	1.28	1.23
22	BIOCHEM-19-22	PRE 2017-5	0.94	1.08	1.14	1.06	1.01	1.05
23	BIOCHEM-19-23	PRE 2017-2	0.89	1.04	1.14	1.37	1.34	1.16
24	BIOCHEM-19-24	PRB 2015-2	1.30	1.16	1.16	1.19	1.11	1.18
25	BIOCHEM-19-25	PT 2015-6	1.63	1.40	1.13	1.36	1.35	1.37
26	BIOCHEM-19-26	PRL 2016-5	1.34	1.22	1.05	1.22	1.11	1.19
27	BIOCHEM-19-27	PR 2016-8	1.14	0.93	1.23	1.09	0.98	1.07
28	BIOCHEM-19-28	PRL 2017-5	1.37	1.22	1.05	1.19	1.19	1.20
29	BIOCHEM-19-29	PR 2017-7	0.97	1.30	1.43	1.22	1.31	1.25
30	BIOCHEM-19-30	PT 2015-7	1.25	1.69	1.18	1.43	1.47	1.40
31	BIOCHEM-19-31	PR 2016-4	0.96	1.31	1.16	1.45	1.43	1.26

Table 10: SFA: MUFA: PUFA ratio

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR
1	BIOCHEM-19-1	GSH 21-80	1:10:08	1:10:8	1:7: 8	1:07:09	1:11:09
2	BIOCHEM-19-2	GSH 17-17	1:10:06	1:10:8	1:7: 7	1:09:08	1:10:07
3	BIOCHEM-19-3	RCH 1	1:13:14	1:9:12	1:7: 9	1:10:11	1:12:14
4	BIOCHEM-19-4	GSH 16-99	1:12:08	1:11:8	1:9:7	1:10:09	1:13:10
5	BIOCHEM-19-5	LEC 61	1:09:14	1:9:11	1:7: 8	1:09:13	1:11:18
6	BIOCHEM-19-6	PDZ 13	1:06:11	1:8:11	1:4: 8	1:07:11	1:07:11
7	BIOCHEM-19-7	RH9OE) 1705	1:13:14	1:11:12	1:4: 10	1:08:09	1:12:13
8	BIOCHEM-19-8	JC 21	1:12:11	1:12:10	1:8: 10	1:09:10	1:10:11
9	BIOCHEM-19-9	GSH 1707	1:12:14	1:12.:10	1:8: 7	1:10:09	1:14:12
10	BIOCHEM-19-10	JC 33	1:09:12	1:13:12	1:9: 11	1:10:11	1:11:12
11	BIOCHEM-19-11	PM 29	1:09:09	1:12:11	1:7: 10	1:08:08	1:10:09
12	BIOCHEM-19-12	PM 30	1:08:09	1:10:10	1:7: 9	1:09:09	1:11:11
13	BIOCHEM-19-13	LES 60	1:09:14	1:10:13	1:6: 9	1:08:11	1:10:14
14	BIOCHEM-19-14	LES 59	1:08:09	1:10:10	1:8: 8	1:07:08	1:09:10
15	BIOCHEM-19-15	LES 54	1:09:13	1:9:12	1:5: 10	1:10:13	1:10:13
16	BIOCHEM-19-16	PDZ 1	1:12:09	1:15:12	1:7: 8	1:08:08	1:11:09
17	BIOCHEM-19-17	RH(OE) 1706	1:09:12	1:8:11	1:5: 9	1:09:12	1:10:13
18	BIOCHEM-19-18	RH(OE) 1710	1:08:10	1:12:15	1:6: 9	1:10:12	1:09:11
19	BIOCHEM-19-19	RH(OE) 1711	1:09:16	1:9:15	1:6: 9	1:08:13	1:10:17
20	BIOCHEM-19-20	PDZ 1	1:12:09	1:10:9	1:7: 7	1:08:07	1:10:10
21	BIOCHEM-19-21	Kranti	1:15:08	1:16:9	1:12: 7	1:16:08	1:18:10
22	BIOCHEM-19-22	PRE 2017-5	1:18:08	1:17:9	1:12: 7	1:14:07	1:17:08
23	BIOCHEM-19-23	PRE 2017-2	1:13:09	1:15:8	1:12: 7	1:13:07	1:13:08
24	BIOCHEM-19-24	PRB 2015-2	1:14:09	1:14:8	1:12: 7	1:19:10	1:15:09
25	BIOCHEM-19-25	PT 2015-6	1:19:09	1:24:10	1:13: 6	1:20:09	1:19:10
