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Abhishek Singh

Student M. Sc (Ag), Dept. of Biochem. N.D.U.A.T Kumarganj, Faizabad, Uttar Pradesh, India

Piyush Kumar Singh

Student M. Sc (Ag), Dept. of Stat. N.D.U.A.T Kumarganj, Faizabad, Uttar Pradesh, India

Ravi Pratap Singh

Student M. Sc (Ag), Dept. of Hort. N.D.U.A.T Kumarganj, Faizabad, Uttar Pradesh, India

Anushka Singh

Student M. Sc (H.Sc.), Dept. of H.D & F.S, B.B.A.U. Lucknow, Uttar Pradesh, India

Garima Dwivedi

Student M. Sc (Ag), Dept. of FSN, N.D.U.A.T Kumarganj, Faizabad, Uttar Pradesh, India

Anand Singh

Student M. Sc (Ag), Dept. of GPB, N.D.U.A.T Kumarganj, Faizabad, Uttar Pradesh, India

Abhineet

Student M. Sc (Ag), Dept. of Agronomy, N.D.U.A.T Kumarganj, Faizabad, Uttar Pradesh, India

Seema Kanojia

Student M. Sc (Nutritional Science), Dept. of Nutritional Science, C.S.J.M. University Kanpur, Uttar Pradesh, India

PK Singh

SMS, KVK Mashodha, N.D.U.A.T Kumarganj, Faizabad, Uttar Pradesh, India

Himanshu Singh

Student M. Sc (Ag), Dept. of GPB, N.D.U.A.T Kumarganj, Faizabad, Uttar Pradesh, India

Correspondence**Abhishek Singh**

Student M. Sc (Ag), Dept. of Biochem. N.D.U.A.T Kumarganj, Faizabad, Uttar Pradesh, India

Evaluation of physical characteristics of linseed varieties

Abhishek Singh, Piyush Kumar Singh, Ravi Pratap Singh, Anushka Singh, Garima Dwivedi, Anand Singh, Abhineet, Seema Kanojia, PK Singh and Himanshu Singh

Abstract

The components of linseed are protein (21%), dietary fibre (28%) and fat (41%) has unique fatty acid profile. Linseed has high polyunsaturated fatty acids (PUFA) (73% of total fatty acids), moderate in monounsaturated fatty acids (18%) low in saturated fatty acids on moisture free basis. Linoleic acid as Omega-6 fatty acid, constitutes about 16 percent of total fatty acid whereas, ALA constitutes about 57 percent. Due to the nutritional profile of linseed, many researchers have recognized linseed as tiny double powerhouse in disease prevention. The present investigation entitled "Evaluation of Physical characteristics of linseed varieties" was conducted at Agronomy Research Farm of Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) India in the year 2016. Ten varieties of linseed Garima, Shikha, Parvati, Mukta, Shubhra, Shekhar, Chambal, T-397, NDL-1 and NDL-3 were collected from department of Genetics and plant breeding of this University, and used as experimental material in the field trail. The seeds of linseed varieties were sown in Completely Randomized Design with three replications on 20 October 2016. The row to row and plant to plant spacing was kept 10 cm and 30 cm, respectively. The seeds were sown at the rate of 30-40 kg per ha. All agronomical practices were adopted to achieve a good crop. For physical analysis observations were made on Number of pods per plant, 1000-seed weight, colour of seeds, and yield per plant.

Keywords: Dietary Fibre, Linoleic Acid, Saturated, Randomized

Introduction

Flax or linseed is among the oldest crop plants cultivated for the purpose of oil and fibre. It belongs to the genus *Linum* and family Linaceae. The botanical name, *Linum usitatissimum* was given by Linnaeus in his book "Species Plantarum" (Linnaeus, 1857) [17]. It is an annual herbaceous plant with shallow root system. The common names flax and linseed are used in North America and Asia, respectively, for *L. usitatissimum*. Oilseed varieties and fibre varieties are specialized development of this species (Millam *et al.*, 2005). Linseed is one of the best dietary sources of lignans. The main lignan in linseed is secoisolariciresinol diglucosidw (SDG), which is present in large quantities. The lignans are generally cinnamic acid dimmers containing a dibenzylbutane skeleton (Essam *et al.* 2012).

