



Effect of Adding Flax Seed to Bread Flour which Produced in the Laboratory and Study its Quality Properties

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Abstract

The aim of this current research was to Knowledge effect of addition of Flax seed at different percentages to bread flour and pop loaf bread was prepared that addition 10 % from Flax seed flour to bread flour resulting in increasing the percentages of moisture, ash, fat, fiber and protein. The result showed no significant differences in the moisture content, low value of gluten content and falling number. Was noticed in all treatment. Specific volume, it is the same for all treatments. Sensory evaluations of loaf bread appear no significant difference between control 100 % wheat flour and 10 % Flax seed. And found that the bread of both types was acceptable. Therefore this conclusion we can point out that the Flax seed can be used with the flour to prepare the flat bread. To improve the deffency of gluten.

Keyword: Bread, Flax seed, Gluten, Fiber.

Introduction

Researches and studies are continuing, particularly in developing countries, to find cheap and available sources that contain a relatively high proportion of proteins to meet the challenges of starvation and low nutritional status in these countries [1]. Bread is a fundamental food and is preferred in food consolidation because it is consumed by most groups in the society.

Where high-protein bread is prepared, with, (41.60 %) protein by adding soybean flour [2]. In addition, maize-fortified bread is a favorite food in Latin America and other countries that grow maize on a large scale [3]. Noted that fortification of protein-based sources such as soybeans, embryos and other protein-rich sources is appropriate in societies with nutritional problems related to protein deficiency.

Flax seeds one of those substances or sources used for the purpose of oil or fiber. Flax seed belongs to the *Linaceae* family and its scientific name *Linum ustatissimum L*. Flax

seed has been used commercially as a food and medicinal product. It is a good source of

alpha-linolenic acid, dietary fiber, Lignans, flavonoids and phenolic acid. Flax seed fiber is important for lowering cholesterol and adjusting sugar, it is important for digestion and prevents constipation, [4]. Flax seed contains 20% protein and contains amino acids same to the soybean content as well as free of gluten [5]. Flax seed is used as a source of protein for consolidation in baking products such as cakes and biscuits as well.

Flax seeds have a taste similar to hazelnuts, so sometimes added to appetizers. Flax seeds contain about 40% fat, and the chemical compositions of the seeds vary depending on the class and the environmental conditions. Therefore, the present study aims at explaining the effects of adding powder Flax seeds to the bread flour produced in the laboratory and study its quality properties.

Materials and Methods Analysis

Turkish wheat flour of the (Basler) type available in local market. Yeast *Saccharomyces cerevisiae* was used; salt, sucrose, and hydrogenated vegetable oil was used.

Component	Control Treatments	Treatments Flax seed 5%	Treatments Flax seed 10%
flour	100	95	90
Dry Yeast	1	1	1
sucrose	5	5	5
salt	1	1	1
fat	3	3	3
Powder Flax seeds	0	10	15

The determination of moisture and ash was carried out by using informatic instrument. The percentage of protein was estimated by using the method of Caldal according to the method (11-46) [6], by using a constant equal to 7.5. Estimating the ratio of fat by using the Sox let method [7]. The percentage of the gluten was estimated according to the German gluten method using Glutork 2020.

The dry gluten was put in the air oven at 45^o C until the drought to get its weight. The activity of the enzymes has been accounted using the standard method (22) -07) [6]. The bread was tested according to the method mentioned in [6].

The material in paragraph 2.7.3. Was baked after mixing well by using a Kenwood paste mixture. The dough was first fermented for 105 minutes at 28-30^o C at a relative humidity of 75-80%. The dough was then left for secondary fermentation for 50 minutes under the same conditions, and then placed after molding with Forms oiled with a light layer of fat and then left to complete the process of fermentation in the molds in the fermentation room for 30 minutes in the same conditions above and after taking the loaf of its normal volume the samples baked in a oven of 225^o C for 18 - 20 minutes, after the removal of loaf Forms from the oven, the pieces of bread left to cool for 60 minutes, then its weight measured by using the method of removing the seeds of the Colza to measure the volume of the loaf.

