

## Oil profile of some genotypes of flax (*Linum usitatissimum* L.) manufactured in the Strumica region, Republic of Macedonia

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### ABSTRACT

Flax (*Linum usitatissimum* L.) is an industrial crop and has great importance for humans and economy. For the production of large amounts of flaxseed oil, the oil industry needs flax genotypes which have higher oil content.

Analysis of five different flax genotypes, produced in the Strumica region, Republic of Macedonia, in 2014 and 2015 is made, with regard to the oil content in the flax seed. The experiment consisted of five variants in three repetitions, divided by the method of randomized block system. During the vegetation, standard farming practices for field flax production were used. Analysis of the fat content in flaxseed was made in the Laboratory for plant and environmental protection, at the Faculty of Agriculture, “Goce Delcev” University – Stip (No. LT – 028, Standard: MKCEN ISO/IEC 17025:2006). The fat content of the flaxseed was analyzed by Soxhlet method. The results were statistically processed by the method of analysis of variance, and the differences were tested by LSD – test.

The fat content in flaxseed of the tested genotypes ranged from 18.9% to 33.8%. All flax genotypes had higher percentage of fat content in the seed compared to standard *Velušina*, regardless the year of examination. So, *Duferin* genotype (27.7%) have 7.7% more fat content than the standard; *Belan* genotype (30.8%) – 10.8% more, *Viking* genotype (26.2%) – 6.2% more and *Belinka* genotype (30.9%) – 10.9% more. The difference of the fat content in the flaxseed is due to the variety specificity. The genotypes *Belinka* (30.9%) and *Belan* (30.8%) are characterized by the highest average fat content in the seed, regardless the year of production. *Belinka*, *Belan* and *Duferin* are perspective genotypes for the oil industry, as they have higher fat content in the seed than the other analyzed genotypes.

**Key words:** Flax, Seed, Content, Genotype, Percent, Oil.

### 1. Introduction

Flax or linseed is among of the oldest crop plant cultivated for the purpose of oil and fiber [1]. The production of flax in the Republic of Macedonia it is grown on small surfaces for its seed (as bird food) and in 2005-2006 is grown on the Faculty of Agricultural Sciences and Food in Skopje as a research project [8]. Interest for oilseed flax in recent years has increased as a result of the increased capacity of oil production. Starting from that point, reintroducing of the flax surfaces in Republic of Macedonia imposed the need for an investigation of the characteristics of certain varieties of flax, their acclimatization, production and quality characteristics.

Main aim of this examination is to determine the content of oil in the seeds of different genotypes of flax, produced in agro-ecological conditions of the Strumica region of Macedonia and to offer better information to manufacturers and industry who genotype of flax to be used if the same time oil content in the seed is a priority factor.

On the size of content of oil in the flaxseeds largely influence had a specificity variety, soil and climate conditions, the applied agro-technical measures, method of storage and more. General average oil content in the seeds of the flax, was 27.1%.

### 2. Material and methods

The research was conducted in the field and laboratory conditions. Field examinations were set up at the experimental field in Strumica at Uniservice - Agro D.O.O.E.L., Faculty of Agriculture, University „Goce Delchev”-Stip. The research was conducted in the period of two years (2014 and 2015).

As a work material were used five flax genotypes:

