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Review article

INVESTIGATING THE POSSIBILITIES OF CREATING FROZEN DOUGH BREAD TECHNOLOGY FROM WHOLE GRAIN KAMUT FLOUR ENRICHED WITH SPROUTED RED LENTILS

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Abstract

The aim of the present scientific research is to develop innovative approaches for obtaining grain-based foods with the addition of plant raw materials of high biological value. The raw plant materials used for the preparation of the innovative products are kamut flour is obtained and red lentil. For the preparation of the two mixtures, Bulgarian varieties of raw materials are used, as well as additional raw materials. The article shows the technological indicators of the products and the finished products. When adding whole grain organic kamut with the addition of 8 % red lentil. The innovative cereal products are obtained basis in which different values of the protein energy value and fiber contents.

Keywords: bio, sprouted red lentil, flour, kamut, frozen dough, bread

Introduction

Whole grain flours are obtained by grinding the whole grain. Whole grain flour is richer in vegetable fiber than refined flour. (Lazova-Borisova, I., 2022b).
From a medico-biological point of view, flours from whole grains obtained by so-called simple grinding are more valuable. They are rich in vitamins, minerals, cellulose and proteins (Georgieva et al., 2007).
From a technological point of view, however, they are of low quality, as they are slightly resistant to storage and have poor baking qualities. (Lazova-Borisova, I., 2022c).
Special attention is paid to β-glucans, which are contained in larger quantities in barley and oats.
Numerous studies have been conducted on the influence of β-glucans on human health. β-glucans have been reported to lower low-density lipoprotein cholesterol and thereby protect against cardiovascular disease.
Some studies show that β-glucans act as immunostimulators and have an antitumor effect.
The addition of barley and oat bran to refined flours changes the rheological properties of the dough and the quality parameters of the bread.
In addition, earlier studies have shown that the addition of semolina, duntas and high-fiber semolina products to wheat flour weakens the cellular structure of the medium, which is a consequence of thinning and weakening the reticular structure of the wheat protein. The whole grain sorghum and rye flours used are rich in protein and fiber, making them suitable for use as the main ingredient for bakery products (Sausserde and Kampuss, 2014).

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Materials and methods

The main and additional raw materials used to produce frozen doughs are a mix of whole grain kamut flour, solt, pressed yeast and 8 % red lentil. The kamut flour and red lentil was delivered by the Milling Plant in the village of Medovo, Pomorie municipality. Test baking in laboratory conditions are by the single-phase method (Karadjov, 2007). To obtaining bread from frozen dough, whole grain kamut flour is mixed with the addition of 8% sprouted red lentils, pressed yeast, cooking salt and drinking water. The dough is mixed using a single-phase mixing method for 4 minutes. The dough has a temperature of 18◦C . Then it is divided into pieces of 200g, formed into bagels, the pieces are packed and frozen at -20◦C for 3h 20 min. They are stored at -20◦C for 1 to 15 days. Dough defrosting was carried out for 130min at 30◦C final fermentation was at 50min. Baking was at 30 min at 190◦C and cooling at 60 min at 20◦C.
Determination of total protein content (BDS EN ISO 16634-2:2016)
Determination of fat content (BDS EN ISO 11085:2010).
Determination of total ash content (ISO 1762:2019).
Determination of fiber content (BDS EN ISO 12009:2017).
Energy value of 100g product kJ/ kcal/- calculation based on chemical composition
Statistical analysis was performed with Microsoft Excel 2016.

Results and discussion

According to Sausserde and Kampuss, 2014 the whole grain kamut and lentil flours used are rich in protein and fibers.

Table 1. Recipe formula for obtaining dough from kamut and sprouted red lentil

Raw material	Quantity, %
Kamut flour	34.5%
Sprouted red lentil	8.0%
Water	52.0%
Pressed yeast	4.0%
Salt	1.5%

The table 1 shows recipe formula for obtaining dough from whole wheat flour kamut and sprouted red lentil. The red lentils sprouting 24 hours.

Table 2. Indicators on the raw materials

Sample type	Moisture,%	Acidity,◦H	Amount of wet gluten,%	Quality of wet gluten, mm
whole wheat flour kamut	14.0	3.4	20.6	5.2
sprouted red lentil	23.2	2.1	-	-
Mix from whole wheat flour kamut+ sprouted red lentil	12.5	2.9	-	-

The table 2 shows determination of some basic indicators of kamut flour, sprouted red lentil and kamut and sprouted lentil flour mixture: moisture, acidity, amount and quality of wet gluten.

Table 3. Establishing the modes of some basic technological operations**.**

Dough	Freezing duration, h	Cryoscopy Temperatur e,◦C
Dough from whole wheat kamut	2h 30min	-4.3
Dough from mix from whole wheat flour kamut+ sprouted red lentil	3h 20min	-5.5

The table 3 shows establishing the modes of some basic technological operations. The freezing time at which the dough reaches its cryoscopy temperature is established.The technological losses are 12.5%.

To obtaining bread from frozen dough, whole grain kamut flour is mixed with the addition of 8% sprouted red lentils, pressed yeast, cooking salt and drinking water. The dough is mixed using a single-phase mixing method for 4 minutes. The dough has a temperature of 18◦C . Then it is divided into pieces of 200g, formed into bagels, the pieces are packed and frozen at -20◦C for 3h 20min. They are stored at -20◦C for 1 to 15 days. Dough defrosting was carried out for 130min at 30◦C final fermentation was at 50min. Baking was at 30 min at 190◦C and cooling at 60 min at 20◦C.

The resulting bread has the following parameters: 39.2 % moisture,3.2◦H acidity,2.3 % ash, 2.8% fats, 13.1 % protein, 8.4% fibers, 77.3 % carbohydrates, 247 kcal for 100 g product energy value.

Conclusions

Innovative methods for obtaining grain-based foods with added raw plant material with high biological activities were applied.

The optimal parameters for obtaining the test and finished product were found. The obtained dough can be used for up to 15 days to obtain bread and bakery products with a high biological value.

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