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MODERN METHOD OF FLOUR`S QUALITY CONTROL WITH THE HELP OF «INFRANEO»

Abstract

The modern economy demands not only productions of flour, various on food advantages, but also gaining the market since it is an important factor of stability of the enterprise in competition. Therefore on each mill it is necessary to develop several grades of flour especially as it is allowed by the modern legislation.

The considered method of assessment of quality of flour by means of INFRANEO can be used at justification of use by production of flour according to requirements of standard documentation.

Analyzing, the obtained data during the researches it is possible to draw the following conclusions: what flour «House», «Extra», the «Classic» is recommended to use as a premium flour on indicators whiteness and ashes.

For improvement of sale it is recommended to expand the range of flour of the Premium class and to make packing on 2 and 5 kg.

Keywords: *flour, gluten, protein, desiccant ability.*

For the production of certain dietary foods, flour confectionery or functional food products, flour with special properties, such as increased or reduced protein content, is required. Recently, so-called flour mixtures have been produced on large mills, that is, flour with a high content of fibrous substances, vitamins, mineral substances, etc.

Analysis of the chemical composition of the flour streams of different grinding systems shows that it differs markedly in the content of organic and inorganic substances. Thus, already during grinding, it is possible to organize the formation of final sorts of flour in such a way as to obtain products that are significantly different in food quality. Therefore, according to the modern technology, two or three streams of flour with different characteristics are organized in the grinding department and sent to the finished products shop (pick-out section), and there is formed such flour that is required by the consumer.

In addition, to obtain flour with a high content of fibrous substances, the presence of which has a positive effect on the function of the digestive tract. For the enrichment of flour with vitamins, minerals, dry gluten or various food additives use special technology.

In the last decade there has been a decrease in the baking properties of wheat flour, which does not meet the requirements set by standards for the quality of grain products for two main reasons:

- gradual decline in the quality of wheat, celebrated as a global trend;
- natural differences in the quality of wheat according to the agro-climatic conditions of the year [1-3].

The technological properties of grain are realized in the process of its processing into flour and groats. The greater the yield of these final products and the better their quality, as well as the lower the unit cost of production, the higher the technological properties of the processed batch of grain.

Knowing the initial indicators of the physicochemical properties of the grain, the technologist can judge not only the potential possibilities of obtaining a certain yield of flour or cereal from it, but also select the parameters of the modes of the main stages of the technological process.

With data on the structural and mechanical properties of the grain and its anatomical parts, the technologist has the opportunity to choose the mode of operation of the grinding or peeling machines so as to ensure their maximum efficiency with minimal energy expenditure.

Information about the biochemical properties of the grain allows the technologist when selecting modes of hydrothermal processing of grain, forming flour streams by grades, etc., to ensure the high quality of the finished product.

Thus, the technological properties of the grain are derived from a complex of various properties, which will be primary in relation to the technological. Consequently, there must be a relationship between the indicators determining the various properties of the grain.

The relationship between the indicators of various properties of the grain allows the technologist to judge the change in the milling properties, without subjecting the grain to a special test, i.e., without carrying out the experimental grinding.

Consumer properties determine the degree of conformity of finished products to their intended use. Flour must ensure the production of bakery, macaroni or high-quality confectionery products, cereals - various culinary dishes, mixed fodder - to serve as highly effective feed for farm animals, poultry and fish.

Consumer properties are assessed by laboratory analysis, as well as experimental testing in a specially organized trial.

State standards and technical conditions for finished products are necessarily made taking into account ensuring sufficiently high consumer properties.

In modern laboratory quality control of flour, it is customary to analyze a multitude of individual parameters of various constituent parts of flour: starch, gluten, proteins, water, etc. In addition, there are a number of components that are often neglected: resilience, extensibility, elasticity. INFRANEO manufactured by CHOPIN (France), allows you to conduct quality control to a new level, taking into account all the above elements. And most importantly, the interaction between them, and all this on one machine and in a single sample. Due to its unique features, it has unmatched capabilities in the field of fast and accurate quality control of flour.

The moisture absorption index (EPS) directly affects the whole baking process and, in particular, the physical and mechanical properties of the dough, such as the weight of the resulting dough and the amount of the final product. For example, when flour is excessively wetted, the interaction between protein compounds and starch is reduced. In general, an increase in the water absorption of flour leads to better gelatinization, a large increase in baking, an improvement in the softness of the crumb, and less retrogradation of starch.

P is the elasticity (maximum pressure required to deform the sample);

L is the bite (length of the curve);

W - baking capacity (area of the curve);

Le - elasticity elasticity (P / L).

Plasticity improvers of flour using INFRANEO users can optimize the amount of additives in flour in accordance with specified criteria: when gluten is added, the values of W and P increase, the value of L decreases; when adding an emulsifier, the value of P decreases slightly, the values of W and L increase.

Preparation of various types of flour according to its purpose: biscuit flour - dough with low viscosity (low P value) and high extensibility (high L value); flour for French loaves - dough with sufficiently high strength and extensibility (average values of P and L); Hamburger bun baking flour - high viscosity and tensile dough (high P and L values).

The ease of operation and high speed analysis make this device indispensable in any laboratory (figure 1).

Figure 1 - Adjustment of the device at the workplace of the laboratory of LLP «Beles-Agro»

Main advantages: high speed and accuracy of determination, obtaining spectral data in 3 seconds; simultaneous determination of several parameters; reliability in work and good convergence of results, lack of special requirements for sample preparation; lack of human factor in the determination.

Advantages in operation: the use of an open cup as a sample cuvette speeds up the work process and minimizes the possibility of error; the presence of standard for modern computer interfaces provides ease of working with data; thanks to the use of precision optics and the method of reflection in the near infrared range, the calibration results can be transferred from one instrument to another, replaced with new ones or corrected in place (figure 2).

