

DIETARY FIBER IN CURRENT NUTRITION APPLICATIONS ON WAFFERS

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Rezumat: Societatea modernă acordă din ce în ce mai multă importanță alimentelor funcționale. Pentru obținerea unor astfel de alimente cu efect benefic asupra sănătății există mai multe posibilități. Una din ele este îmbogățirea acestora cu fibre. Interesul pentru obținerea unor astfel de produse pare să fie mai mare în industria panificației decât în alte sectoare alimentare. O explicație în acest sens ar putea fi faptul că bobul de grâu integral reprezintă o importantă sursă de fibre. Scopul acestei lucrări experimentale este de a îmbogăți în fibre unul din produsele de panificație și anume vafa prin adăugarea de diferite ingrediente care să-i mărească conținutul acestuia în fibre.

Cuvinte cheie: fibră insolubilă, vafă, fibră de mazăre, tărâță.

Abstract: Modern society attaches much importance to balanced and healthy food. There are many options to improve products in a digestive-physiological sense. Enriching them with dietary fibres is one of the options. Interest in this now seems to be growing in bakery industry much faster than in other foods products. Whole cereal grains and their fractionated fibres provide a significant proportion of the dietary fibre. The purpose of this project was to improve the classic waffle by adding ingredients with a high content of fibre.

Keywords: insoluble fibre, waffle, yellow pea fibre, bran.

Résumé: La société moderne accorde beaucoup d'importance aux aliments équilibrés et sains. Il y a beaucoup de choix pour améliorer les produits d'une manière digestive et psychologique. En les enrichissant avec des fibres diététiques représente un des choix. L'intérêt y semble d'augmenter dans l'industrie de panification plus vite que dans d'autres produits alimentaires. Les grains entiers des céréales et leurs fibres fractionnées fournissent une proportion significative de fibres diététiques. Le but de ce projet est d'améliorer le waffer classique en ajoutant des ingrédients à haut contenu de fibres.

Mots clef: fibre insoluble, gaufre, fibre de pois jaune, paille de blé

Introduction

Researches show that the eating behaviour of the population's majority is based on disaccharides and fats, which result in exceeding body necessities of calories and generates diseases like: obesity, diabetes, heart dysfunctions.

Most of the times, diabetes is associated with obesity and heart diseases. In these cases, diabetes occurs to overweight people and most probable to people who use sugar on a daily basis, and it results in a lack of balance between the energetic input and nutritional needs of the individual.

In order to temper, diminish and mainly prevent such diseases, it is necessary to develop healthier eating habits, in other words to decrease glucose and lipid input and to replace it with products containing more fibres, as dietetic food of hypo-caloric type. The radical changes, that have lately taken place on the global food supply free market, show an obvious increasing interest of the buyers for such dietetic products.

Such a product is waffle, a food item that is a part of a larger category: the fibre enriched waffle type. This product contains 30-35% fibres of which physiologic benefit can be thus described (e. g. [1]):

- They reduce the caloric input in meals and diminish assimilation of nutrition basics in the small intestine, by this helping in treatment of obesity and diabetes.;
- They reduce the cholesterol level and the producing of hepatic cholesterol, thus preventing the bile lithiasis, atherosclerosis, ischemic cardiopathy;
- The fibres, by their dissolvability, reduce the time of the intestinal transit, thus avoiding constipation;
- They have a detoxifying effect due to their capacity to interact by exchanging ions;

Materials and methods

In the manufacturing receipt of classical product we have employed different ingredients in different combinations with a beneficent role upon the human body. The waffle dough is attained by mixing the ingredients given in the receipt. We have done three trials using different ingredients and we achieved three versions of such a product which are presented in table no. 1:

Table 1-the ingredients of the three version of waffle

Reference	Version I	Version II	Version III
<ul style="list-style-type: none"> • flour type 650 • salt • expander • sunflower oil • water 	<ul style="list-style-type: none"> • flour type 1350 • bran • cinnamon • salt • expander • sunflower oil • whey 	<ul style="list-style-type: none"> • flour type 650 • bran • pea fibre • caraway • expander • sunflower oil • whey 	<ul style="list-style-type: none"> • flour type 650 • bran • pea fibre • expander • sunflower oil • whey

Within the fibre-waffle technology, bran flour/flour type 1350/pea fibre has replaced the equivalent of wheat flour type 650 as is presented in table no. 2:

Table 2-the equivalent of wheat flour type 650 with different source of fibre in the three versions of waffle

Ingredients	Reference	Version I	Version II	Version III
Flour type 650	100	-	50	50
Flour type 1350	-	70	-	-
Bran	-	30	30	30
Pea fibre	-	-	20	20

The health and nutritional benefits of the functional ingredients used in the three version of waffle can be thus described:

Flour of type 1350 - is raw flour of a more primary meal, 85%, that has a ratio of ash, as reported to the dry substance, of 1.35, in other words 3 times more than the white flour - of type 650 (of 0.48%). Raw flour has a higher nutritive value than white flour. As compared to white flour, raw flour is rich in lipids, pentose, vitamins, and folic acid. The content of fibre is of 10-11%.

