

# DEVELOPMENT OF PUFFING TECHNOLOGY

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**REZUMAT.** Cerealele joacă un rol esențial în nutriția umană, astfel încât prezența de alimente de bună calitate pe piață este din ce în ce mai importantă pentru o alimentație sănătoasă. Acest articol descrie un program de cercetare (programul Gábor Baross --Regiunea Câmpia Ungară de Nord). În acest program, cercetătorii au dezvoltat produse industriale alimentare sănătoase cu o tehnologie nouă de producție. Ca urmare a realizării ofertei am obținut produse expandate aromatizate în volumul lor combinând expandarea și operațiunea de aromatizare.

**Cuvinte cheie :** cereale, expandare , tehnologie noua , arome

**ABSTRACT.** Cereals play an essential role in the human nutrition so the presence of good quality food in the market is more and more important because it is necessary for healthy nutrition. This article describes a research programme (Gábor Baross programme – North Hungarian Plain-Region). In this programme the researchers have developed healthy food industrial products with a new production technology. As a result of the realisation of the tender we obtained puffed products flavoured in their volume combining the puffing and the flavouring operation.

**Keywords:** cereals, puffing, new technology, flavours

## 1. INTRODUCTION

Puffed cereals have a basic role in human consumption. They are made primarily from wheat and rice. These cereals may be puffed in several ways but the demand is directed towards consumption of special products which satisfy special demands, have favourable effect for nutrition prevailing healthy and environmental protection guidelines. Consumers are motivated when they can choose good quality and cheap products by their gestation for healthy nutrition.

## 2. PROCESSING OF GRAINS

Grains are important for healthy nutrition because they supply energy during nutrition. The aim of the processing of cereal crops is to produce products which are suitable for human nutrition, easy to digest and rich in nutrient. This aim can be realized by different kinds of technologies namely milling, husking, *puffing*, extruding etc. puffing is a relatively well known and widely used process. In the course of puffing, the volume of the grains is expanded (multiple) so it becomes easy to digest [[www.baboss.hu](http://www.baboss.hu)].

Puffing of the heat and rice is commonly used. Kernel has relatively homogeneous and less porous structure. Puffing induces significant changes in the structure and physical properties of the kernel. But the effect of the puffing treatment is strongly influenced by the morphology and composition of the kernel [*Mariotti et al, 2006*].

In the frame of Gábor Baross programme of North Hungarian Plain-Region there was a call for

tenders so we wrote a work plan to develop a new food industrial technology and produce a new healthy food. The project has finished successfully, so we would like to present some important results of our R&D&I work.

## 3. EXPERIMENTAL TECHNOLOGY

It is important to keep original nutrients of grains in the course of processing. These cereal products can be produced by new considerate processing technologies [*Léder, 2003*].

The object of Baross-2-2007-0026 project is to develop a technology and to produce puffed cereals which are flavoured in full volume. We made puffing and flavouring experiments with durum wheat, white rice, brown rice. We wanted to produce sweet and salty cereal products according to potential consumers taste. In the course of our experiments we used the flavouring mixture as liquid paste and as powder. The traditional puffing apparatus was available at the head of the researching consortium. Tachibana Small 11 apparatus was used for the puffing experiments. The main characters of the apparatus are:

- energy supply: 220 V electric power,  
6 bar air-supply,  
PB gas
- loading (quantity): 1.44-2 kg
- productivity: 60 kg kernel / shift

We changed a little bit this apparatus:

- we made a separate cyclone to collect the puffed cereals (faster and simpler)

- we made a directing path to move (horizontally) the puffing machine (loading and cleaning of the machine are simpler)
- In *Fig. 1* there is the puffing apparatus.



*Fig. 1* Puffing machine

#### 4. PUFFED CEREALS WHICH ARE FLAVOURED IN FULL VOLUME

We have developed the puffing technology process considering HACCP requirements (it is important to produce quality products). There are two ways to produce such puffed cereals which are flavoured in full volume:

- flavouring before puffing or
- flavouring after puffing

Both ways are used to produce flavoured products (independent of type of grains and

flavouring mass/liquid) but before puffing the soaking in the flavouring mass resulted more intense flavour in case of salty-taste products.

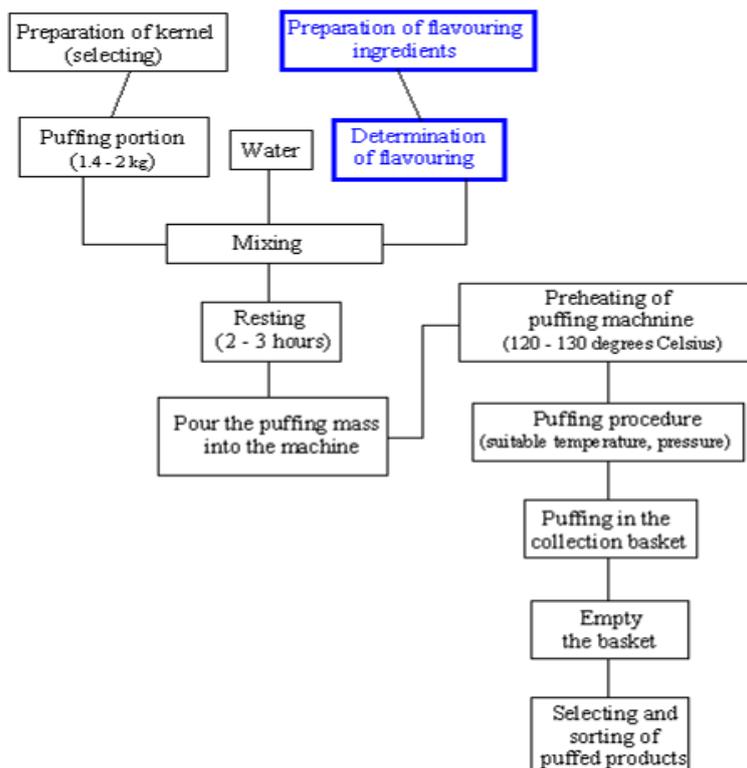
Main equipment of flavouring working process is dropping kettle (*Fig. 2*). Technological parameters of the dropping kettle:

- height 1450 mm
- width 950 mm
- length 1080 mm
- diameter of kettle 950 mm
- maximum load 100 kg
- rpm 25, 30, 35 1/min



*Fig. 2* Dropping kettle

In *Fig. 3* it can be seen the full technology process of the puffed cereals which are flavoured in full volume.



*Fig. 3* Diagram of puffing process

We have produced the next puffed cereals by flavoured liquid:

- white rice: honey-cinnamon, garlic-pepper, milk chocolate
- durum wheat: honey-cinnamon, milk and bitter chocolate, Hungarian style
- brown rice: honey-cinnamon, milk and bitter chocolate

## 5. SUMMARY

During the experiments we examined the effect of different kinds of parameters (pressure, temperature, time) to the amount and the quality of puffed products. We determined that the optimal technological parameters are different per grains. As a result of the realisation of the tender we obtained different kinds of puffed products flavoured in their volume combining the puffing and the flavouring operation. Lots of new puffed cereals have already appeared in the market.

## 6. ACKNOWLEDGEMENT

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