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# Oat grain composition and its nutrition benefice.

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**Abstract**

A key component of well-being and healthy lifestyle is healthy food including functional food. Oat (Avena sativa L.) is a well known annual crop in temperate climates. It is recognised as a healthy food containing significant amounts of soluble dietetic fibre, β-glucans, fat-soluble vitamin E and polyunsaturated fatty acids in the world. There are luck investigations in the protein quality and fatty acids composition, but few investigations of dietetic fibre amount and composition till now. Therefore the aim of this study was to characterise the biochemical composition of husked and naked oat varieties and breeding lines to grown in Latvian condition. In the studied samples content of protein, fat, vitamin E (α-tocopherol), same as composition of amino acids, fatty acids and dietary fibre were determined. The obtained results showed a wide range of fat content among varieties, it varied from 4.9 to 10.5 g 100 g-1. The content of α-tocopherol in oat grain was determined 4.5 – 12.3 mg kg-1, the sum of essential amino acids 35-45gkg-1 and unsaturated fatty acids accounted 78–81.5% of total fatty acids content. Results of evaluation leads to conclusion that oat grain are rich with biologicaly significant substances and their consumption in human diet is beneficial for human well-being.


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*Keywords:* Human healts; well-being; amino acids; vitamin E; dietetic fibre;

## 1. Introduction

In recent years, public attention is especially paid to inhabitants health and well-being, through the consumption of wholesome food. Grains, including oats (*Avena sativa* L.), have been recognized functional foods, because provide beneficial effect on the health of the consumer and decrease the risk of various diseases. The valuable

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physiological and nutritional attributes of oat by β-glucans and other dietary fibre components, high tocopherol and natural antioxidant level have generated an increased demand for oats in human nutrition, mentioned by Zwer (2004). Vitamin E activity is provided by the tocopherols and tocotrienols, which together create tocols. Alpha-tocopherol is a major antioxidant component in crude oat unaltered when the lipid is refined, noted Zielinski et.al., 2001. Separate fatty acids (FA) also have different impact on human health. Many studies estimate the beneficial effects of polyunsaturated (PUFA) and monounsaturated fatty acids (MUFA), reported Chillard et al. (2000) and Gebauera et.al. (2005).

A potential in improving nutrition and health is the consumption of dietary fibre. Dietary fibres were shown to contribute to the prevention of heart disease, diabetes, some forms of cancer and the improvement of both short and long-term memory functions. The World Health Organization (WHO) recommends a dietary fibre intake of at least 25g per day. The average intake is only 12-18g in the USA and 15-20g in Europe, but 40-60 g in Africa. One consequence of this imbalance in dietary fibre intake is obesity.

The discussion on oat grain dietetic value and suitability to the production of functional foods is more frequently mentioned in scientific literature by Biel et. al. (2009). Oats are a major component of infant foods due to their high nutritional profile, lack of allergenicity, palatable flavour, good shelf-life, stability and low cost. Food uses for oats include oat bran, oat meal, oat flour and oat flakes which are mainly used for breakfast cereals. Porridge, hot cereals, bread, biscuits, infant food, muesli and granola bars are a few examples of food products produced from oats. Oat flour is also used as a thickener in many infant foods, noted Ranhotra (1995).

The increase of feed lots and the development of improved oat varieties for feed value will also increase the demand for oats. For further breeding of oats, there is an urgent need to increase our knowledge on variation in content of fibre and bioactive components in European oats and also on the importance of growing conditions. Old and new types need to be characterized on a broader scale. In the future most likely it will be possible to produce European oats and foods from these cereals with specific health benefits.

The aim of our investigation was to analyze the composition of hight yielding hulled and naked oat varieties and perspective breeding lines grains grown in Latvia and evaluate its nutritional benefice and functional properties.

## 2. Materials and methods

The research was conducted at the State Stende Cereal Breeding Institute. The material consisted of 5 oat genotypes – hulled oat varieties Laima and Lizete, naked oat variety Stendes Emilija (S-156) and naked oat breeding lines 33793, 34170, were taken 3 replicates of each variety or breeding line.

Mean samples from all replications (0.5 kg) were taken for testing with Infratec Analyser 1241 (test weight, protein, starch, β-glucans, and lipid content). ). Determination of dietary fibre composition was made by enzymatic-gravimetric method using Fibertex filtration module. The content of amino acids, fatty acids and α-tocopherol were determined using high-performance liquid-chromatography methods (Sterna et. al., 2014). The sum of essential amino acids was calculated as EAA = Thr + Val + Met + Ile + Leu + Phe + His + Lys (FAO/WHO).

The statistical analysis was performed using SPSS 17. Statistical significance was declared at $p < 0.05$.

## 3. Results and discussion

The results of analyzed protein, fat, starch, total dietary fibre, β-glucans and vitamin E in husked and naked oat grains grown in different conditions are shown in Table 1.