26	BIOCHEM-19-26	PRL 2016-5	1:21:08	1:16:9	1:14: 7	1:19:09	1:21:10
27	BIOCHEM-19-27	PR 2016-8	1:20:09	1:18:8	1:14: 7	1:17:08	1:21:10
28	BIOCHEM-19-28	PRL 2017-5	1:21:10	1:18:7	1:14: 7	1:20:09	1:20:09
29	BIOCHEM-19-29	PR 2017-7	1:20:14	1:15:11	1:11: 6	1:16:10	1:21:15
30	BIOCHEM-19-30	PT 2015-7	1:21:07	1:14:6	1:13: 7	1:20:09	1:19:07
31	BIOCHEM-19-31	PR 2016-4	1:12:09	1:12:11	1:8:10	1:09:07	1:12:11

Table 11: Protein content (%)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	34.13	31.64	32.58	33.18	32.13	32.73
2	BIOCHEM-19-2	GSH 17-17	35.88	33.52	32.42	35.36	33.88	34.21
3	BIOCHEM-19-3	RCH 1	35.88	31.08	32.31	34.64	35.28	33.84
4	BIOCHEM-19-4	GSH 16-99	31.5	31.68	32.53	30.99	29.50	31.24
5	BIOCHEM-19-5	LEC 61	32.38	32.73	33.73	31.72	30.38	32.19
6	BIOCHEM-19-6	PDZ 13	36.75	30.94	31.43	35.36	34.75	33.85
7	BIOCHEM-19-7	RH9OE) 1705	33.51	32.91	33.40	31.72	29.50	32.21
8	BIOCHEM-19-8	JC 21	27.13	30.96	29.79	28.07	26.13	28.42
9	BIOCHEM-19-9	GSH 1707	32.81	33.60	34.77	32.45	30.81	32.89
10	BIOCHEM-19-10	JC 33	33.69	30.10	29.90	32.45	31.69	31.57
11	BIOCHEM-19-11	PM 29	30.63	30.26	30.67	30.26	29.63	30.29
12	BIOCHEM-19-12	PM 30	33.25	32.80	33.73	33.91	31.25	32.99
13	BIOCHEM-19-13	LES 60	35.88	33.17	33.02	34.64	33.88	34.12
14	BIOCHEM-19-14	LES 59	33.04	32.44	34.22	34.64	33.00	33.47
15	BIOCHEM-19-15	LES 54	37.63	31.46	32.64	36.82	35.63	34.84
16	BIOCHEM-19-16	PDZ 1	36.31	32.38	31.76	35.36	34.31	34.02
17	BIOCHEM-19-17	RH(OE) 1706	38.5	33.02	32.80	36.82	36.50	35.53
18	BIOCHEM-19-18	RH(OE) 1710	36.75	33.14	33.18	35.36	34.75	34.64
19	BIOCHEM-19-19	RH(OE) 1711	35.88	32.65	33.46	34.64	33.88	34.10
20	BIOCHEM-19-20	PDZ 1	36.11	31.14	31.65	35.36	33.00	33.45
21	BIOCHEM-19-21	Kranti	34.01	32.37	31.60	34.64	34.00	33.32
22	BIOCHEM-19-22	PRE 2017-5	35.44	31.16	30.78	35.36	33.44	33.24
23	BIOCHEM-19-23	PRE 2017-2	33.25	30.54	30.94	32.45	31.25	31.69
24	BIOCHEM-19-24	PRB 2015-2	35.88	31.45	31.60	34.64	33.88	33.49
25	BIOCHEM-19-25	PT 2015-6	34.13	30.24	30.01	33.91	32.13	32.08
26	BIOCHEM-19-26	PRL 2016-5	33.69	30.06	29.79	32.45	31.69	31.54
27	BIOCHEM-19-27	PR 2016-8	34.56	32.24	31.21	33.18	32.56	32.75
28	BIOCHEM-19-28	PRL 2017-5	35.88	30.34	30.23	34.64	33.88	32.99
29	BIOCHEM-19-29	PR 2017-7	33.69	31.28	32.20	33.18	31.69	32.41