Linseed has a shallow root system and needs sufficient moisture during the growing season (Hocking *et al.*, 1997). Seedling establishment is generally slow and seedlings have poor competitive ability. Germination and seedling emergence may be influenced by temperature, sowing depth and seedbed conditions like available moisture and salinity (O'Connor and Gusta, 1994; Saeidi and Rowland, 1997; Couture *et al.*, 2004; Kurt and Bozkurt, 2006) [13]. In arid and semi-arid regions where rainfall is insufficient to leach salts out of the root zone, the salinity is a major problem which limits plant growth (Khajeh Hosseini *et al.*, 2003), since evaporation tends to exceed rainfall (Pessarakli, 1999; Kaya *et al.*, 2003). Salinity leads to delayed germination and emergence, low seedling survival, irregular crop stand and lower yield due to abnormal morphological, physiological and biochemical changes (Ashraf and Fatima, 1994; Munns, 2002; Muhammad and Hussain, 2010) [6].

The components of linseed are protein (21%), dietary fibre (28%) and fat (41%) has unique fatty acid profile. Linseed has high polyunsaturated fatty acids (PUFA) (73% of total fatty acids), moderate in monounsaturated fatty acids (18%) low in saturated fatty acids on moisture free basis. Linoleic acid as Omega-6 fatty acid, constitutes about 16 percent of total fatty acid whereas, ALA constitutes about 57 percent. Due to the nutritional profile of linseed, many

researchers have recognized linseed as tiny double powerhouse in disease prevention (Ziegler, 1994). The effect of dietary factors of linseed on health promotion and disease prevention has been an issue of interest since antiquity and has become a subject of renewed research activity in recent years.

Phenolic compounds in general possess an aromatic ring bearing one or more hydroxyl substituents and may be found in Free State, conjugated with sugars or esters or polymerized (Shahidi, 2000). They are not evenly distributed in tissues or cells of plants, and can be associated with components of the cell wall such as tissues or cells of plants, and can be associated with components of the cell wall such as polysaccharides and proteins (Nackz and Shahidi, 2004).

Materials and Methods

The experiment was conducted during Rabi season 2017 at the Agronomy research farm. The seeds of linseed varieties were sown in Completely Randomized Design with three replications on 20 October 2016. The row to row and plant to plant spacing was kept 10 cm and 30 cm, respectively. The seeds were sown at the rate of 30-40 kg per ha. All agronomical practices were adopted to achieve a good crop. For physical analysis observations were made on Number of pods per plant, 1000-seed weight, colour of seeds, and yield per plant.

Experimental Results

The field and laboratory experiments of the present investigation entitled "Evaluation of Physical characteristics of linseed varieties". The observations recorded in the linseed were analysed statistically.

The number of pods per plant was recorded in the range of 44.66 to 59.33. Highest number of pod per plant was reported

in the variety NDL-3(c) (59.38) followed by NDL-1 (57.67), T-397 (53.33), Shekhar (51.34). Minimum pods per plant were recorded in Garima (44.67). Data pertaining to the 1000-seed weight in different linseed varieties was observed in the range of 6.24 to 7.97g. Maximum 1000-seed weight was recorded in the variety NDL-3(c) (7.96g) followed by NDL-1 (7.86g), T-397 (7.81g), Chambal (7.80g). Lowest 1000-seed weight was observed in the variety Garima (6.24g). Colour of seeds in linseed varieties were noticed as brown colour by visual observation. The brown colour was visually observed in the varieties Garima, Shikha, Parvati, Mukta, Shubhra, Shekhar, Chambal, T-397, NDL-1 and NDL-3. The yield per plant was recorded in the range of 4.99 to 8.65 g. Highest yield per plant was recorded in the linseed varieties NDL-3(c) (8.26g) followed by NDL-1 (7.85g), T-397 (7.63g), Shubhra (7.49g). Lowest yield per plants observed by Garima (6.61g).

Table 1: Number of pods per plant and 1000 seed weight (g) of linseed varieties

S. No.	Verities	Number of pods/plants	1000-seed weight
1	Garima	44.67	6.24
2	Shikha	46.66	7.33
3	Parvati	47.63	7.20
4	Mukta	48.67	7.67
5	Shubhra	45.67	7.77
6	Shekhar	51.33	7.78
7	Chambal	50.33	7.80
8	T-397	53.33	7.81
9	NDL-1	57.67	7.86
10	NDL-3(C)	59.38	7.96
	SEM ±	1.39	0.09
	CD at 5%	4.06	0.27

