

FOOD EMULSIFIERS IN BREAD PRODUCTS AND IMPROVING THE NUTRITIONAL QUALITY OF BREAD PRODUCTS

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Abstract

This article presents ideas on the proper use of food emulsifiers and increasing the nutritional value of bread products due to the development of the food industry.

Keywords: emulsifier, fermentation, gluten, starch, trace elements, wheat flour.

Introduction

An emulsifier is a surfactant with a hydrophilic group and a lipophilic group, which can dissolve two phases (for example, oil) and form a homogeneous dispersion or emulsion, thereby changing the original physical. Currently, due to the improvement of processing technology in the food industry, emulsifiers play an important role in the processing of food products. The most important thing for consumers is not a wide range of bakery products and meeting the demand for bakery products, but the quality of the products.

MATERIALS AND METHODS

The main component of bread is carbohydrates (starch). It serves as an energy source along with other sugars [1,2,3,4]. 50% (from type 1 wheat flour) and 40% (from rye flour) of a person's need for carbohydrates are covered by bread. Bread is an important source of dietary fiber. The lower the fertility of the flour, the more flour it contains. The most useful of these positions is bread made from coarse flour. From vitamins, bread fully covers people's need for thiamine (B1), at the same time, B vitamins are concentrated in the shell of the grain, and therefore high-quality flour contains few of these vitamins. If whole grain wheat bread contains 0.27 mg% of vitamin B1, then the highest grade bread contains only 0.11 mg%, vitamin B2 - 0.13 and 0.06 mg%, vitamin PP - 4.20 and 0.92 mg% are available. Therefore, in some regions of the country, 0.4 mg of vitamins B1 and B2 and 2 mg of PP vitamins are added to 100 g of premium flour and 1 first grade flour. Bread contains almost no vitamins A and C.

RESULTS AND DISCUSSION

An emulsifier can be a better mixture of oil and water in a baked product. According to the type of baked goods, the emulsifier effect works well and the quality of the baked goods improves.



They are widely used by the baking industry, thereby changing the internal structure of products and improving product quality. According to the different characteristics of products, different emulsifiers can fulfill the following main roles as a product:

1. Emulsifiers increase the gas retention of gluten and dough. In baked products, emulsifiers can interact with gluten, and also increase the resistance of the dough to mechanical impact and fermentation temperature. During dough formation, gluten forms a network structure. If the mechanism is relatively weak, the carbon dioxide produced by the yeast is lost. Adding an emulsifier to the dough, such as DATEM, SSL, or the like, strengthens the gluten structure so that the resulting CO₂ gas is better retained.

2. Emulsifier creates a smooth film layer structure between gluten and starch. This structure ensures good bonding with gluten and reduces the viscosity of the dough, thereby increasing the falling properties of the gluten protein network and facilitating the formation of the product.

3. An emulsifier can be used as a dough softener to extend the softness and flavor of baked goods. Saturated distilled monoglycerides are effective dough softeners. Aging of starch in wheat dough is a natural enemy of dough softening. The amylose in the starch swells in water and forms a relatively stable jelly state after cooking and cooling to form the texture of bread, and when the temperature is lowered and the time is extended, the amylose recovers and becomes insoluble, thus becoming hard and brittle, so the softness of the dough is greatly reduced. If an emulsifier such as monoglyceride is added to the dough, it is absorbed by the starch molecules after mixing, and when the dough temperature reaches 55 °C, it reacts with amylose to form a spiral complex. It also reduces the loss of moisture from the protein structure and delays the formation of hard proteins. All of the above will make the texture of the bread softer and last longer [5,6,7,8].

4. Emulsifiers provide the main emulsification. Good bakery products require a good emulsification reaction. Hydrophilic and lipophilic groups of the emulsifier act separately in the dough to adsorb water and fat in the dough, thereby reducing the interfacial tension between the fat and water phases and homogenizing the previously incompatible polydisperse phase system in the dough. The resulting emulsion can be of two types: oil in water and water in oil. The emulsifying ability of an emulsifier depends on the number of hydrophilic groups and oleophilic groups [9,10,11,12].

The hydrophilic-lipophilic balance value can generally be used to indicate the difference in emulsification ability.

5. It has negligible ventilation effect. The addition of emulsifier can reduce the specific gravity of dough, increase product volume, and improve quality and appearance [13,14,15,16].

Currently, the following emulsifiers are mainly added to bread and bakery products - E471, E472A, E472B, E472C, E472E, E475, E476, E477, E481, E482, etc.

Bread is an important source of protein in a person's diet, covering 30% of his daily need (with the consumption of 450 grams of bread per day). Bread proteins are mostly denatured. At the same time, bread proteins lack amino acids lysine and threonine. Rye bread has slightly more independent amino acids, but lysine and threonine are low in rye bread. Wheat bread is high in these amino acids. Other nutrients in bread include lipids and amino acids. Starch is often



gelatinous, lipids form complexes with proteins and carbohydrates. Hemicellulose in bread is softened and swollen. Bread partially covers a person's need for iron[17,18,19,20,21].

Each food product must meet certain GOST requirements. It primarily uses bread as a mass consumer product. The most important quantitative indicators of properly baked bread are: density 1.25, moisture 49%, acid level 9 - 11 conditional degrees, acid equivalent in 100 grams of bread [22,23,24,25,26].

The World Health Organization and FAO, among many other nationally recognized organizations, have recognized that there are more than 2 billion people worldwide who suffer from various micronutrient deficiencies [27,28,29,30]. In 1992, 159 countries pledged at the FAO/WHO International Conference on Nutrition to help combat deficiencies of these micronutrients, highlighting the importance of reducing the number of people deficient in iodine, vitamin A, and iron. A key statistic that has fueled these efforts is that 1 in 3 people worldwide are at risk of iodine, vitamin A, or iron deficiency. While it is recognized that fortification of bread and bakery products alone will not address this deficiency, it is a step towards reducing the prevalence of these deficiencies and the health conditions associated with them [31,32,33,34,35].

In most cases, micronutrients added to food products are synthetic. In some cases, some forms of micronutrients can be actively toxic at high enough doses, even if other forms are safe at the same or higher doses. There are examples of this toxicity in both synthetic and naturally occurring vitamins. Retinol, the active form of vitamin A, is toxic at much lower doses than other forms such as beta carotene [36,37,38,39,40].

CONCLUSION

Nowadays, many people think that enriched bread is more useful than wheat bread. As for enrichment, the wheat grain is made up of three elements - the variety that can give new life, the kernel, which stores a lot of sugar and starch, and the outer shell. The shell protects the inside of the grain from external aggressive environment, temperature changes, moisture and mechanical damage. It contains many useful substances. Many scientists have conducted scientific and research work on the production of enriched bread, according to research, it belongs to the food industry and can be used in the production of enriched bread products.

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