1. Velusina
2. Duferin
3. Belan
4. Belinka
5. Viking

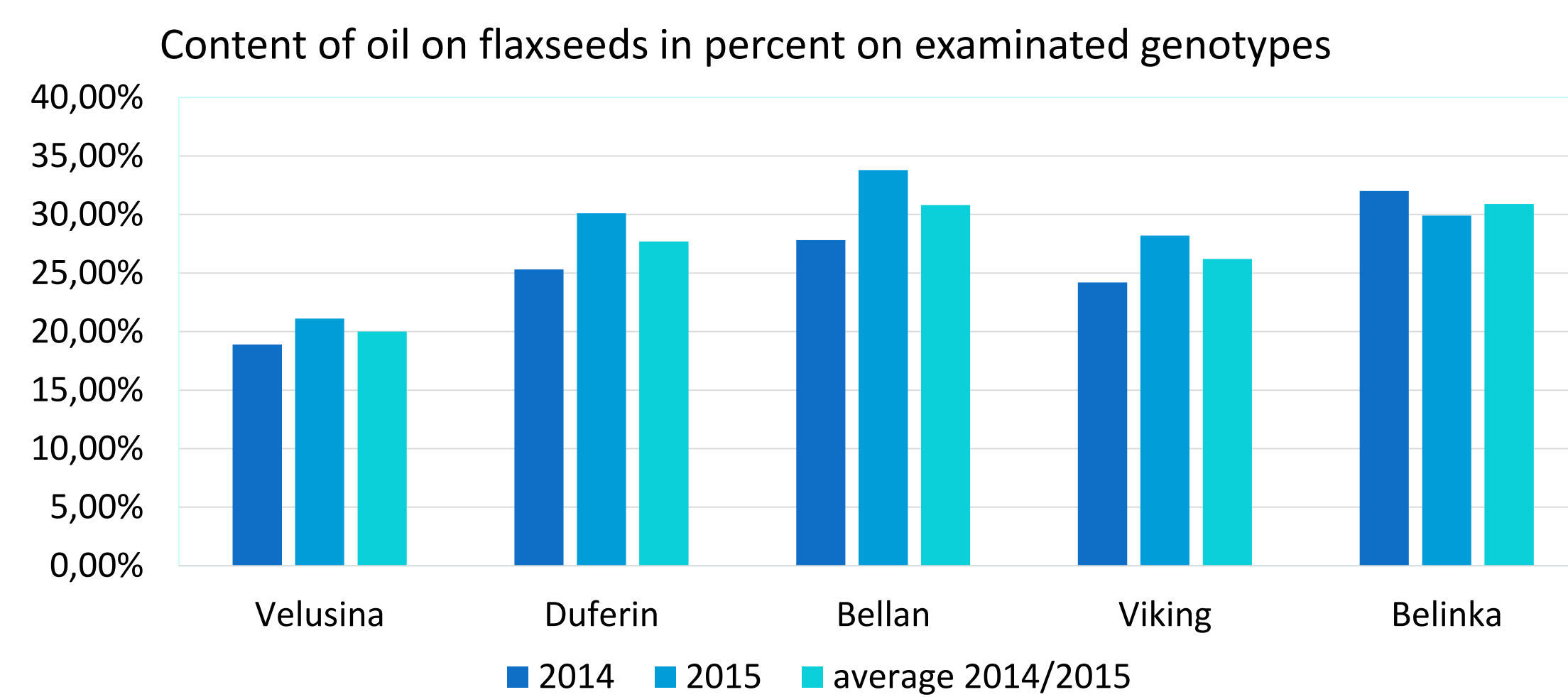
Four of which are domestic intermediate flax genotypes (*Velusina*, *Duferin*, *Belan*, *Belinka*) and one is a French introduced fiber flax variety (*Viking*).

The experiment consisted a five variants in three repetitions, divided by the method of random block system with the basic dimension of the parcel of 10 m<sup>2</sup>. The distance between the variants was 50 cm and 100 cm between repetitions. The distance between rows was 30 cm. Analysis of the fat content in flaxseed was made in the Laboratory for plant and environmental protection, at the Faculty of Agriculture, “Goce Delcev” University - Stip (No. LT - 028, Standard: MKCEN ISO/IEC 17025:2006). The fat content of the flaxseed was analyzed by Soxhlet method. The results were statistically processed by the method of analysis of variance, and the differences were tested by LSD - test.

### 3. Results and discussion

**Table 1. Content of oil in flaxseed presented in percent (%)**

Genotype	Year		Average on genotype
	2014	2015	
Velusina	18,9	21,1	20,0
Duferin	25,3	30,1*	27,7
Bellan	27,8*	33,8*	30,8
Viking	24,2	28,2	26,2
Belinka	32,0**	29,9*	30,9
Average on year	24,6	28,6	27,1
LSD	0,05	7,23	General average
	0,01	12,99	



**Figure 1. Content of oil in seed (%) of examination genotypes of flax**

The ranges of oil content was from 18.9 to 33.8%. General average oil content in the seeds of the flax, was 27.1%.

### 4. Conclusions

Based on research and the results of the oil content in the seeds of the five examined genotypes of flax produced in 2014 and 2015 in the Strumica region, Republic of Macedonia, may be concluded the following:

The oil content in the seeds of flax ranges is from 18.9 to 33.8%. On the size of this parameter largely influence had a specificity variety, soil and climate conditions, the applied agro-technical measures, method of storage and more.

The genotypes *Belinka* (30.9%) and *Belan* (30.8%) are characterized by the highest average oil content in the seeds, regardless of the year of production.

The lowest oil content in the seeds had a standard genotype *Velušina* (20.0%).

Independently of the year of examination, all genotypes have a greater percentage of oil content in the seeds compared to standard genotype *Velušina* (20.0%). These differences in the percentages of oil in flaxseed in tested genotypes is due to the variety specificity.

The industry for the production of cooking oil for larger quantities of oil should be processed and used flaxseed from genotypes *Belinka*, *Belan* and *Duferin*, who have more oil content, regardless of the year of manufacture, and which is produced in climate conditions like Strumica region in Republic of Macedonia.

The examinations on this field should to continue with another genotypes and to give a recommendation for genotypes with better properties for yield and oil content for growing in Republic of Macedonia

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