ULST Timisoara
Multidisciplinary Conference on Sustainable Development
30-31 May 2024

Theoretical aspects regarding the nutritional value and methods of extracting food fibers from oats used in baking

Ramona Carmen Romînescu, Adrian Riviș, Ersilia Alexa,
Mariana-Atena Poiana

University of Life Sciences "King Mihai I" from Timisoara,
Faculty of Food Engineering

Abstract: *Dietary fibers have an important role for human health, for a healthy diet, their presence in the daily diet in a certain proportion is necessary. Considering the nutritional value and functional properties, dietary fibers help to increase the feeling of satiety and to improve the functioning of the digestive process. Oats contain a large amount of fiber, more precisely beta-glucans - soluble fibers, which not only have beneficial effects on digestion, also having a role in controlling the increase in blood sugar, and in maintaining an optimal level of cholesterol in the blood, reducing cholesterol from low density lipoproteins. Oats contain up to approximately 11 g of fiber per 100 g. The recommended daily intake of fiber is 30 g. A 50 g portion of oats provides 18% of the recommended daily intake of fiber. The present work presents the study of the nutritional value and importance of oat fibers in food as well as the study of the most modern methods of fiber extraction with the aim of using them to obtain bakery products with functional potential.*

• Introduction

The importance of dietary fiber in maintaining the health of consumers, by combating or treating a large number of diseases of the contemporary era, has been studied and accepted by specialists.
Enzymes in the human digestive tract cannot hydrolyze dietary fiber in plant products.
In 100 g of oats there are about 11 g of fiber. The recommended daily intake of fiber is 30 g [1].

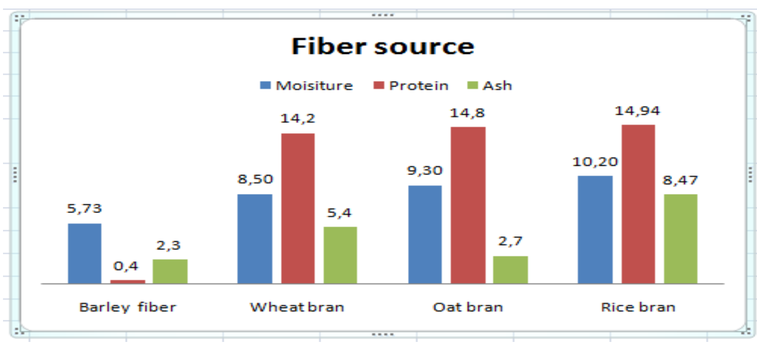
Constituenţi	Fructe	Cereale	Legume
Celuloză			x
Hemiceluloze:			
- xiloglucani		-	x
- glucuronoxilani		-	-
- glucuronoarabinoxilani	-		-
- galactomanani	-	-	x
β-D- glucani	-		-
Substanţe pectice			x
Lignină			-
Esteri fenolici	-		-
Proteine	-		-
Glicoproteine		-	x

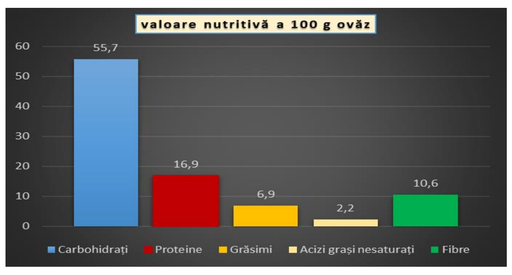
The beneficial effects of dietary fiber are as follows:
a. they reduce intestinal transit time;
b. They are readily fermented in the microflora of the colon;
c. have the ability to reduce the levels of total cholesterol in the blood;
d. may reduce postprandial blood sugar and/or insulin levels, etc. [2].
Due to these effects, fiber improves gastrointestinal health and prevents or reduces susceptibility to some diseases, as well as increased satiety and weight loss.

Materials and methods

The most commonly used extraction methods are wet processing methods. The following types of wet grinding methods have been identified: alkaline wet grinding, conventional wet grinding, modified wet grinding method, and enzymatic wet processing.
In the conventional wet milling method, peeled seeds are used [3]. They are ground to flour that is treated with an alkaline solution to extract protein. Proteins are removed by acid precipitation or ultrafiltration. In this method, soaking of raw materials is carried out using sulfurous acid solution, this process due to the large amounts of sulfur dioxide (SO2) required during the soaking stage is environmentally unfriendly [4].

Results and discussions





Conclusions

Oat products, compared to products derived from wheat or rye, are more valuable from a nutritional point of view, able to bring significant health benefits. Oats contain 2-3 times more lipids than other cereals and has a high protein content that can be an excellent source of amino acids. Compared to other cereals, oats have a lower carbohydrate content, being much more abundant in dietary fiber .
Following studies we can say that dietary fiber in oats has properties that make them almost indispensable in a healthy diet.
The dietary fiber extraction methods developed so far allow fiber to be obtained from quality agro-food sources such as wheat, rye, barley, oats, potatoes, carrots, lettuce and peas.

•References

• [1] L. Kotilainen, R. Rajalahti, ş. a., Health Enhancing Foods. Opportunities for Strengthening. the Sector în Developing Countries, World Bank. Agriculture and Rural Development, 2006, disponibil online la http://siteresources. worldbank. org/INTARD/Resources/Health_Enhacing_ Foods_ARD_ DP_30_final. pdf;
• [2] R. Mehta, Dietary fiber benefits, Cereal Foods World, volume 50, 2005, pages 66-71;
• [3] Merenkova S. P., Zinina O.V., Stuart M., Okuskhanova E. K., Androsova N.V. Effects of dietary fiber on human health: a Review // Человек. Спорт. Медицина. 2020. №1. URL:
• [4] Hussain, S., Jõudu, I., Bhat, R. Dietary Fiber from Underutilized Plant Resources—A