

Expanded extrudates with corn and defatted chia flour

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Abstract

Expanded extrudates, also known as snacks, are obtained through extrusion of corn flour, which presents a high content of starch. The addition of fiber sources can be used for regulating the liberation of glucose in the gastrointestinal tract. The aim of this research is to increase the fiber content on the final product, maintaining acceptable technological properties, by using defatted chia flour in the composition of the material used on extrusion. The effect of the content of defatted chia flour and moisture content of the material was evaluated in the final product, in order to find the optimized point.

Key words: Snacks, fiber, extrusion.

Introduction

The production of expanded extrudates snacks is a growing business in food industry. They are produced by thermoplastic extrusion, in which the flour goes through a process of starch gelatinization and protein denaturation, creating complexes between the starch and other components, such as protein molecules. The main raw material used to produce snacks is corn flour, which contains a high content of starch and lacks fiber on its composition.¹

The fiber is very important for a good functioning of the human body. It passes intact through the intestine, thus does not contribute with calories. It helps controlling the digestion of components such as proteins, lipids and carbohydrates. Some types of fibers carry sugar and fat molecules through the intestine, reducing cholesterol levels and glycemic index.²

Chia is a pseudocereal rich in lipids, vitamins, minerals and, most importantly, fibers. Adding defatted chia flour (fat interferes on the extrusion process) to the composition of the expanded extrudates raw material supplies the lack of fibers on the snacks.³

Results and Discussion

Technological properties, such as expansion index, water absorption and solubility indexes, texture, specific volume, instrumental color and pasting properties were evaluated. The optimal point was selected, by analyzing the response surfaces and the mathematical model, with the addition of 8% defatted chia flour and 15% moisture content, resulting in a product "source of fiber" (2.5g/30g of final product), according to Brazilian legislation. Also, a control sample (only corn flour) and a sample "rich in fiber" (5.0g/30g of final product) were elaborated in order to analyze the effect on the product quality. The degree of

gelatinization of the final product was also analyzed (Chart 1).

Chart 1. Some technological parameters of the control, source of fiber and rich in fiber samples

Parameter	Control	Source of fiber	Rich in fiber
EI	2,7852	2,6128	1,5564
WAI	6,72	6,35	6,75
WSI	5,45	5,52	4,26
CF	15,5783	19,9438	25,4412
SV	0,1756	0,1926	0,6537
L*	68,57	62,60	50,96
CV	327,33	1101,11	1294,22
DG	89,91	98,94	87,58
TDF	0,05	2,5	5,0

EI-expansion index; WAI-water absorption index (g of gel/g of sample); WSI-water solubility index (%); CF-compression force (N); SV-specific volume (g/mL); L*-luminosity; CV-cold viscosity (cP); DG-degree of gelatinization (%); TDF-total dietary fiber (g/30g of final product).

Conclusions

It has been concluded that there is a practical possibility to produce expanded extrudates source of fibers, resulting in a healthier product. The snack would have the claim of "fiber source" and, since the search for healthier foods is increasing significantly, its production could be an interesting business.

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¹ Fernandes, M. S.; Wang, S. H.; Ascheri, J. L. R.; Oliveira, M. F.; Costa, S. A. J. (2002). Produtos extrusados expandidos de misturas de canjiquinha e soja para o uso de petiscos..

² GRUPO VIRTUOUS. (2014). Fibras alimentares. Só nutrição.

³ COATES, W.; AYERZA, R. (2005). Chia. Tucson: The University of Arizona Press..