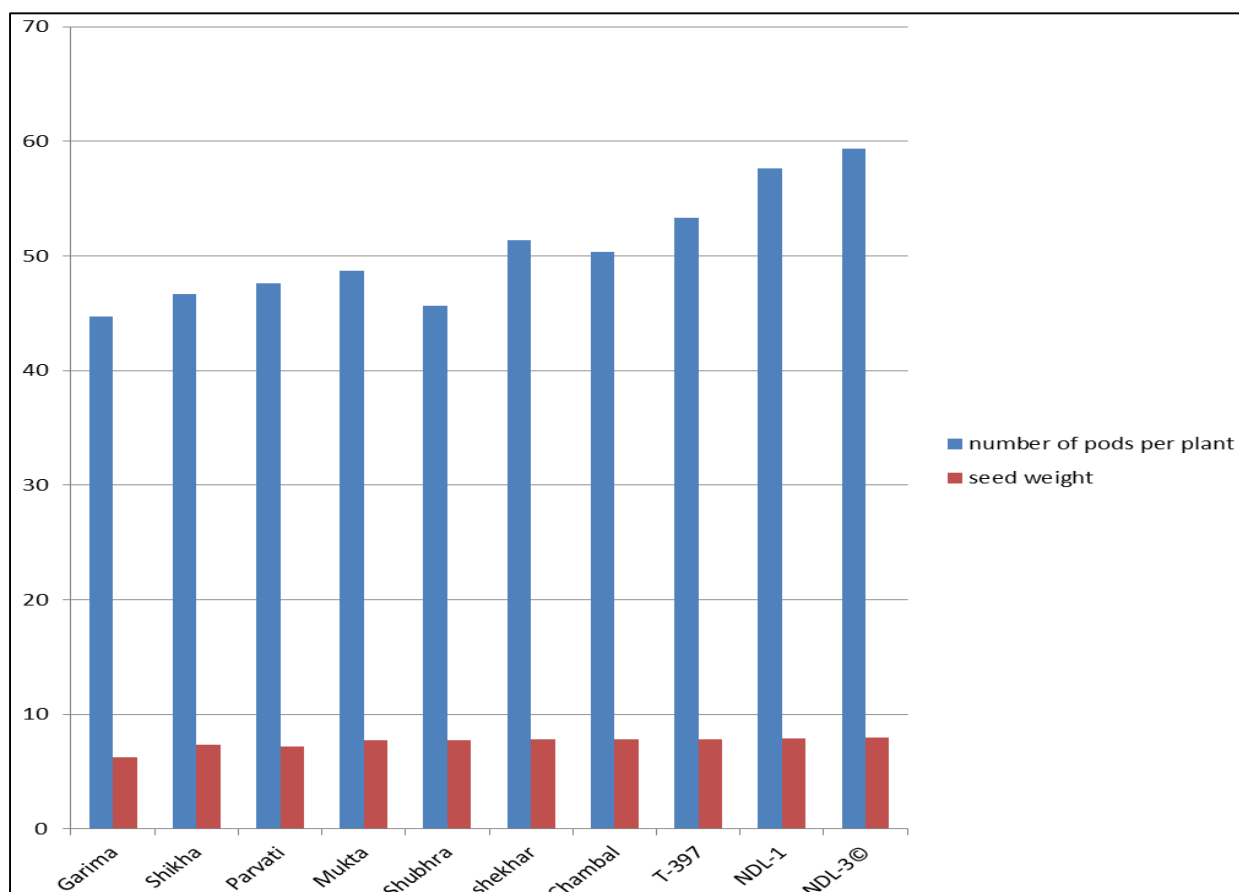
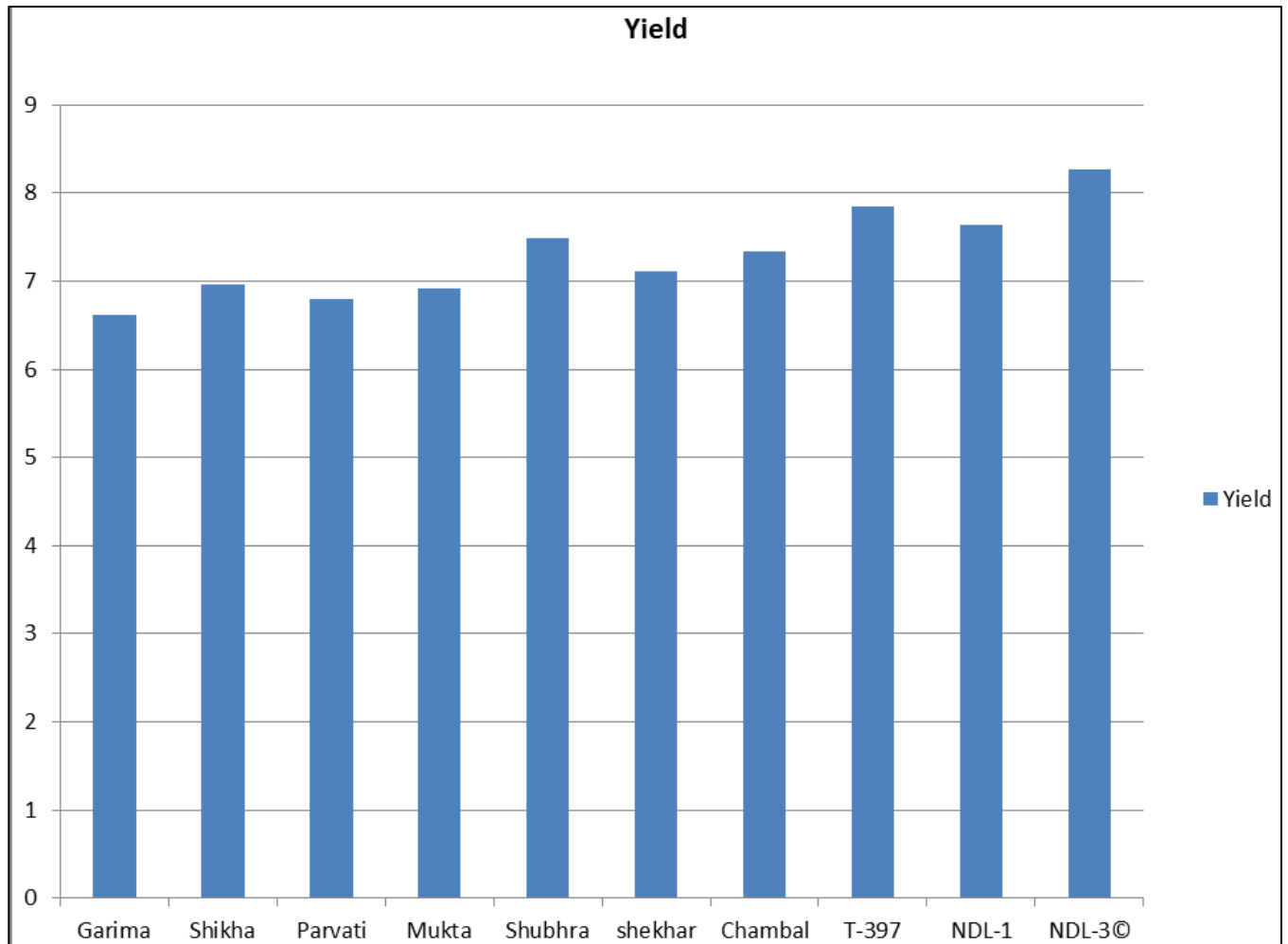


