

BISCUITS WITH SEEDS AND RYE FLOUR

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Abstract: The biscuit market was one of the most dynamic markets due mainly to the desire to innovate and market new producers. In terms of nutritional value, these biscuits are net superior to other types of biscuits made from wheat flour. Proteins, vegetable fats, carbohydrates, microelements, mineral substances, vitamins B1, B2, E are preserved in this assortment. The product has been specially designed to meet the needs of those who prefer a sweet snack and can be enjoyed at any time of the day, representing the ideal alternative for a dessert consistent and savoury. Biscuits with seeds and rye flour are a product with a rich blend of sunflower seeds, pumpkin, linseed, sesame seeds and rye flour, which gives it a specific taste, particularly refined, long-lasting, without additives and with high fibre content. These non-digestible nutrients help regulate digestive processes and eliminate many undesirable components of the digestive tract. In addition to health issues, consumers are also aware of the positive effects: vegetable fibres practically do not have calories, and induce a feeling of satiety.

Rare flour from rye flour is used to remove bad cholesterol from the circulation to prevent thickening of the walls of blood vessels with adverse effects on the cardiovascular system. The taste, the texture, the ability to maintain freshness for a long time make rye flour products highly appreciated.

The aim of this research was to establish the evolution of nutritional value of biscuits with seeds and rye flour, during the storage.

Keywords: fibre content, rye flour, cardiovascular system

Introduction

Biscuits are recommended for all categories of people. They have the advantage of having a long storage life, a different composition that can be adapted to nutritional needs, and is an important energy source.

The composition of biscuits is optimally adapted to the needs of the body, is rich in dietary fibre more than 6% and contains valuable cereals and oil-rich seeds such as sunflower seeds, flaxseed and sesame seeds. It is known that rye flour is a natural source of vitamins, minerals (magnesium, phosphorus and potassium) and dietary fiber stimulating intestinal transit with beneficial effects on the body. The high rye flour is made by removing bad cholesterol from the circulation to prevent thickening of the walls of the blood vessels with adverse effects on the cardiovascular system. The amount of cellulose and plant fibres in rye flour is high compared to wheat flour, this work making it a "digestive product." The taste, the texture, the ability to maintain freshness for a long time make rye flour products highly appreciated. Many of the bakery products in Europe have the rye flour, which touches even 70%. [Esarom 2013]

Seed biscuits and rye flour have a pleasant, balanced, delicious taste due to the variety of seeds they contain [Esarom, 2013]. The seeds have health-friendly properties, which are also the richest plants in nutrients; they are a very good source of vitamin B1, manganese, phosphorus, copper and magnesium. Flaxen seeds can be used in the nausea treatments of many but they cannot be considered a good food but a beneficial food. In them, we find lignans, plant compounds that act as a weak estrogen. Lignani has a high percentage of in is the only plant that contains the richest content of lignans and fibres.

Lignans and fibres have a group of natural compounds found only in plants, having the chemical composition similar to estrogen (phytoestrogen) and antioxidants. It is a highly appreciated property, which is the high fibre content. Lignans can help reduce cholesterol, in diabetes can reduce the severity of the disease and stabilize blood sugar. It is used since ancient times, it is also known as the "blessed plant", being used for the elimination of abdominal pain, cough, skin abscess and constipation. Studies and research on the benefits of flax seed:

Women who daily supplemented their daily diet for 4 weeks with 50g of wheat seeds in their daily diet lowered their total cholesterol to 9% and their LDL cholesterol levels by 18%. Insects reduce the signs of inflammation associated with the increased risk of heart disease. A guinea pig study found that supplementary intake of flaxseed oil (rich in Omega 3) is beneficial in preventing colon cancer, while corn oil (which has more Omega 6 fat) has resulted in tumour growth.

Another pilot study in India has investigated the effect of flaxseed oil on the behaviour of children with ADHD (Defibrillation Attention Syndrome). Significant improvement in symptoms, expression in decreasing total symptoms of hyperactivity has been found.

Seeds of sesame – the most popular sesame seeds are ivory, open, but there are also brown, red and black sesame seeds. Have a taste of sweet nuts, which is accentuated if they are lightly roasted. Sesame black sesame seeds but they are stronger than flavour to others. One thing to know is that black sesame contains 60% more calcium than white. Since they are small, sesame seeds on so many benefits bring to the human body. It is an important source of calcium, fibre and other essential minerals for the health of the body. They also contain healthy fats, necessary for the proper functioning of the metabolism and the endocrine system.

The formation of acryl amide, a caragen agent likely formed in plant-derived foods, appeared 11 years ago [Tareke et al, 2002]. Learning about the mechanisms involved in the formation of acryl amide has been learned and methods have been developed to reduce its presence in food.

The Maillard reaction is the main pathway for acryl amide formation. It is responsible for many of the features associated with coped, fed and fried foods that consumer's demand, and which define in particular products and brands [Mottram et al., 202].

