

Effect of Orange Pulp as a New Source of Dietary Fiber on the Nutritional Characteristics of Pound Cake

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ABSTRACT

Consumers are increasingly aware of diet related health problems and therefore are demanding natural ingredients which are expected to be safe and health promoting. By-products of citrus processing industries represent a serious problem, but they are also promising sources of materials which may be used in food industry because of their valuable technological and nutritional properties. Pound cake prepared from blended containing different proportion (0, 10, 15 and 25 %) of orange pulp were evaluated for chemical composition (protein, fat, ash, total dietary fiber and carbohydrates) according to standards of AOAC (Association, 2000). Data revealed that, incorporation of orange pulp in cake formula increased total dietary fiber from 2.62 to 14.79 % and ash have the same trend, while protein and fat contents were decreased.

Keywords: *citrus by-product, orange pulp, pound cakes, dietary fiber.*

INTRODUCTION

The post harvest loss of fresh fruits and vegetables are estimated to be 20-30%. In order to prevent the losses, there is a need to process the commodities into various value added products. Human nutritional research is continually showing that a well balanced diet, rich in fruits and vegetables, promotes good health and may reduce the risk of certain diseases (Catunescu *et al.*, 2012; Salanță *et al.*, 2015). One of the food ingredients greatly used when developing nutritionally designed foods that promote health is the dietary fiber. Dietary fibres from cereals are much more used than dietary fibres from fruits; however, dietary fibres from fruits have better quality. A few years ago the subproducts generated during the processing of plant food constituted an economic and environmental problem, today they are considered a promising source of functional compounds (Carle *et al.*, 2001). Many fruits, for example orange, apple and peach, are used for the

extraction of their juices. From the by-product of the juice extraction, different high added value compounds can be recovered; among those, the fibre fraction that has a great potential in the preparation of functional foods, is remarkable. It contains both soluble and insoluble fibre compounds that can be used for designing new "functional foods". Fibre derived from fruits have a considerably higher proportion of soluble dietary fibre, whereas cereal fibres contain more insoluble cellulose and hemicellulose (Sharoba *et al.*, 2013).

AIMS AND OBJECTIVES

The aim of this work was to study the effect of the addition of orange pulp powder, as source rich in dietary fiber, on the nutritional characteristics of pound cakes.

MATERIALS AND METHODS

The raw materials (wheat flour type 000, oranges, eggs, sugar, oil and baking powder)

Tab. 1. Chemical composition of the pound cake with orange pulp powder added, g/100 g dry weight basis

Sample	Protein	Fat	Ash	Total Carbohydrates	Total dietary fiber
Control	10.12	17.62	0.49	71.77	2.62
Orange pulp powder					
10%	6.88	14.40	1.27	77.45	8.67
15%	6.47	13.77	1.40	78.36	11.75
25%	5.67	11.03	1.52	81.78	14.79

used in these experiments have been purchased from markets of specialized stores. Oranges have undergone the process squeezing of the juice. Afterwards, the citrus by-products were pressed using a helical press to remove excess liquid prior to drying. Drying was respectively carried out in an oven at 50°C for 24 h to improve citrus by-products shelf-life without addition of any chemical preservative. A grinder mill and sieves were used to obtain a powder particle size of less than 0.5 mm. The wheat flour was substituted with different percentages (0, 10, 15, and 25 %) of orange pulp powder for the preparation of pound cake. Mechanical loosening is obtained by churning egg white. The experimental variants was analyzed for chemical composition: protein, fat, ash, total dietary fiber and total carbohydrates according to standards of AOAC (Association, 2000).

RESULTS AND DISCUSSION

The addition of orange pulp powder in pound cake improved its sensory and nutritional qualities. The values of analyzed parameters for cakes with orange pulp powder are presented in Table 1:

Chemical composition of substituted pound cakes showed decrease in protein and fat content. Results are consistent with Nassar *et al.*, 2008 who explained that this might be due to the lower content in protein and fat of citrus by-products. On the other side, dietary fiber increased significantly ($p < 0.05$) with the substitutions amount of the citrus by-products (orange pulp) as compared to the control sample. This may be due to higher

contents of dietary fiber constituents in citrus by products (Sharoba *et al.*, 2013).

CONCLUSION

It could be concluded that dehydrated citrus by-products obtained from the remaining pulp after juice extraction could be used as a suitable source of dietary fiber with associated bioactive compounds and could be incorporated as functional ingredients in pastry products as pound cakes.

REFERENCES

1. Association of official analytical chemists-AOAC (2000). Official Methods of Analysis, Washington: AOAC.
2. Carle R, Keller P, Schieber A, Rentschler C, Katzschner T, Rauch D (2001). Method for obtaining useful materials from the by-products of fruit and vegetable processing. Patent application, WO 01/78859 A1.
3. Catunescu CM, Tofana M, Muresan C, Ranga F, David A, Muntean M (2012). The effect of cold storage on some Quality Characteristics of Minimally Processed parsley (*Petroselinum Crispum*), Dill (*Anethum graveolens*) and Lovage (*Levisticum officinale*), Bulletin USAMV, Agriculture Volume 69 (2):213-221.
4. Nassar AG, AbdEl-Hamied AA, El-Naggar EA (2008). Effect of Citrus by-Products Flour Incorporation on Chemical, Rheological and Organoleptic Characteristics of Biscuits. World Journal of Agricultural Sciences 4 (5): 612-616.
5. Sharoba AM, Farrag MA, Abd El-Salam AM (2013). Utilization of some fruits and vegetables waste as a source of dietary fiber and its effect on the cake making and its quality attributes. Journal of Agroalimentary Processes and Technologies, 19(4), 429-444.
6. Salanță LC, Tofană M, Pop C, Socaci S, Pop A, Nagy M (2015). Physicochemical Properties and Sensory Evaluation of Jelly Candy Made from Carrots and Strawberries. Bulletin UASVM Food Science and Technology 72(1):139-140.