Evaluation of functional properties of defatted seed cakes and flour blends

Aleksandra L. Ćirković[1], Biljana B. Rabrenović[1], Jovanka G. Laličić-Petronijević[1], Milica S. Stevanović[1], Olivera Šimurina[2], Branka Žarković[1], Mirjana A. Demin[1]*

[1] Univerzitet u Beogradu, Poljoprivredni fakultet, Zemun
[2] Univerzitet u Novom Sadu, Naučni institut za prehrambene tehnlogije u Novom Sadu, Novi Sad

INTRODUCTION

By-products of fruit processing, such as pomace, pulp, peel or seeds, are a rich source of biologically valuable ingredients. They can be used to replace part of wheat flour in bakery and confectionery products, where they also have an impact on their functionality. The usage of by-products in cereal-based products while maintaining consumer acceptability, enhancing the healthiness of the products and potentially conferring distinctiveness, while also offering valuable diversion of waste back into the food chain[1,2].

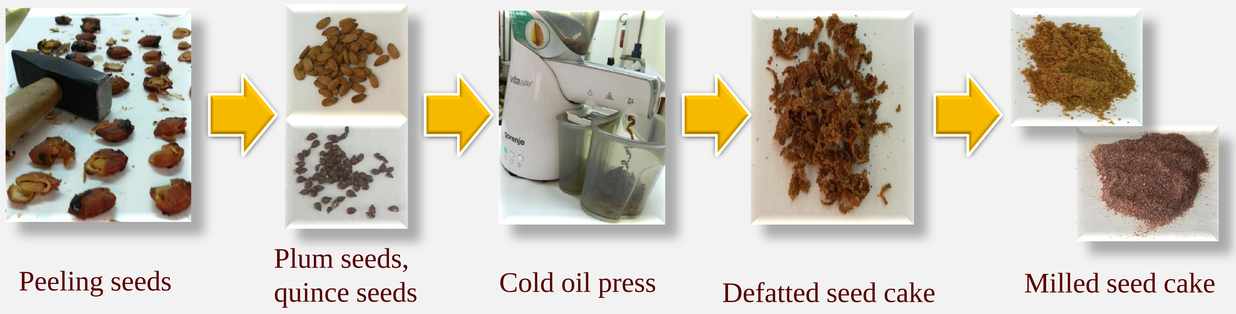
Functional properties help us to predict and evaluate how new proteins, fat, carbohydrates and fibre may behave in specific food systems and demonstrate whether or not it can be used to stimulate or replace conventional mentioned compounds. Also, the behavior of ingredients during preparation, as well as their affection on the finished food products, can be predicted[3].

The SRC test, is a solvation assay for determing functional properties of flours that is based on the enhanced swelling behavior of individual polymer networks in selected single diagnostic solvents[4].

AIM

In the present study, possibility of using different percentage of defatted seed cakes as a source of functional ingredients to develop low-calorie foods and foods with reduced gluten content, was investigated.

SAMPLE PREPARATION



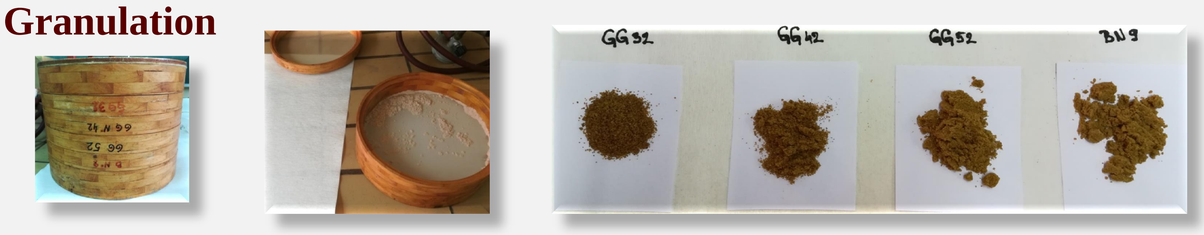
Peeling seeds → Plum seeds, quince seeds → Cold oil press → Defatted seed cake → Milled seed cake

In this study, we investigated white wheat flour, defatted plum cake, deffated quince cake and their blends with wheat flour:

- P 10% and P 20% - blends contains 10% and 20% of plum cake, and
- Q 5% and Q 10% - blends contains 5% and 10% quince cake.

METHODS

Granulation



SRC

Solvents:
- water (H_2O),
- 5% w/w lactic acid in water (LA),
- 5% w/w sodium carbonate in water (SC),
- 50% w/w sucrose in water (Suc)[5].