30	BIOCHEM-19-30	PT 2015-7	34.13	30.64	30.61	34.64	32.13	32.43
31	BIOCHEM-19-31	PR 2016-4	35	31.67	31.32	35.36	33.00	33.27

Table 12: Methionine content (g/100g protein)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	1.39	1.84	1.75	1.46	1.41	1.57
2	BIOCHEM-19-2	GSH 17-17	1.17	1.84	1.74	1.54	1.09	1.48
3	BIOCHEM-19-3	RCH 1	2.01	1.72	1.74	2.00	2.18	1.93
4	BIOCHEM-19-4	GSH 16-99	1.69	1.8	1.75	1.66	1.74	1.73
5	BIOCHEM-19-5	LEC 61	2.19	2.02	1.94	2.21	2.06	2.08
6	BIOCHEM-19-6	PDZ 13	1.09	1.81	1.69	1.58	1.00	1.43
7	BIOCHEM-19-7	RH9OE) 1705	1.69	1.91	1.92	1.79	1.62	1.79
8	BIOCHEM-19-8	JC 21	1.82	1.71	1.60	1.87	1.97	1.79
9	BIOCHEM-19-9	GSH 1707	0.97	1.91	1.87	1.08	0.91	1.35
10	BIOCHEM-19-10	JC 33	1.06	1.76	1.61	1.01	0.97	1.28
11	BIOCHEM-19-11	PM 29	1.98	1.64	1.65	2.17	2.18	1.92
12	BIOCHEM-19-12	PM 30	1.75	2.08	1.94	1.54	1.65	1.79
13	BIOCHEM-19-13	LES 60	1.95	1.89	1.90	1.72	2.15	1.92
14	BIOCHEM-19-14	LES 59	2.01	1.92	1.96	2.29	2.09	2.05
15	BIOCHEM-19-15	LES 54	1.49	1.69	1.75	1.55	1.38	1.57
16	BIOCHEM-19-16	PDZ 1	1.59	1.83	1.71	1.83	1.79	1.75
17	BIOCHEM-19-17	RH(OE) 1706	1.49	1.91	1.88	1.62	1.71	1.72
18	BIOCHEM-19-18	RH(OE) 1710	1.21	1.92	1.78	1.86	0.85	1.52
19	BIOCHEM-19-19	RH(OE) 1711	2.11	1.96	1.80	2.16	2.38	2.08
20	BIOCHEM-19-20	PDZ 1	1.74	1.63	1.70	1.78	1.68	1.71
21	BIOCHEM-19-21	Kranti	1.59	2.07	1.81	1.71	1.38	1.71
22	BIOCHEM-19-22	PRE 2017-5	1.27	1.76	1.77	1.58	1.09	1.49
23	BIOCHEM-19-23	PRE 2017-2	1.64	1.71	1.78	1.65	1.50	1.66
24	BIOCHEM-19-24	PRB 2015-2	1.41	1.83	1.81	1.39	1.03	1.49
25	BIOCHEM-19-25	PT 2015-6	1.63	1.95	1.72	1.33	1.47	1.62
26	BIOCHEM-19-26	PRL 2016-5	1.45	1.81	1.71	1.43	1.56	1.59
27	BIOCHEM-19-27	PR 2016-8	1.41	2.01	1.79	1.32	1.29	1.56
28	BIOCHEM-19-28	PRL 2017-5	1.33	1.86	1.74	1.48	1.50	1.58
29	BIOCHEM-19-29	PR 2017-7	1.98	1.92	1.85	1.58	1.88	1.84
30	BIOCHEM-19-30	PT 2015-7	1.51	1.65	1.76	1.42	1.53	1.57
31	BIOCHEM-19-31	PR 2016-4	1.59	1.88	1.80	1.19	1.47	1.59

Table 13: Tryptophan content (g/100g protein)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	0.98	1.08	1.09	1.23	0.94	1.06
2	BIOCHEM-19-2	GSH 17-17	1.19	1.15	1.08	1.15	1.06	1.13
3	BIOCHEM-19-3	RCH 1	0.75	1.16	1.08	0.96	0.56	0.90
4	BIOCHEM-19-4	GSH 16-99	0.9	1.08	1.08	0.85	0.52	0.89
5	BIOCHEM-19-5	LEC 61	1.01	1.12	1.12	1.05	0.80	1.02