Fig.-1: Number of pods per plant and 1000 seed weight (g) of linseed varieties:

Table 2: Colour of seeds and yield per plant of linseed varieties:

S. No.	Verities	Colour	Yield per plant (g)
1	Garima	Brown	6.61
2	Shikha	Brown	6.96
3	Parvati	Brown	6.80
4	Mukta	Brown	6.91
5	Shubhra	Brown	7.49
6	Shekhar	Brown	7.11
7	Chambal	Brown	7.33
8	T-397	Brown	7.85
9	NDL-1	Brown	7.63
10	NDL-3(c)	Brown	8.26
	SEM \pm	–	0.24
	CD at 5%	–	0.7

**Fig 2:** Colour of seeds and yield per plant of linseed varieties:

Conclusion

The number of pods per plant was recorded in the range of 44.66 to 59.33. Highest number of pod per plant was reported in the variety NDL-3(c) (59.38) followed by NDL-1 (57.67), T-397 (53.33), Shekhar (51.34). Minimum pods per plant was recorded in Garima (44.67). Data pertaining to the 1000-seed weight in different linseed varieties was observed in the range of 6.24 to 7.97g. Maximum 1000-seed weight was recorded in the variety NDL-3(c) (7.96g) followed by NDL-1 (7.86g), T-397 (7.81g), Chambal (7.80g). Lowest 1000-seed weight was observed in the variety Garima (6.24g). Colour of seeds in linseed varieties were noticed as brown colour by visual observation. The brown colour was visually observed in the varieties Garima, Shikha, Parvati, Mukta, Shubhra, Shekhar, Chambal, T-397, NDL-1 and NDL-3. The yield per plant was

recorded in the range of 4.99 to 8.65 g. Highest yield per plant was recorded in the linseed varieties NDL-3(c) (8.26g) followed by NDL-1 (7.85g), T-397 (7.63g), Shubhra (7.49g). Lowest yield per plants observed by Garima (6.61g). Even these varieties may also be best for qualitative livestock feeds and widely used as row nutrient for agri-industries.

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