JAZ INDIA

Journal of Advanced Zoology

ISSN: 0253-7214

Volume ***44*** *Issue* ***S-0 Year 2023*** *Page* ***1984:1988***

Influence of the Degree of Grain Damage by the Bug Turtle on Its Bakery Properties

M.B. Khamdamov[1], G.Q. Tukhtamishova[2], D.I.Ganijonov[3]

[1,2,3]Gulistan State University, Uzbekistan

Article History

Received: 13 June 2023
Revised: 12 September 2023
Accepted:21 September 2023

Abstract

The paper presents the results of experimental studies and theoretical generalization and analysis of published literature data, scientifically substantiated technologies for obtaining high-quality varieties of flour, from grain with reduced biological properties, frost-hardening, sprouting infected with field pests, etc. To characterize the biochemical characteristics of the grain, we studied its chemical composition, the distribution of chemicals over anatomical parts and the activity of enzymes, primarily proteolytic and amylolytic. Influence of the electromagnetic field on the properties of gluten.

Keywords: *frosty, sprouted, dry wind, damaged by field pests, grain defects, self-warming, "runoff"*

1. Introduction

The grain processing industry is one of the most important branches of the agro-industrial complex in providing the population with food.

The grain independence policy of the Republic of Uzbekistan is designed to solve the problems of further increasing the volume of grain production - the basis for creating food and fodder funds of the state, as well as using it with maximum efficiency and expediency.

It is important to provide agriculture with varieties of grain crops that are best adapted to local conditions. The selection agencies of Uzbekistan are doing a lot of work on the selection of new varieties of wheat. Local varieties of wheat are of great value for breeding work in terms of such indicators as early maturity, drought resistance, adaptability to vegetation under conditions of short daylight hours. All this contributes to a decrease in grain imports and saves the state's foreign exchange resources.

2. The main results and findings

The technological properties of grain are derived from physicochemical, biochemical, structural and mechanical and other properties. Of particular importance is the fact that grain is a living organism, and therefore all processes in grain are controlled by its biological system. Reaction of the grain - an applied external influence: chemical, mechanical, etc., causes a response, the meaning of which is to ensure the safety of the grain as a living organism. Controlling the properties of grain is possible and dehydrated only if the nature of this response is known. It is this task that is the main one in terms of technology and forms the basis for managing the properties of grain during processing.

One of the main tasks facing the food industry is to meet the needs of the population in biologically safe and economically pure food products. [1; 27-38c, 2; 5-14c.].

One of the reasons for the decline in the quality of the gluten of food wheat is the damage to crops by the pest "turtle bug". The turtle bug damages crops, especially winter wheat. Bug bug damage can "transfer" food, high-grade grain with a good gluten content into the category of non-food.

To select the optimal technological modes for preparing dough from flour produced from grain damaged by the tortoise bug, the influence of temperature, humidity, and fermentation duration on them was studied. The tests were carried out on flour made from grain damaged by the tortoise bug (6%). Technical analyzes and biochemical studies were carried out using standardized methods accepted in the baking industry.

The objects of research were varieties of soft wheat grown in the natural and climatic conditions of Uzbekistan, which for research were differentiated according to the degree of damage by the tortoise bug from 0 to 3%. For the initial grain, batches of grain were taken that did not contain grains damaged by a bug - a turtle with gluten in quality: 2 group satisfactory weak (90 conventional units according to IDK) 3 group unsatisfactory weak (100 conventional units according to IDK),

Studies have shown that the degree of damage to the grain of different varieties of soft wheat by the turtle bug has a different effect on the content and quality of gluten in the grain compared to the original grain. In particular, it was found that:

- when the content of wheat grains damaged by the turtle bug is up to 2%, the quality of gluten in the varieties increased by 5-10 conventional units of IDK;

- when the content of wheat grains damaged by the tortoise bug is up to 3%, the quality of gluten has changed by 15-20 conventional IDK units.

In all studied samples of wheat grain, an increase in the amount of gluten from 2 to 4% was recorded with an increase in the content of grains damaged by the turtle bug in the grain. Data on the amount of gluten in wheat, depending on the degree of damage to the grain by the bug-turtle, are shown in table 1

Table 1- Damage to the butt by a gluten-containing turtle bug

Bed bug damage, %	Indicators of the amount of gluten			
	Sample №1	Sample №2	Sample №3	Sample №4
0	24	23	22	20
2	25	24	22	20
3	26	25	23	21

Gluten tests on the IDK device showed a result of more than 80 units, which means that the gluten of the flour is weak. Problems in the processing of such flour for bread cannot be avoided, but such flour is quite suitable for the production of many flour confectionery products.