6	BIOCHEM-19-6	PDZ 13	1.11	1.00	1.05	1.14	0.92	1.04
7	BIOCHEM-19-7	RH9OE) 1705	1.05	1.08	1.11	0.89	0.50	0.93
8	BIOCHEM-19-8	JC 21	0.77	1.04	0.99	0.98	0.68	0.89
9	BIOCHEM-19-9	GSH 1707	0.93	1.14	1.16	1.21	0.69	1.03
10	BIOCHEM-19-10	JC 33	0.68	0.95	1.00	0.95	0.52	0.82
11	BIOCHEM-19-11	PM 29	0.99	1.05	1.02	1.08	0.78	0.98
12	BIOCHEM-19-12	PM 30	1.25	1.11	1.12	0.92	0.79	1.04
13	BIOCHEM-19-13	LES 60	1.15	1.10	1.10	1.27	1.02	1.13
14	BIOCHEM-19-14	LES 59	1.17	1.09	1.14	0.92	0.43	0.95
15	BIOCHEM-19-15	LES 54	0.73	1.07	1.09	0.73	0.44	0.81
16	BIOCHEM-19-16	PDZ 1	0.99	0.94	1.06	0.98	0.78	0.95
17	BIOCHEM-19-17	RH(OE) 1706	1.41	1.1	1.09	1.46	1.17	1.25
18	BIOCHEM-19-18	RH(OE) 1710	0.59	1.15	1.11	0.93	0.52	0.86
19	BIOCHEM-19-19	RH(OE) 1711	0.94	1.14	1.12	0.96	0.70	0.97
20	BIOCHEM-19-20	PDZ 1	0.97	1.05	1.06	0.99	0.76	0.97
21	BIOCHEM-19-21	Kranti	1.39	1.10	1.05	1.41	1.21	1.23
22	BIOCHEM-19-22	PRE 2017-5	1.05	0.96	1.03	1.04	0.85	0.99
23	BIOCHEM-19-23	PRE 2017-2	1.19	1.10	1.03	1.12	0.80	1.05
24	BIOCHEM-19-24	PRB 2015-2	0.96	0.93	1.05	1.61	0.85	1.08
25	BIOCHEM-19-25	PT 2015-6	0.79	1.01	1.00	1.06	0.62	0.90
26	BIOCHEM-19-26	PRL 2016-5	1.28	1.05	0.99	1.66	1.05	1.21
27	BIOCHEM-19-27	PR 2016-8	1.19	1.09	1.04	1.35	1.18	1.17
28	BIOCHEM-19-28	PRL 2017-5	1.18	1.01	1.01	1.51	0.98	1.14
29	BIOCHEM-19-29	PR 2017-7	1.31	1.02	1.07	1.67	1.16	1.25
30	BIOCHEM-19-30	PT 2015-7	1.11	1.03	1.02	1.47	1.06	1.14
31	BIOCHEM-19-31	PR 2016-4	0.82	0.96	1.04	1.02	0.53	0.87

Table 14: Total antioxidant capacity (mg/g AAE)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	14.81	16.31	27.55	15.14	16.24	18.01
2	BIOCHEM-19-2	GSH 17-17	18.29	18.95	26.25	18.62	26.38	21.70
3	BIOCHEM-19-3	RCH 1	21.49	21.93	24.36	20.25	23.98	22.40
4	BIOCHEM-19-4	GSH 16-99	19.14	19.06	25.49	18.47	22.15	20.86
5	BIOCHEM-19-5	LEC 61	21.34	20.01	20.03	20.44	20.97	20.56
6	BIOCHEM-19-6	PDZ 13	19.15	17.68	20.33	18.63	15.91	18.34
7	BIOCHEM-19-7	RH9OE) 1705	24.01	29.76	20.96	26.62	26.86	25.64
8	BIOCHEM-19-8	JC 21	24.77	27.87	24.49	26.31	26.59	26.01
9	BIOCHEM-19-9	GSH 1707	24.90	24.30	25.66	25.74	28.45	25.81
10	BIOCHEM-19-10	JC 33	26.27	22.50	25.20	23.71	26.96	24.93
11	BIOCHEM-19-11	PM 29	14.97	11.19	22.43	15.13	16.84	16.11
12	BIOCHEM-19-12	PM 30	27.14	26.93	22.09	27.66	23.52	25.47
