

SPENT GRAINS QUALITATIVE ESTIMATION – BY PRODUCTS OF BEER INDUSTRY

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Abstract

Presently, spent grains are used in our country for its significant nutritional value only for animal feedstuffs delivered as raw material. This aspect may produce the blocking of storage spaces many times. In this paper we have made few researches on chemical composition and also on nutritional components of spent grains with the view of its utilization in other fields of food industry: bakery industry, pastry, flour confectionery goods, confectionery products.

Keywords: *spent grains, nutritional value, useful components*

Introduction

The last years beer industry knows significant progress by new technologies introduction and existing technologies development, by new products: non alcohol beer, special beer, beer cooler products, yields and quality finite product improvement, and complex turning account of by-products.

There is a series of by-products obtained from malt and beer industry: cereal wastes, malt rootlets, spent grains, spent hops, proteic sediment (hot break, cold break), brewer's yeast, carbon dioxide, etc.

Spent grains holds the most weight out of all the by-products obtained from the manufacturing of beer. The quantity and quality of the spent grains obtained from the manufacturing of beer depend on the adopted mash filtration method, the quality of the raw material used in the technological process. For example, the spent grains obtained at the mash filtration in lauter tuns, represent 100÷150 kg/100 kg malt and have 70÷80% humidity (Banu, 2001; Dabija, 2002).

Presently, spent grains are used in different forms in animal feedstuffs: fresh spent grains, ensiled spent grains (lactic acid, lactobacillus cultures), dried spent grains (Moll, 1991). Due to the high nutritive values of this by-product we have tried using spent grains in human nourishment. The researches made world wide had lead to the

obtainment of spent grains flour, which can be used in the bakery industry for the improvement of bakery products' porosity and the increase of water absorption capacity on a level 3-5%. Adding the spent grain flour in the dough may positively influence freshness maintaining. It may produce a darker color of the core in the case of spent grain flour raising quantity, what is undesirable for some products (Ioancea, 1998). Spent grains are also used as an addition in polished cast iron in a proportion of 10-12 g/l, after preliminarily treated with hydrochloric acid.

Spent grain is presently used in our country for its significant nutritional value only for animal feedstuffs delivered as raw material. This aspect may produce the blocking of storage spaces many times.

This study presents quality-spent grains evaluation from some brewing units and its capitalization possibilities for human feeding.

Experimental

In the experiments we have used spent grains from four plants:

- S.C. ZIMCA S.A. PIATRA NEAMT (sample no.1);
- S.C. BERE LICHIOR MARGINENI S.A. BACAU (sample no.2);
- S.C. ALBRAU S.A. ONESTI (sample no.3);
- S.C. ZIMBRU S.A. IASI (sample no.4),

and a sample of spent grains obtained in condition of laboratory (Kongress method – sample no.5).

It had analyzed the following physical-chemical parameters:

- Humidity- etuve drying at 105°C;
- Total proteic substances- Kjeldhal method;
- Mineral substances (ash)- ashing at 550°C;
- Carbohydrates- Bertrand method;
- Cellulose – Charer-Kurshner method.

Results and discussions

The results of determinations are presented in table 1 and figure1. The high values for humidity explain why spent grains cannot be used in this form. Also, its composition reflects many fields of using for this product: source of protein, low level of carbohydrate and good source of fibers. The values show no major differences between various sources of provenience.

It looks like spent grains have a raised nutritional value due to proteic substances, carbohydrates and other components (vitamins group B). Also the raised content of cellulose may lead to fiber contribution in human nourishment. The fibers have a positive influence in health state maintaining and constitute an important component of daily diet, with certain protective effect.

Table 1. Physical-chemical parameters of spent grains

Characteristics	Provenience of sample:				
	1	2	3	4	5
Humidity	76	70	82	78	80
Another substances	2	1.4	1.8	2.9	3.5

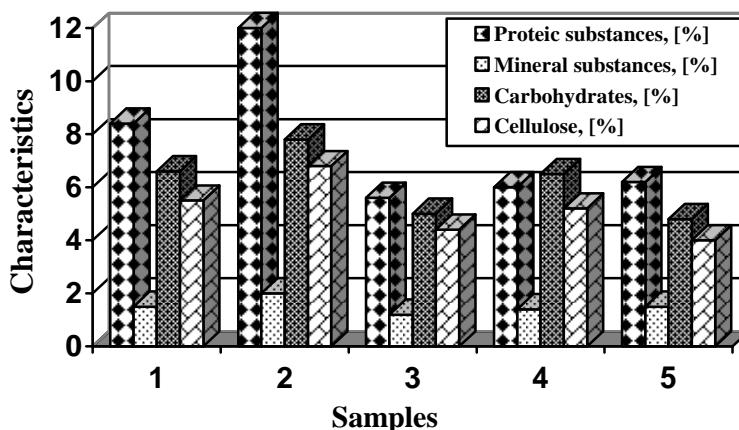


Fig.1. Variation of physical-chemical parameters of spent grains samples

It is known those food fibers:

- Reduces the diet's caloric contribution: with big hydration capacity, fibers fill in the stomach and so they create a satiety sensation, controlling the obesity;
- Diminish the nutrient absorption in the jejunum so they control the diabet end the obesity;
- Reduces the time for intestine transit and stimulates gall-bag salts and gall-bag acids, so they fight against constipation and colon cancer;

- Has the rendering harmless effect by their capacity to function as ions exchangers;
- Reduce colon pH (Costin and Segal, 1999; 2001).

Spent grains may be dried and then milled resulting spent grains flour, which can be added in various food industry fields: bakery industry, pastry, flour confectionery goods, confectionery products.

For example, adding the spent grains to the bread manufacturing, in 10% proportion it had obtained a proteic substance content improvement in wheat flour. The raising of protein content had led to: rising the time of dough development, kneading tolerance, dough elasticity and flour hydrating capacity.

Spent grains flour contains gelatinized starch that contributes to the growth of dough's capacity to produce gas, this type of starch being much easier hydrolyzed by amylases and also contributes to the extension of bread freshness. Also, the spent grains flour contains mineral substances, which are valuable for yeast nutrition and for their influence upon the dough rheological properties.

Another research direction may be the transformation of spent grains in food concentrate that may be used as component in culture media as source of: carbohydrates, mineral substances, aminoacids.

Conclusions

Spent grains consist as a valuable by-product, which can be, turned account not only for animal feedstuffs but also for human nourishment. For its valuable content in components with nourishing and energetic value spent grain can be used for bakery products recipes.

References

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