It is important that when measures are taken to attenuate the formation of acryl amide, aspects related to the responsible reaction for the production of colours, flavours and flavours are retained to ensure that the quality of the finished product is not impaired [Stadler et al., 2002]. Theoretically, one of the most effective methods of mitigating acryl amide would be to reduce the accumulation of acrylamide precursors in the plant material used for food production.

The identification of genetic and environmental factors affects precursor content is therefore an important approach [Halford et al.2012.].

Materials and methods

Rye flour was provided by local producers. The analytical flour quality was determined according to the international standard methods (ash content – ICC104/1, wet

gluten – ICC105/2, protein content – ICC106/2, hydration capacity with Pharinograph - ICC115/1 and Zeleny index – ICC116/1).

Table1. Analytical parameters of Control flour

Moisture %	Ash %	Wet gluten %	Protein %	Hydration capacity %	Falling Number sec
13.42	0.68	31.1	13,3	62.6	329

The Falling Number values for the experimental flours improved with rye flour were determined with AACC/No.56-81 method using a 1500 PERTEN Falling Number System. After baking, the samples were cooled 6-8 hours in controlled atmosphere (UV lamps). In order to be scoring (after 24 hours), the samples were sliced for packed in plastic bags.

The experiments are made in the research laboratory of “Ștefan cel Mare” University of Suceava, Faculty of Food Engineering

Results and discussion

In order to evaluate the technological behaviour of biscuits sample during the storage we made a set of phisico-chemical determination. The results are shown in the figure 1, 2, 3, 4 and 5 :