Then extracted swelling values by multiplying the values of specific volume (ml\g) in a constant (10). The sensory evaluation of the various Treatments was carried out by a number of professional

The bread has been prepared in accordance with the standard method (10-10) [6], and admixtures have been prepared according to the following Table:

evaluators according to the following sensory evaluation Form mentioned in the [8].

Statistical Analysis

Complete Random Design has been used; also [9] program has been used in the statistical analysis.

Results and Discussion

Table (1) shows the values of moisture content in wheat flour and other factors. The results showed no significant differences in the moisture content of the flour. The moisture content of the flour was within the limits indicated by [10], for flour of zero degree which was between (11.5-16.2) %. The moisture content of flour does not play a major role in determining the quality of flour, but it is an important factor for assessing the quality of wheat [11]. The table shows that the percentage of protein in Flax seed flour is 30% higher than that of wheat flour, and adding it to the mixtures resulting in increasing of its protein content. The values of the protein ratio in the flour of the three Treatments came within the limits set by [10].

This was 9.5 - 13.9%. The high protein in Linen as well as its content of lysine amino acid compared to wheat flour makes it suitable for the consolidation of baked goods such as bread and pastries [12]. Protein content of flour is an important criterion for its quality. [13] Reported that the strength of flour is not related to its content of protein, but the quality remains the most important in determining the properties of the specific flour and the volume of the loaf when the amount of protein is equal. Also table (1)

shows that the total fat content in the flour of the three Treatment has reached (1.5) in the flour. Many researches confirm the importance of flour fat in the manufacture of bread and the rheological properties of the dough although it is less than the other flour ingredients.

As for ash content as observed in the table is high in Flax seeds flour 3.3% compared to wheat flour 0.30%. The percentage of ash in the Treatments content Flax seeds flour is

within the desired range of flour suitable for baking, ranging from (0.35 to 0.52) % [10].

Ashes percent considered as a measure of the quality of the flour, which varies according to the varieties, the period of wetting and the degree of cleaning of the wheat before grinding. The results also show a high percentage of fiber in flax seed as it reached 7%, while the flour of the wheat was 1%, which led to high fiber percent in the loaf mixtures, as it was in treatment 3 (3.9) % and in treatment 4 (4.15) %.

Table 1: Chemical components of flax seed, wheat flour and mixtures prepared by them

Treatment %	moisture	ash	Fat	Fiber	Protein
wheat flour	2.75	0.3	1.61	1	10
Flax seeds	6.28	3.3	30	7	30
wheat flour with 5% Flax seeds	2.73	0.35	1.59	3.9	14.14
wheat flour with 10% Flax seeds	2.88	0.47	2.75	4.15	16.80

The values of the falling number are indicative of the activity of enzymes in the flour. The value of the falling number for the control treatment, which is 400 s, indicates a decrease in the activity of the enzymes. The ideal limits for the falling number range between 200-300 seconds, which means a moderate activity for the amylases, and higher than this mean enzyme activity is low. It was figured out that the addition of Flax seed, led to a significant increase in the activity of enzymes of the enzyme for Treatment contains of Flax seed compared to

the control Treatment, and this may be due to the reduction of viscosity of the suspension, which leads to decrease the time required to drop the piston due to the low starch content in Treatment. Also the content of the Gluten in the studied Treatment were also figured out, it is shown that the content of Gluten the in the used Turkish wheat flour was 31%, which is a little bit the same and higher than mentioned, and the addition of powder Flax seed led to a decrease in the content of the Gluten in the Treatment compared to the control treatment.