13	BIOCHEM-19-13	LES 60	16.18	15.41	18.48	17.12	26.78	18.79
14	BIOCHEM-19-14	LES 59	17.83	16.5	18.61	17.48	20.14	18.11
15	BIOCHEM-19-15	LES 54	22.89	16.05	21.63	14.39	16.73	18.34
16	BIOCHEM-19-16	PDZ 1	14.99	12.02	26.50	14.42	15.95	16.78
17	BIOCHEM-19-17	RH(OE) 1706	19.95	20.08	24.70	19.24	23.74	21.54
18	BIOCHEM-19-18	RH(OE) 1710	21.21	22.32	22.13	21.22	19.95	21.37
19	BIOCHEM-19-19	RH(OE) 1711	16.11	17.96	22.01	16.21	16.51	17.76
20	BIOCHEM-19-20	PDZ 1	11.63	10.77	25.83	13.14	13.84	15.04
21	BIOCHEM-19-21	Kranti	24.97	25.08	22.26	25.14	27.67	25.02
22	BIOCHEM-19-22	PRE 2017-5	20.94	23.37	22.55	21.60	25.09	22.71
23	BIOCHEM-19-23	PRE 2017-2	21.74	22.97	23.94	23.23	22.86	22.95
24	BIOCHEM-19-24	PRB 2015-2	20.00	21.21	22.34	22.08	24.82	22.09
25	BIOCHEM-19-25	PT 2015-6	26.55	24.07	24.02	23.67	26.53	24.97
26	BIOCHEM-19-26	PRL 2016-5	22.47	27.68	24.95	25.10	23.45	24.73
27	BIOCHEM-19-27	PR 2016-8	21.95	24.05	21.17	23.62	22.54	22.67
28	BIOCHEM-19-28	PRL 2017-5	18.52	18.32	23.56	18.10	18.72	19.44
29	BIOCHEM-19-29	PR 2017-7	21.18	21.53	21.92	22.02	17.83	20.90
30	BIOCHEM-19-30	PT 2015-7	22.04	20.54	24.11	21.16	23.21	22.21
31	BIOCHEM-19-31	PR 2016-4	22.98	27.57	22.05	25.69	16.21	22.90

Table 15: β-carotene (ppm)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean
1	BIOCHEM-19-1	GSH 21-80	4.65	4.20	4.87	5.33	3.87	4.58
2	BIOCHEM-19-2	GSH 17-17	4.68	4.85	4.62	4.85	4.59	4.72
3	BIOCHEM-19-3	RCH 1	3.46	3.77	4.46	3.92	3.28	3.78
4	BIOCHEM-19-4	GSH 16-99	2.94	2.31	5.25	2.95	3.24	3.34
5	BIOCHEM-19-5	LEC 61	4.59	4.73	2.43	4.31	5.80	4.37
6	BIOCHEM-19-6	PDZ 13	2.67	2.78	3.63	1.95	2.95	2.80
7	BIOCHEM-19-7	RH9OE) 1705	5.96	5.12	2.53	5.43	6.07	5.02
8	BIOCHEM-19-8	JC 21	5.01	4.07	4.33	5.03	5.74	4.84
9	BIOCHEM-19-9	GSH 1707	4.86	4.12	5.37	4.90	5.93	5.04
10	BIOCHEM-19-10	JC 33	5.39	5.06	4.55	4.83	5.74	5.11
11	BIOCHEM-19-11	PM 29	3.87	3.22	2.69	3.29	2.69	3.15
12	BIOCHEM-19-12	PM 30	4.31	4.68	2.73	4.40	5.15	4.25
13	BIOCHEM-19-13	LES 60	3.59	3.7	2.17	3.75	3.64	3.37
14	BIOCHEM-19-14	LES 59	4.79	4.51	2.25	4.18	5.08	4.16
15	BIOCHEM-19-15	LES 54	4.86	4.40	2.83	4.98	4.62	4.34
16	BIOCHEM-19-16	PDZ 1	2.89	2.91	5.32	2.95	5.44	3.90
17	BIOCHEM-19-17	RH(OE) 1706	5.01	5.96	3.07	5.64	6.13	5.16
18	BIOCHEM-19-18	RH(OE) 1710	5.07	4.64	2.56	4.92	6.26	4.69