Gluten performance index[4]:

$$GPI = \frac{LA}{Na_2CO_3 + Suc}$$

RESULTS AND DISCUSSION

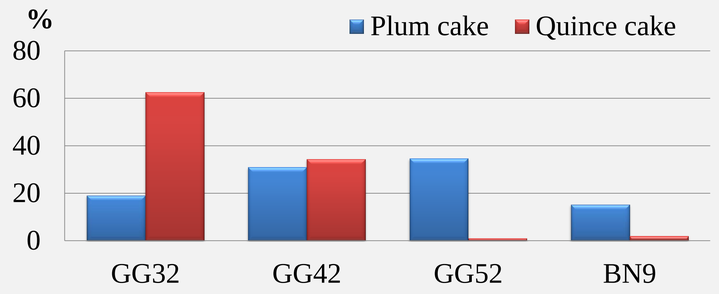


Figure 1. Granulation of defatted seed cakes

Deffated plum cake has the largest percentage of middle size particles, while deffated quince cake has the biggest percentage of the largest size particles (Fig. 1).

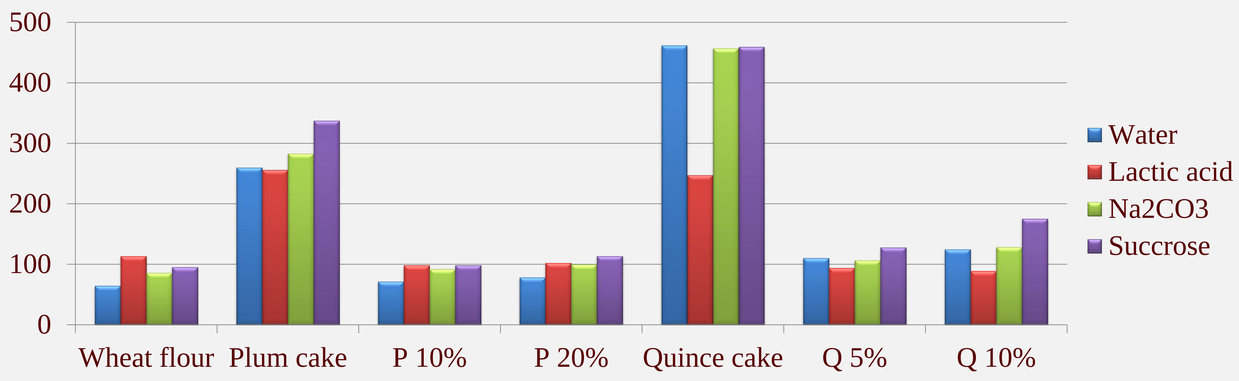
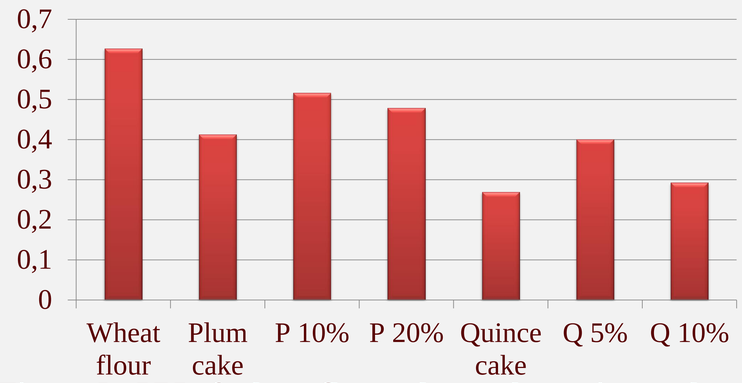


Figure 2. SRC results for wheat flour, plum cake, quince cake and blends

The SRC results showed differences in the quality of wheat flour and used blends. Based on results presented in Fig. 2. plum and quince defatted cakes have higher values for the polymeric components (glutenin-H_2O, LA; damaged starch-SC, pentosans-Suc) in regard to white wheat flour.

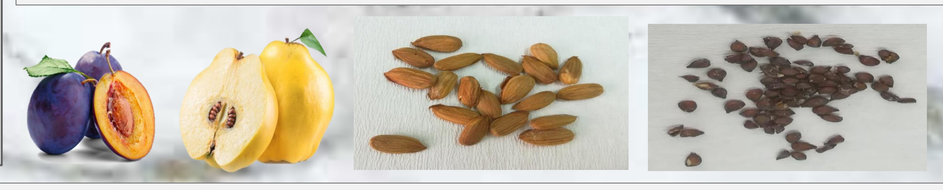


White wheat flour, as it is presented in Fig. 3., has the highest value of GPI, while the quince cake has the lowest GPI. The usage of plum and quince cakes increases GPI in blends.

Figure 3. GPI of wheat flour, plum cake, quince cake and blends

CONCLUSION

High SRC values (H_2O and Suc) and low SRC values (LA and SC) which corelates with size of particles, indicated the appropriate quality needed for the bakery productions. Defatted cakes have a high nutritional value due to the high content of protein and crude fiber, according to literature. It is possible to use defatted seed cakes as a source of functional ingredients to develop low-calorie foods.



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For further informaton please contact: *demin@agrif.bg.ac.rs*

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