Table 2: Mixture content of Gluten and falling number

Treatment	Gluten percentages	Falling number /seconds
control	31	400
wheat flour with 5% Flax seeds	30	384
wheat flour with 10% Flax seeds	28	372
L.S.D		

As shown in Table 3, shows that the volume of the loaf produced by the treatment -1 (control) was 3 cm³/ gram, it is the same for

all Treatment. This indicates that the addition of Flax seeds flour did not adversely affect the specific volume of the loaf.

Table 3: the specific volume of the produced bread

Treatment	Specific volume cm ³ / gram
control	3
wheat flour with 5% Flax seeds	3
wheat flour with 10% Flax seeds	3
L.S.D	0.96

Table (4) shows the sensory evaluation of the prepared loaf of wheat flour and the

Treatment containing Flax seed, with a score of (8, 86, & 87) % for bread of control

treatment, and Treatment with 5% and 10% Flax seed. The results showed that there was no significant difference between the degree of sensory evaluation of the treatment containing 10% Flax seed, compared to the control treatment and also found that the bread of both types was acceptable, as not

affected in its qualities in terms of color and smell and taste, and the effect of Flax seed was not inverse of the characteristics of loaf. From this conclusion we can point out that the Flax seed can be used with the flour to prepare the flat bread. To improve the deffency of gluten.

Table 4: Sensory evaluation of loaf bread

Treatment / Quality elements	Degre limits	control	wheat flour with 5% Flax seeds	wheat flour with 10% Flax seeds
Atactifrom	14	15	14	13
color	15	15	15	15
Atactic and Smoothness pulp texture	13	15	14	13
flavor	14	15	14	15
Standing Height	30	40	30	30
Grand total	86 a	87a	100	86a
LSD value P<0.05	0.23			



Figure 1: The bread produced from wheat flour the control treatment (A) and the treatment containing 5% Flax seed (B) and the treatment containing 10% Flax seed (C)

References

1. Apata DF (2018) Biochemical, nutritional and toxicological assessment of some tropical legume seeds. Ph.D Dissert, Deptt. Anim. Sci. Univ. Ibadan, Nigeria.
2. Abdul kadir, Dhilal Mehdi (2002) Effect of wheat flour Substitution with saya protein Product on Quality Properties bread and cake, Department of Home Economics, College of Education for Women, University of Baghdad.
3. Shewry /L R (2016) improve in the protein Contenk and Composition of Cereal grain. J. of Cereal Science, 46: 239-250.
4. Institute of Medicine (2014) Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids, Nat. Acad. Press Washington DC. 7-1-7-69
5. (dietary fiber), 8-1-8-97 (fat and fatty Acids). Invest. 9: 29
5. Hongzhi Y, Zhihuai, T Hequn (2017) Determination and removal methods of cyanogenic glucoside in flaxseed. ASAE/CSAE meeting presentation: 04066.
6. AACC (2017) Approved Methods of the American Association of Cereal Chemists. Amer. Assoc. of Cereal Chem. Inc. St. Paul, Minnesota.
7. AOAC (2014) Official Method of Analysis 13th ed., Washington DC. Association of Official Analytical Chemists.
8. Organizational Guide for the Work of the Laboratories (2017) Department of Quality Control / Taji.

9. SAS (2012) SAS/ STAT Users Guide for Personal Computers Release 9.1SAS. Institute Inc. Cary and N.C, USA.
10. Zine EI Abidine, Mohamed Wajih (1979) A study to prove the standard specifications for flour suitable for the production of the production of Iraqi bread and salmon, MA Faculty of Agriculture , Department of Food Science, University of Baghdad.
11. Edward WP (2014) The science of Bakery products. Brdfield consultants Braintree, Essex, UK.
12. Pasha I, Anjum FM, sad/ybuit, m, ShHan JI (2010) Gluten yualiby prediction and correlabio studies in sp /ing wheat S. J. of food yualiby, 30: 438-449.
13. Curic D, Karlovic D, Tusak D, Petrovice B, Dugum J (2001) Gluten as standard of whey Flour quality food Teennol. Biotech no 139 (4): 353 -361.