19	BIOCHEM-19-19	RH(OE) 1711	5.08	5.52	2.46	5.39	3.97	4.48
20	BIOCHEM-19-20	PDZ 1	2.67	4.77	5.43	3.24	5.31	4.08
21	BIOCHEM-19-21	Kranti	5.80	5.23	5.41	5.74	3.44	5.12
22	BIOCHEM-19-22	PRE 2017-5	3.68	3.5	5.20	3.99	3.51	3.98
23	BIOCHEM-19-23	PRE 2017-2	3.96	2.79	5.22	2.33	3.05	3.47
24	BIOCHEM-19-24	PRB 2015-2	3.20	2.70	5.20	2.58	3.46	3.43
25	BIOCHEM-19-25	PT 2015-6	3.31	2.34	5.91	2.42	3.67	3.53
26	BIOCHEM-19-26	PRL 2016-5	3.45	3.69	5.10	2.89	3.32	3.69
27	BIOCHEM-19-27	PR 2016-8	4.89	4.45	5.33	5.07	2.95	4.54
28	BIOCHEM-19-28	PRL 2017-5	5.37	6.06	5.20	5.85	3.64	5.22
29	BIOCHEM-19-29	PR 2017-7	3.59	3.92	4.81	3.48	3.41	3.84
30	BIOCHEM-19-30	PT 2015-7	4.76	4.48	5.48	5.07	3.68	4.69
31	BIOCHEM-19-31	PR 2016-4	4.42	3.32	4.72	4.13	3.41	4.00

Table 16: Total glucosinolate (µmole/g)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean *
1	BIOCHEM-19-1	GSH 21-80	17.6	15.48	10.33	19.14	19.27	16.36
2	BIOCHEM-19-2	GSH 17-17	12.4	7.39	7.84	14.91	11.89	10.89
3	BIOCHEM-19-3	RCH 1	18.88	16.67	12.44	19.62	19.47	17.42
4	BIOCHEM-19-4	GSH 16-99	16.17	15.77	18.21	19.83	16.32	17.26
5	BIOCHEM-19-5	LEC 61	71.29	67.68	63.30	72.83	72.41	69.50
6	BIOCHEM-19-6	PDZ 13	17.86	15.1	10.99	19.01	20.32	16.66
7	BIOCHEM-19-7	RH9OE) 1705	63.79	72.10	75.60	67.13	70.00	69.72
8	BIOCHEM-19-8	JC 21	18.22	17.53	14.76	20.71	16.25	17.49
9	BIOCHEM-19-9	GSH 1707	10.8	8.94	4.26	14.06	15.33	10.68
10	BIOCHEM-19-10	JC 33	21.34	17.42	20.01	19.94	20.37	19.82
11	BIOCHEM-19-11	PM 29	80.83	80.43	66.02	83.48	80.03	78.16
12	BIOCHEM-19-12	PM 30	87.82	101.24	118.44	94.04	95.56	99.42
13	BIOCHEM-19-13	LES 60	75.65	87.79	61.61	72.44	86.43	76.78
14	BIOCHEM-19-14	LES 59	65.2	82.49	93.37	78.63	71.93	78.32
15	BIOCHEM-19-15	LES 54	38.25	30.88	18.21	34.31	36.33	31.60
16	BIOCHEM-19-16	PDZ 1	19.23	13.15	14.02	16.37	21.65	17.48
17	BIOCHEM-19-17	RH(OE) 1706	79.54	72.23	72.32	81.40	81.91	77.48
18	BIOCHEM-19-18	RH(OE) 1710	75.67	73.76	85.61	77.71	77.66	78.08
19	BIOCHEM-19-19	RH(OE) 1711	78.52	83.03	82.43	75.41	85.51	80.98
20	BIOCHEM-19-20	PDZ 1	19.2	15.82	20.36	19.46	22.48	19.46
21	BIOCHEM-19-21	Kranti	66.78	61.27	73.70	71.65	68.23	68.33
22	BIOCHEM-19-22	PRE 2017-5	79.94	87.50	105.38	74.81	88.89	87.30
23	BIOCHEM-19-23	PRE 2017-2	72.39	68.99	64.82	70.32	71.24	69.55
24	BIOCHEM-19-24	PRB 2015-2	72.99	76.97	72.35	71.21	72.32	73.17