Figure 2 - The process of analyzing the sample of flour on the device INFRANEO

The research material was: wheat flour produced by the mill complex of Beles Agro LLP.

Research methods: humidity was determined according to GOST 9404-88, the amount of gluten, protein, ash, whiteness, starch, EPS, elasticity, extensibility, elasticity, baking ability on the INFRANEO device.

Analysis of the indicators obtained using INFRANEO, allows us to conclude about the quantitative characteristics of the following flour parameters:

According to the results of the studies listed in the table, «Home», «Extra», «Classic» flour in terms of whiteness and ash content exceeds flour of the first and second grade. Wheat grains have the highest ash content in the shells and aleurone layer, and the lowest in the central parts of the

endosperm. Therefore, the ash content of flour I grade is always higher than the ash content of flour of the highest grade (table 1).

Table 1 - Indicators of the quality of wheat flour LLP «Beles-Agro», which obtained using the device INFRANEO

Indicators	Flour`s Sample					
	Top grade (control)	First grade	Second grade	Premium class flour		
				Extra	Classic	Home
Humidity, %	14,8	15,0	13,8	14,6	14,4	14,6
Protein, %	13,9	17,9	17,2	12,8	12,9	13,4
Ash, %	0,52	0,73	1,06	0,45	0,53	0,55
Gluten, %	36	46	42	33	33	34
Starch, %	17,7	17,7	19,0	17,9	17,8	17,9
AMS, %	66,2	66,6	70,0	65,6	65,3	66,7
P, elasticity, mm	49,2	63,9	80,7	47,7	49,0	51,8
L, tensile properties, mm	29,2	34,7	32,9	27,4	27,0	27,6
Le, elasticity, mm	62,6	67,0	57,8	61,4	62,4	61,4
W, baking ability, e/a	427	540	476	397	405	405
Whiteness, %	72,0	61,0	46,0	77,0	77,0	72,1

The quantity and quality of gluten characterize the nutritional (protein) value of flour, determine the physicomechanical properties (elasticity, plasticity, strength)

The amount of protein in the flour affects the water absorption capacity of the products when the content of raw gluten in flour is 25-40%.

According to the quality indicators of flour of the first and second grade can be used in the production of social bread, and flour of the highest grade for baking pastries.

Flour «Home», «Extra», «Classic» as a premium class - for consumers who prefer whiteness.

The modern economy requires not only the production of flour of various nutritional advantages, but also the conquest of the market, as this is an important factor in the sustainability of the enterprise in the competitive struggle. Therefore, several sorts of flour should be produced at each mill, especially since it is allowed by modern legislation.

Conclusion. The considered method of assessing the quality of flour with the help of INFRANEO can be used in justification in the production of types of special-purpose flour in accordance with the requirements of regulatory documents.

Analyzing the data obtained in the course of research we can draw the following conclusions: that the flour`s marks «Home», «Extra», «Classic» are recommended to use as a premium flour in terms of whiteness and ash content.

To improve sales, the company is recommended to expand the range of premium flour and pack 2 and 5 kg each.

REFERENCES

1. Lazerev S.V., Cyganova T.B. Proizvodstvo muki iz myagkoj pshenicy dlya celevogo ispol'zovaniya // Pishchevaya promyshlennost'. – 2003. - №8. - S. 62 - 64. *(in Russian)*

2. Mart'yanova A.I. Ocenka tekhnologicheskih svojstv tovarnyh partij zerna pshenicy. - M.: Agropromizdat, 1986. – 58 s. *(in Russian)*

3. Butkovskij V.A., Galkina L.S, Ptushkina G.E. Sovremennaya tekhnika i tekhnologiya proizvodstva muki. - M.: DeLi print, 2006. - 319 s. *(in Russian)*

ТҮЙІН

Қазіргі экономиканың талабы өндірілетін ұнның тағамдық ерекшелігі ғана емес сонымен қатар нарықты жаулау және кәсіпорынның бәсекелестікке қарсы тұра алатындай маңызды факторы болып табылады. Сондықтан әрбір диірменге ұнның бірнеше сорттарын шығару керек, оның үстіне қазіргі заманғы заңнамаларда бұған рұқсат етілген.

Нормативтік құжаттардың талабы бойынша ИНФРАНЕО қондырғысының көмегімен ұнның сапасын бағалау әдісін ұн өндірісінде қолдануға болады.

Алынған деректерді талдай отырып мынадай тұжырымдар жасауға болады: «Кеспелік», «Экстра» және «Классик» ұнын түсі мен күлділігі көрсеткішіне байланысты премиум класты ұн ретінде пайдалану ұсынылады. Премиум класты ұнның ассортиментін кеңейту үшін 2 және 5 кг өлшемде сату ұсынылады.

РЕЗЮМЕ

Современная экономика требует не только производства различной по пищевым достоинствам муки, но и завоевания рынка, т.к. это является важным фактором устойчивости предприятия в конкурентной борьбе. Поэтому на каждой мельнице следует вырабатывать несколько сортов муки, тем более, что это допускается современным законодательством.

Рассматриваемый метод оценки качества муки с помощью ИНФРАНЕО можно использовать при обосновании использования при производстве муки в соответствии с требованиями нормативной документации.

Анализируя, полученные данные в ходе исследований можно сделать следующие выводы: что муку «Домашняя», «Экстра», «Классик» рекомендуется использовать как примум мука по показателям белизна и золы.

Для улучшения сбыта рекомендется расширить ассортимент муки Премиум класса и производить фасовку по 2 и 5 кг.