When pressed, a sample of weak gluten is easily deformed (flattened). Weak gluten is characterized by poor elasticity, so it stretches a lot. After stretching, the shape of the sample is not restored. Dough made from flour with weak gluten has poor dimensional stability and is very blurry. Under the influence of carbon dioxide released by yeast, the dough from flour with weak gluten quickly rises, and then falls off and no longer restores its volume. Flour with weak gluten causes a lot of trouble for bread producers. Products from such flour are obtained with low volume, vague shape, with poor porosity.

Investigation of the influence of the initial temperature of the dough from flour obtained from grain containing grains damaged by the tortoise bug on the quality of bread

The rheological properties of the dough largely depend on temperature, which is one of the main factors affecting the intensity of biochemical (enzymatic) and colloidal processes. Lowering the fermentation temperature of wheat flour dough is known to slow down enzymatic processes and gluten disaggregation.

The determination of the initial temperature of the dough and dough, which ensures the best quality of bread, was carried out taking into account the established indicators of the humidity of the dough - 43% and the dough - 42.0%.

In the technological instructions for the preparation of various types of bakery products, it is always indicated what the final temperature of the kneaded dough should be. Careful observance of the temperature parameters of the technological process is a necessary condition for obtaining products of stable quality.

At elevated temperatures, the dough ripens faster and acquires a higher acidity. At low temperatures, the maturation rate of the dough slows down, acid accumulation decreases.

The final temperature of the dough is most affected by the temperature of water, flour, dough, ambient air and the degree of heating of the dough during kneading.

The easiest way to achieve the desired final temperature of the dough is by adjusting the temperature of the water used for kneading.

A handy technique for calculating the desired dough temperature is given by Jeffrey Hamelman in Bread.

Based on the parameters of the table, a general formula is derived for calculating the specified dough temperature:

$$T = t \times E - t_1 - t_2 - t_3 - K,$$

where: t- is the required test temperature, °C; E - empirical coefficient; t_1 - flour temperature, °C; t_2 - room temperature, °C; t_3 - dough temperature, °C; K - coefficient of friction, ^{o}C.

Table 2- Parameters of a dough made from flour made from grain containing grains damaged by the tortoise bug

Parameter	Value for the test	
	Accelerated method	On dough
Required test temperature, °C	26	26
Empirical coefficient	3	4
Total temperature coefficient (product of desired test temperature times empirical coefficient)	78	104
Minus flour temperature, °C	15	15
Minus room temperature, °C	25	25
Minus the temperature of the dough, ° C	-	25
Minus coefficient of friction, °C	13	13
Estimated water temperature, °C	25	26

The coefficient of friction depends on which mixer is used for kneading and how long it lasts. Typically, the coefficient of friction is in the range of 12 to 14.

We set the optimal kneading parameters (3 minutes at speed 1 and 4 minutes at speed 2). We took the value of the coefficient of friction equal to 13. We performed the calculations and determined the approximate temperature of the water for kneading the dough. Produced kneading the test on the water with the estimated temperature. After kneading, the actual temperature of the dough was measured and the necessary adjustments were made to the calculations.

For example, if we used water with a design temperature of 29°C for kneading, the flour temperature was 15°C, the room air temperature was 25°C, the final temperature of the dough after kneading was 27°C, then the coefficient of friction for the selected kneading parameters was 12, namely: (27 x 3) -15-25-29 \u003d 12.

This value of the coefficient of friction was used to calculate the dough temperature for the same kneading parameters..

If the dough was kneaded for a longer or shorter time, then this coefficient changed. These calculations allowed us to stabilize the quality of our products..

From the data of a literature review on the effect of low temperatures on the properties of yeast dough, we know that low temperatures lead to a sharp inhibition of the activity of the fermentation microflora. Keeping rich yeast dough at temperatures from +8 to +3 degrees during the day leads to a very slight increase in its acidity (0.4-0.6oN).

Despite the fact that the fermentation processes in the dough practically stop, the enzymes continue to work. Under the action of proteolytic enzymes, the elastic properties of gluten decrease, as a result, the dough becomes softer and more elastic, and products made from such dough acquire a well-developed uniform porosity, the color of the crumb improves, the volumetric yield of finished products increases, the aroma of products becomes more pronounced.

The dough has a low thermal conductivity, therefore, to protect it from peroxidation, it is necessary to ensure the most rapid cooling of the semi-finished product in the refrigerator to the optimum temperature. Chilled dough can be used for molding products immediately after removing it from the refrigerator. Formed dough pieces are sent to proofing and then to baking.

It is best to use chilled dough for making small-piece products or pies. Larger products are slowly warmed up, so fermentation in different layers of the dough proceeds with different intensity. The heated outer layers of the dough are over-spaced, and the cold inner layers are under-spaced.

