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TO STUDY THE EFFECT OF BLIGHT DISEASE ON SUGAR CONTENT OF LINSEED SEED (CV. CHAMBAL), INDIA

Sharma Rakesh Babu[1], Singh Balwant[2]
Assistant Professor, Department of Plant Pathology, BNPG College, Rath, Hamirpur (UP)
Associate Professor, Department of Genetics and Plant Breeding, BNPG College, Rath, Hamirpur (UP)
Email: rakeshsharma1780@gmail.com

Abstract

Study area of this research was Northern Bundelkhand Region during 2013-14 and 2014-15. Data were collected from different places of linseed growing farmer's field and research field of BNPG College Rath, Hamirpur (UP). keeping the view of above mentioned objective. The sugar content in linseed is present in form of soluble and insoluble fibres including lignin. High level of reduction in soluble fibers was fond in Glucose (61.54%) followed by Rhamnose (59.68%) and insoluble fibres, highest reduction was observed in other sugars (30.40%) followed by Cellulose (19.15%).

Key words: *Sugar content, Soluble fibers, Insoluble fibers, Linseed seed*

Introduction

Flaxseed is the seed from the flax plant (Linum usitatissimum L.), which is a member of the Linaceae family. The plant is not a new crop and native to West Asia and the Mediterranean (Berglund, 2002). Flaxseed is rich in fat, protein, and dietary fibre. Chemical analysis of flaxseed averaged 30 to 40% oil, 20 to 25% protein, 20 to 28% total dietary fibre, 4 to 8% moisture and 3 to 4% ash and the oil contains vitamins A, B, D and E, minerals and amino acids. By virtue of the presence of physiologically active food components that may provide health benefits beyond basic nutrition, flaxseed is often grouped into one of several categories: ''functional food'', ''bioactive food'' and an ''endocrine active food'' (Hasler et al., 2000). The qualitative and quantitative .

Flaxseed contains substantial soluble and insoluble fiber. Cui *et al*, (2001) reported the content of insoluble and soluble fiber to be 20% and 9%, respectively, whereas reported 30% and 10%, respectively. The differences likely arise from seed and/or extraction protocols used. Soluble fiber, also known as mucilage, occurs in the seed coat and is readily extracted with hot and less readily with cold water (Paynel et al., 2013). This soluble fiber includes acidic [composed of L-rhamnose (25.3%), L-galactose (11.7%), L-fructose (8.4%), and D-xylose (29.1%)] and neutral polysaccharides [L-arabinose (20%) and D-xylose/D-galactose (76%)]. (Anderson & Lowe, 1947). Insoluble fiber is composed of cellulose (7e11%), lignin (2e7%), and acid detergent fiber (10e14%) (Cui *et al*, 1994). Flaxseed mucilage arabinogalactans are associated with protein. Flaxseed oil content of ranges from 38 to 44% due to genotype and environmental parameters. Microscopic membrane bound oil bodies, known as oleosomes, are the main storage form of oil in the endosperm and cotyledons. Oleosomes may be extracted from other seed components and they contain CLs (Gui, Shim, & Reaney, 2012). Fatty acid composition varies among different flaxseed types and cultivars. The majority of the flaxseed oil (75%) is found in cotyledons, with much of the remaining oil (22%) present in the seed coat and endosperm. The oil is primarily in the form of triacylglycerides.

Ponter *et al*., (2005) said that flax seed is rich in lanoline acid added to the diet of post partum dairy cows on ovarian follicle growth and milk and plasma fatty acid.

Singh and Singh, (2005) studied the different time of sowing 16° C, 7 Nov., 18 Nov., 5 Feb., against *Alternaria* blight of linseed. The highest yield losses were available in the variety Chambal sown on 16 October.

Radhamanij *et al.*, (2006) reported that linseed is one of the important oil seed and fiber yielding crops of India. India is the 3rd largest producer in the world. However, the average national productivity (403 kg/ha) is far below the world average (851 kg/ha). Predominantly was owing to the susceptibility of the cultivars to biotic and abiotic stresses.

Stramkala *et al*., (2003) studied that oil flax seed contains about 5.1 – 11.7% carbohydrate (Mucilaginous substances), cotyledons contain on average 25-45 % fat and up to 30 % of protein. A part from these substances, flax seed contains carbohydrates, phosphorous compounds that are similar to fat in their composition, pigments, carotene, glycoside linamarine, enzymes (lipase, protease, etc.) and other substances.

Materials and Methods

Flaxseed contains both soluble and insoluble fiber (Bloeden and Szapary, 2004). The measurement of dietary fibers in flaxseed is a complex issue, associated with the definition of fiber in the analytical method chosen. Methods for the determination of dietary fiber may be divided into three categories: non-enzymatic-gravimetric, enzymatic gravimetric and enzymatic-chemical methods. The later includes enzymatic-colourimetric and enzymaticchromatographic (GLC/ HPLC) methods. Nowadays, the most commonly used methods for dietary fiber measurement are the enzymatic-gravimetric, the Association of Official Analytical Chemists (AOAC) method (Prosky et al., 1988) and enzymatic-chemical method (Englyst et al., 1994). The most fiber-rich plants include grains such as wheat, barley and oats; legumes such as beans, lentils and soybeans; and vegetables such as garlic, asparagus, broccoli and carrots (Murphy and Hendrich, 2002). Flaxseed is recognized as having about 35 to 50% dietary fiber. It contains 5% viscous fiber (mucilage) (Muir et al., 2000).

Results

Table 1 Sugar Content in normal and blighted seeds of linseed

Sr. No.	Soluble Fiber	Normal seed %	Blighted seed %	% Reduction
1	rhamnose	25.3	10.2	59.68
2	galactose	11.7	4.5	61.54
3	fructose	8.4	3.8	54.76
4	xylose	29.1	12.5	57.04
Insoluble Fiber				
5	cellulose	9.4	7.6	19.15
6	Lignin	3.6	3.3	8.33
7	Others	12.5	8.7	30.40
	Total	100	-	

The sugar content in linseed is present in form of soluble and in soluble fibers including lignines. The seed analyzed data for both normal and blighted seeds are presented in table 1 which showed that wide reduction in sugar content was observed in blighted seed as compared with normal one. High level of reduction in soluble fibers was noted as compared with insoluble. Highest reduction was observed in galactose (61.54%) followed by rhamnose (59.68%) and xylose (57.40%) respectively. In insoluble fibers highest reduction was noted in other sugars (30.40%) followed by cellulose (19.15%) while lowest reduction was noted in lignin content. The reduction in sugars might be due to utilization of these components by the pathogen in building of the body and utilization in energy source for their growth and multiplication

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