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To study the fatty acid palmitic, stearic, oleic and linoleic acid profile of linseed

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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 per cent of total fatty acid whereas, ALA constitutes about 57 per cent.

Keywords: acid palmitic, stearic, oleic, linoleic acid

1. Introduction
Flax or linseed is one of the predominant industrial oils seed crops grown in temperate climates. The seed oil of this oilseed crop is enriched in α-linolenic acid (ALA). Because of this, flax oil readily polymerizes on exposure to oxygen, making it useful for a variety of industrial products, including varnish and linoleum, while meal from pressed seed is useful as animal feed. Industrial demand declined after the 1960s due to a shift to acrylic paints and vinyl floor coverings, but now there is a renewed interest in using biomass derived feedstocks. In addition to industrial applications, ω-3-enriched linseed oil is gaining importance in livestock feed and aqua-feed applications. The oil is also recognized as a good source of ALA for the human diet. Additional flax constituents, including fibre and lignans (Czemplik and Szopa, 2009) [4]. 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 per cent of total fatty acid whereas, ALA constitutes about 57 per cent. Due to the nutritional profile of linseed, many researchers have recognized linseed as tiny double powerhouse in disease prevention (Ziegler, 1994) [8]. 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 tissuess or cells of plants, and can be associated with components of the cell wall such as polysaccharides and proteins (Nackz and Shahidi, 2004) [5]. Linseed has the potential antioxidant property where lipids are protected by oxidation due to the presence of lignans, phenols, tocopherols and flavonoids (very important phytochemicals). Consumption of linseed is beneficial for human health. Linseed containing about 36 to 40 per cent of oil is the richest (among crop plants) source of PUFA essential in the human diet. Therefore, it has been considered as the source of increased interest in the field of diet and disease research due to its biologically active components (Anonymous, 2010) [1] including prebiotic properties of linseed and in its beneficial effects on coronary heart diseases, Some kinds of cancer; neurological and hormonal disorders (Bassette *et al*., 2010) [2].
Although it is a rich source of many nutrients, it also has got antinutritional factors such as, trypsin inhibitors, cyanogenic compound of about 264 to 540 mg/100g. These compounds either inhibit the availability of protein or toxic to humans.

Hence, processing by adopting thermal and mechanical applications including roasting, cooking in microwave, autoclaving and boiling are recommended to avail the nutritional benefits from these seeds (Carrora *et al*., 2012).

2. Materials and Methods
The fatty acids used to prepare the standard solution were the major fatty acid namely palmitic, oleic, linoleic and steatic acid were analyzed by "High Performance liquid chromatography".

3. Experimental Results
The data pertaining to the basis of four important fatty acids palmitic, stearic, oleic and linoleic acid found in linseed oil. It has been presented in Table 1. In the case of palmitic acid content it ranged from 5.50-7.03%. Maximum palmitic acid was evaluated in the NDL-3(c) (7.03%) followed by NDL-1 (6.83%), T-397 (6.70%) and Parvati (6.23%). Minimum palmitic acid was noticed in the variety Garima (5.70%). Statistical analysis showed a significant variation palmitic acid content in various treatment of linseed varieties in the present investigation. Stearic acid content it ranged from 4.27-6.70%. Maximum stearic acid was evaluated in the NDL-3(c) (6.7%) followed by NDL-1 (5.17%), T-397 (5.0%) and Chambal (4.74%). Minimum stearic acid was noticed in the variety Garima (4.33%). Statistical analysis showed a significant variation stearic content in various treatment of linseed varieties in the present investigation. Linolenic acid content it ranged from 51.62-55.58%. Maximum linolenic acid was evaluated in the NDL-3 (55.58%) followed by NDL-1 (55.14%), Chambal (54.70%) and T-397 (54.26%). Minimum linolenic acid was noticed in the variety Garima (51.62%). Statistical analysis showed a significant variation linolenic acid content in various treatment of linseed varieties in the present investigation. Oleic acid content it ranged from 19.7-22.59%. Maximum oleic acid was evaluated in the NDL-3 (22.59%) followed by T-397 (22.32%), Chambal (21.71%) and Shekhar (21.53%). Minimum oleic acid was noticed in the variety Shikha (19.7%). Statistical analysis showed a significant variation oleic acid content in various treatment of linseed varieties in the present investigation.

Table 1: Fatty acids profile of linseed oil

S. No.	Variety	Palmitic Acid (%)	Stearic Acid (%)	Linolenic Acid (%)	Oleic Acid (%)
1	Garima	5.50	4.33	51.62	19.70
2	Shikha	6.10	4.57	53.38	20.66
3	Parvati	6.23	4.50	52.06	21.40
4	Mukta	5.70	4.60	52.50	20.90
5	Shubhra	5.90	4.27	52.94	21.14
6	Shekhar	6.03	4.73	53.82	21.53
7	Chambal	6.13	4.74	54.70	21.71
8	T-397	6.83	5.0	54.26	22.32
9	NDL-1	6.70	5.17	55.14	20.63
10	NDL-3(c)	7.03	6.7	55.58	22.59
	SEM ±	0.147	0.046	0.79	0.11
	CD at 5%	0.43	0.13	2.32	0.33

4. Conclusion
Flax seed has been valued historically for its abundance of fat, which provides a unique mix of fatty acids. Flaxseed is rich in the essential omega-3 fatty acid, alpha linolenic acid. The omega-3 fatty acids have biologic effects that make them useful in preventing and managing chronic conditions such as type 2 diabetes, kidney disease, rheumatoid arthritis, high blood pressure, coronary heart disease, stroke, alzheimer disease, alcoholism and certain types of cancers.

The high alpha linolenic acid content of flaxseed oil and the observed protective effects of omega-3 fatty acids on cancer have led to the hypothesis that the fatty acid composition of flaxseed may render it protective against cancer Serraino (1992) [7]. In the case of palmitic acid content it ranged from 5.5-7.03%. Maximum palmitic acid was evaluated in the NDL-3(c) (7.03%) and minimum palmitic acid was noticed in the variety Garima (5.70%). In the case of stearic acid content it ranged from 4.27-6.7%. Maximum stearic acid was evaluated in the NDL-3(c) (6.7%) and minimum stearic acid was noticed in the variety Garima (4.33%). In the case of linolenic acid content it ranged from 51.62-55.58%. Maximum linolenic acid was evaluated in the NDL-3 (55.58%) and minimum linolenic acid was noticed in the variety Garima (51.62%).

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