3. Conclusions

Based on the conducted experimental and practical studies, the following main conclusions were drawn:

1.The analysis of the methods for preparing dough (dough, unpaired and accelerated) in the production of bread from flour obtained from grain containing grains damaged by the turtle bug on the quality of bread proved the expediency of using the sponge (on thick dough) and the accelerated method (intensive " cold" technology) dough preparation;

2.By studying the effect of the moisture content of dough from flour obtained from grain containing grains damaged by the tortoise bug on the quality of bread, the optimal technological parameters for the moisture content of sourdough 43.0-44.0% and dough 41.0-42.0% were established, at which an improvement in the quality of bread is noted;

4. References

1. Aurman L.YA. Texnologiya xlebopekarnogo proizvodstva, Sankt Peterburg 2005, 278 s.

2. TSyganova T.B. Texnologiya xlebo pekarnogo proizvodstva, Moskva, 428 s.
3. Pashenko L.P. Jarkova I.M. Texnologiya xlebobulochnyx izdeliy, Moskva, Kolos, 2006, 210 s.
4. Polandova R.D. Primenenie pishevyx dobavokv xlebopechenii // Agrobiznes YugaRossii, 1999, №11, S 22-24.
5. SHatnyuk L.H. Pishevye mikro ingredienty vsozdanii produktov zdorovogo pitaniya // Pishevye ingredienty. Syrei dobavki, 2005, №2, S 18-22.
6. Reznichenko I. Yu. Dragunova I.A. Poznyakovskiy V.M. Kvoprosu o klassifikatsii pishevyx kontsentratov funktsionalnogo naznacheniya // Pishevaya promyshlennost, 2007, № 12, S 26-28.
7. Vasileva A.G. Kasyanov G.I. Derevenko V.V. Kompleksnoe ispolzovani etykvyi ee semyanv pishevyx texnologiyax, Krasnodar, Ekoinvest, 2010, 144 s.
8. Magomedov G.O. Oleynikova A.YA. Djamaldinova B.A. Poroshko obraznye polufabrikaty izdikorastushix plodov // Pishevaya promyshlennost, 2007, № 3, S 50-52.
9. Nikiforova T.A. Perspektivnye pishevye dobavki dlya proizvodstvavysoko kachetvennoy produktsii // Pishevaya promyshlennost, 2007, № 11, S 8-9.
10. Koryachkina S.YA. Labutina N.V. Berezino N.A. Xmelyova E.V. Kontrol, xlebopekarnogo proizvodstva, Orel, 2010, 148 s.
11. Puchkova L.I. Laboratornyy praktikum po texnologii xlebopekarnogo proizvodstvo, Sankt Peterburg, 2004, 170 s.
12. Nechaev A.P. SHub I.S. Anoshina O.M. i dr Texnologii pishevyx proizvodstv// Pod red. A.P. Nechaeva. M: Kolos, 2005, S 368-369.
13. Lehmann I. Erfolgreich und sozial vertraglich wirts chaften ein Widerspruch // LandlicherRaum, 2005, Vol 56, № 3, P 47.
14. Shouk A.A. el-Faham S.Y. Effect of fat replacers and hull-less barley flour on low-fat croissant quality // Pol. J/ Food Nutrit. 2005, Vol 14, № 3, P 287-292.
15. Hilliam M. Heart Healthy Foods //World Food Ingredients, 2001, October/November, P 98-103.
16. Barbashov A.V. Gruppovoy sostav belkovogo kompleksa proroshennyx semyanlna sovremennyx sortov// A.V. Barbashov, I.V. Shulvinskaya// Izv.vuzov. Pishev.texnol, 2006. №4, S 40-41
17. Саттаров, К. К., Тухтамишева, Г. К., & Нуриддинов, Б. Р. (2021). Совершенствование технологии получения муки из зерна пшеницы. Образование и право, (7), 236-241.
18. Тухтамишева, Г. Қ., & Саттаров, К. К. (2021). МАХАЛЛИЙ БУҒДОЙ ДОНИДАН ЮҚОРИ СИФАТЛИ УНЛАРНИ ОЛИШ ТЕХНОЛОГИЯСИ. Scientific progress, 2(4), 1003-1101.
19. Suvanova, F., Qobilova, N., & Tuxtamishova, G. (2023). IMPROVEMENT OF SOLVENT RECOVERY TECHNOLOGY IN OIL EXTRACTION PRODUCTION. Science and innovation, 2(A1), 209-212.
20. Tukhtamishev, S., Xudayberdiyev, R., & Tukhtamishova, G. (2023). MECHANIZED APPARATUS FOR CUTTING MELON FRUIT INTO ANNULAR SLICES. Science and innovation, 2(A1), 252-255.
21. Jabbarova, D. (2023). RESEARCH OF BAKING PROPERTIES OF WHEAT FLOUR. Science and innovation, 2(A2), 41-44.