Wheat bran – has a high content of fibres: 70%, and due to the capillaries in its structure, increases chances of a better hydration (e.g. [2]).

Yellow pea fibre looks like a white powder; its composition provides a large quantity of vegetal fibres, over 50% that confers dietetic features to the final product. It is insipid, it has no specific odour, and thus it is technologically neutral. (e.g. [3]).

Pea fibre is not dissoluble, completely degradable in the colon, under the action of bacteria, to hydrogen, methane, carbon dioxide and fat acids of short catenae: acetic, propionic, butyric. Its content of fibre is of 48%.

Whey is used for its content of calcium, lactic acid and albumins that decrease inhibition to absorb calcium, because of the fitic acid in whey and raw flour.

Flavour improvers are used for their positive effects on the human body and on the organic

properties; in our four versions of the product we have used caraway and cinnamon.

Cinnamon is employed as a homeopathic ingredient and has the following benefits:

- diminishes the cholesterol amount in blood;
- increases the metabolism and thus prevents obesity.
- stimulates pancreas functioning, reducing sugar contents in the blood.

Caraway is used as a homeopathic element and has the following advantages:

- reduces chances of engorgement disorders;
- helps in preventing colon diseases;
- has a disinfectant effect;
- is an natural aromatisation component.

From the technological point of view, the procedure for obtaining the product was improved by adapting the classic method of the wafers' oven the enriched fibre wafer. It is important to mention that we can not use the waffle oven simultaneously for both products (the classical and enriched fibre one) because of the variation in consistence of the fluid dough. The enriched fibre waffle is made of a more solid dough that in time force the distance between the matrix frames, altering the pressing system and getting them not to be suitable any more for the common waffle crisps.

From a mechanical point of view, the main changes made to the waffle oven, in order to produce enriched fibre waffle, are:

- changing distance between the matrix's frames with about 3 mm. , thus modifying their pressing system;
- modifying the dosing system for the fluid dough by completely replacing it with a new one, produced in our own workshop: four dosing gaps at equal distances – comparing to the six ones that initially were part of the waffle oven;

From a technological point of view, the speed of the oven's running belt must be correlated with the temperature, in order to achieve a regular product. Otherwise, a greater speed of the oven's running belt would determine a inadequate dosing of dough, acquiring prolonged shapes that would not be a commercial attraction.

Researches established for the new product waffle the following baking indices: $t_0=115-120^{\circ}\text{C}$; $t=4-5\text{min}$ (comparing to $t_0 =145-150^{\circ}\text{C}$; $t=2-3 \text{ min.}$ for obtaining the classic waffles).

To facilitate keeping the same density of the dough of the waffles, we add extra water necessary to a better hydration of the cellulose material, a quantity that can reach to 300% from the whey substance added.

Results and discussion

The three versions have the following features:

Table 3-the features of the three versions of waffle

Features	Reference	Version I	Version II	Version III
Colour	White-yellow	caramel	light brown	caramel
Scent	undetectable	Pleasant, of cinnamon and whey	Pleasant, typical of whey and caraway	Pleasant, of cinnamon and whey
Taste	fade	accentuated, pleasant, of cinnamon	Pleasant, noticeable - taste of whey and caraway	Accentuated ,of cinnamon
Water content	2,1%	2.47%	5.39%	6.99%
Fibre content	~7 %	~33%	~33%	~33%

A choice has been made to replace the 1350 white flower with the 650 type so as to avoid sticking the product to the baking plate. The difference of content in fibres has been substituted by using the pea fibre powder, resulting in the same content of fibres for all four of the products 33%.

A great increase in quality has been obtained for the basic version of the product (reference) by adding active ingredients, with a beneficent role in developing the organism; these ingredients are considered, by the Osawa diet, as spiritual purifying substances. The negative effect of the fitic acid has been removed by adding the whey – thus enriched fibre waffle can be used by people predisposed at rachitism and osteoporosis.

Conclusions

The enriched fibre waffle is an efficient food item by the positive effects that its content of insoluble fibres has on the human body. Moreover, efforts were made to create a product organically attractive by its appearance, colour, and odour. This was achieved by adding flavour ingredients with a helpful effect on the body (caraway and cinnamon) and by improving the producing processes.

References:

- [1] Segal R., Costin G.M, (1999) - *Functional foods* , Ed. Academica,1, Galați, 323-348;
- [2] Bordei D. (2004) - *The modern technology of baking industry*, Ed. Agir, București 420-429;
- [3] SC Enzymes & Derivates Romania SA-*Sheet Products*, Costisa, Neamtz.