25	BIOCHEM-19-25	PT 2015-6	63.78	62.65	48.51	65.29	65.61	61.17
26	BIOCHEM-19-26	PRL 2016-5	80.13	72.52	79.46	74.19	74.60	76.18
27	BIOCHEM-19-27	PR 2016-8	60.47	60.77	75.44	65.49	64.47	65.33
28	BIOCHEM-19-28	PRL 2017-5	73.28	71.36	76.45	77.72	77.43	75.25
29	BIOCHEM-19-29	PR 2017-7	80.18	73.44	63.62	79.10	78.66	75.00
30	BIOCHEM-19-30	PT 2015-7	72.28	75.20	82.73	70.37	70.95	74.31
31	BIOCHEM-19-31	PR 2016-4	89.2	81.84	93.85	87.95	85.33	87.63

Table 17: Phytic acid (%)

Sl. No.	Code	Genotype	BPR	PNT	KNG	LDH	HSR	Mean *
1	BIOCHEM-19-1	GSH 21-80	2.56	2.43	2.63	2.26	2.45	2.47
2	BIOCHEM-19-2	GSH 17-17	2.39	2.17	2.59	2.44	2.31	2.38
3	BIOCHEM-19-3	RCH 1	2.16	2.55	2.58	2.46	2.25	2.40
4	BIOCHEM-19-4	GSH 16-99	1.91	1.87	2.57	1.88	1.82	2.01
5	BIOCHEM-19-5	LEC 61	1.81	1.76	2.50	1.70	1.69	1.89
6	BIOCHEM-19-6	PDZ 13	2.72	2.96	1.85	2.27	2.60	2.48
7	BIOCHEM-19-7	RH9OE) 1705	2.19	2.21	2.44	2.26	2.17	2.25
8	BIOCHEM-19-8	JC 21	1.82	1.97	2.56	1.76	1.73	1.97
9	BIOCHEM-19-9	GSH 1707	2.22	2.28	2.58	2.38	2.26	2.34
10	BIOCHEM-19-10	JC 33	2.49	2.12	2.63	2.06	2.61	2.38
11	BIOCHEM-19-11	PM 29	2.02	2.25	2.55	3.04	2.11	2.39
12	BIOCHEM-19-12	PM 30	1.99	2.43	2.47	2.29	1.82	2.20
13	BIOCHEM-19-13	LES 60	2.97	3.5	2.40	2.91	2.75	2.91
14	BIOCHEM-19-14	LES 59	2.32	2.12	2.46	3.11	2.60	2.52
15	BIOCHEM-19-15	LES 54	2.45	2.47	2.51	2.38	2.40	2.44
16	BIOCHEM-19-16	PDZ 1	2.9	2.24	1.71	1.79	2.42	2.21
17	BIOCHEM-19-17	RH(OE) 1706	2.1	1.79	2.50	1.81	1.76	1.99
18	BIOCHEM-19-18	RH(OE) 1710	2.19	2.74	2.50	2.03	2.22	2.34
19	BIOCHEM-19-19	RH(OE) 1711	1.79	1.87	2.44	1.83	1.83	1.95
20	BIOCHEM-19-20	PDZ 1	2.95	2.07	1.71	1.91	2.49	2.23
21	BIOCHEM-19-21	Kranti	2.89	1.76	2.65	1.68	2.59	2.31
22	BIOCHEM-19-22	PRE 2017-5	1.83	1.26	2.70	1.86	1.90	1.91
23	BIOCHEM-19-23	PRE 2017-2	2.33	2.32	2.70	2.32	2.20	2.37
24	BIOCHEM-19-24	PRB 2015-2	2.01	2.38	2.65	2.32	2.11	2.29
25	BIOCHEM-19-25	PT 2015-6	2.87	3.12	2.77	2.76	2.87	2.88
26	BIOCHEM-19-26	PRL 2016-5	1.92	1.96	2.65	1.62	1.85	2.00
27	BIOCHEM-19-27	PR 2016-8	2.51	2.42	2.67	2.38	2.47	2.49
28	BIOCHEM-19-28	PRL 2017-5	1.59	1.90	2.63	1.77	1.68	1.91
29	BIOCHEM-19-29	PR 2017-7	2.39	2.19	2.68	2.52	2.45	2.45
30	BIOCHEM-19-30	PT 2015-7	3.21	3.77	2.75	3.11	3.11	3.19
31	BIOCHEM-19-31	PR 2016-4	2.71	2.73	2.67	2.22	2.59	2.58