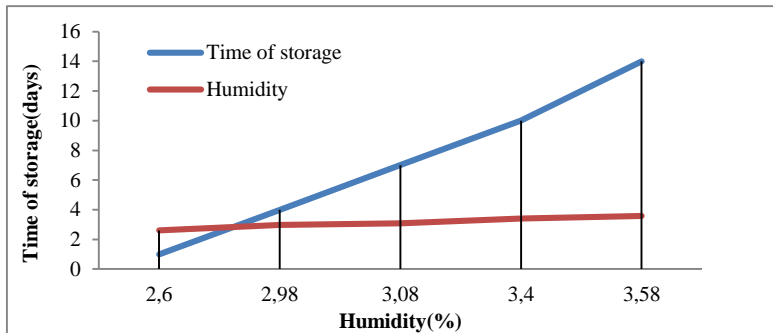


Figure 1. The Humidity evolution during storage

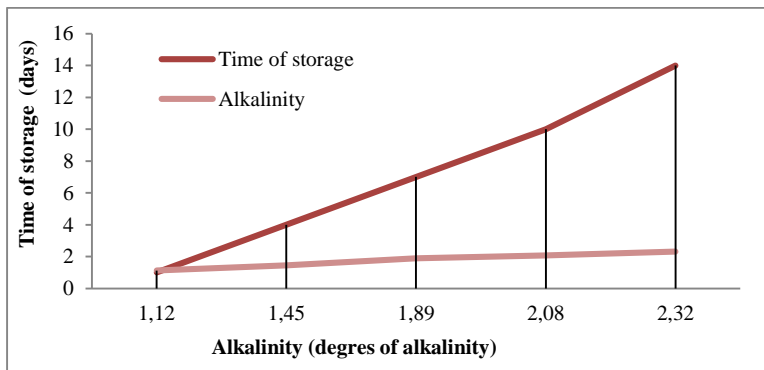


Figure 2. Alkalinity evolution during storage

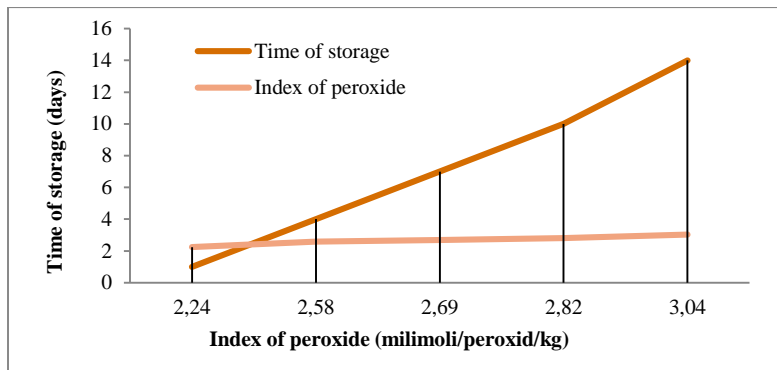


Figure 3. Index of peroxid evolution during storage

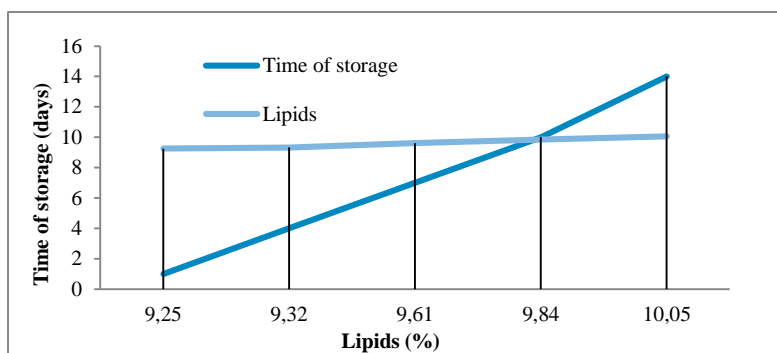


Figure 4. Lipids evolution during storage

The degree of sunscreen for high fat products is a decisive quality criterion.

The peroxide index is an important analytical means of testing the rays. Although it only indicates the rooting process in the initial stages, the presence of peroxides in the product suggests imminence of alteration.

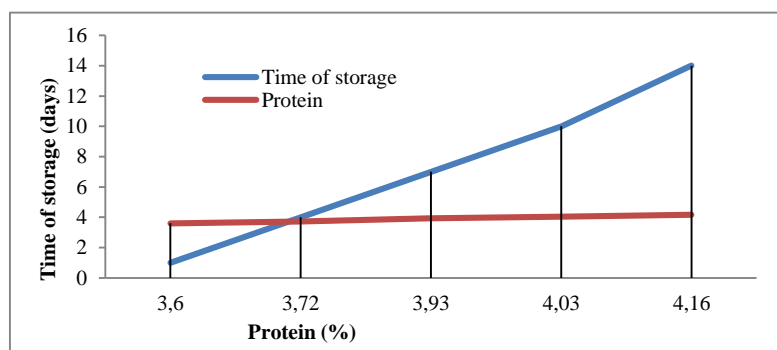


Figure 5. Lipids evolution during storage

Technologically, gluten proteins play an important role. In the presence of water and due to mechanical kneading, they form gluten, which is the structural skeleton of the

dough. Only gluten and gliadin in wheat flour have the property of forming gluten and this gives the wheat its unique bakery properties.

Conclusions

Biscuits with seeds and rye flour are a product with a rich blend of sunflower seeds, pumpkin, linseed, sesame seeds and rye flour, which gives it a specific taste, particularly refined, long-lasting, without additives and with high fibre content. These non-digestible nutrients help regulate digestive processes and eliminate many undesirable components of the digestive tract. In addition to health issues, consumers are also aware of the positive effects: vegetable fibres practically do not have calories, and induce a feeling of satiety. The high rye flour is made by removing bad cholesterol from the circulation to prevent thickening of the walls of the blood vessels with adverse effects on the cardiovascular system.

Bibliography

1. Curtis T.Y., Muttucumaru N., Shewry P.R., Parry M.A.J., Powers S.J., Elmore J.S., Mottram D.S., Hook S., Halford N.G. Effects of genotype and environment on free amino acid levels in wheat grain: implications for acrylamide formation during processing. *Journal of Agricultural and Food Chemistry*. 2009; 57:1013–1021.

2. Curtis T.Y., Powers S.J., Balagiannis D., Elmore J.S., Mottram D.S., Parry M.A.J., Rakszegi M., Bedo Z., Shewry P.R., Halford N.G. Free amino acids and sugars in rye Grain: implications for acrylamide formation. *Journal of Agricultural and Food Chemistry*. 2010; 58:1959–1969.

3. De Vleeschouwer K., Van der Plancken I., Van Loey A., Hendrickx M.E. Role of precursors on the kinetics of acrylamide formation and elimination under low moisture conditions using a multiresponse approach – part I: effect of the type of sugar. *Food Chemistry*. 2009; 114:116–126.

4. Postles J., Powers S.J., Elmore J.S., Mottram D.S., Halford N.G., Effects of variety and nutrient availability on the acrylamide-forming potential of rye grain, *J Cereal Sci*. 2013 May; 57(3): 463–470.,doi: 10.1016/j.jcs.2013.02.001

5. Tareke E., Rydberg P., Karlsson P., Eriksson S., Törnqvist M., Analysis of acrylamide, a carcinogen formed in heated foodstuffs.,*J Agric Food Chem*. 2002 Aug 14;50(17):4998-5006.

6. Stephen J. Powers, Donald S. Mottram, Andrew Curtis, Nigel G. Halford Acrylamide concentrations in potato crisps in Europe from 2002 to 2011, *Food Addit Contam Part A Chem Anal Control Expo Risk Assess*. 2013 Sep; 30(9): 1493–1500.

7. Stadler R.H., Blank I., Varga N., Robert F., Hau J., Guy P.A., Robert M.C., Riediker S., Acrylamide from Maillard reaction products. *Food chemistry, Nature* volume419, pages449–450 (03 October 2002)