

Opponent Review of Doctoral Dissertation

Study program: Chemistry and Food Technology P2901

Thesis title: The Effect of Enzyme Addition on the Rheological Characteristics of the Gluten-free Dough and Bread

Student Name: Vikendra Dabash, M.Sc.

The name of the opponent: prof. Dr. Ing. Luděk Hřivna

The assessment of the level of the dissertation in terms of content and form including comments on the submitted work and topics for discussion:

The author deals with the effect of the enzyme alpha-amylase on the rheological properties of rice bread doughs. This is an issue that has not yet received sufficient attention. Therefore, any experience and information in this area is beneficial and valuable. Undoubtedly, these include data that I had the opportunity to get acquainted with while studying the submitted work.

Form, content, and the aim of the dissertation

The dissertation of Vikendra Dabash, M.Sc. is not very extensive. It is processed on 78 pages. The curriculum vitae of the author and his publishing activities are also included including an overview of tables and graphs. This information is provided after the main work. The total length of the submitted file is eighty-four pages. The work shows a standard structure. Tables and graphs are given in the text. The aims of the work are clearly and comprehensively set. It is clear from them what the author wants to deal with.

The theoretical part describes the issue of the importance of rice flour as a raw material to produce gluten-free bakery products. The existing possibilities of production of gluten-free dough using hydrocolloids, hydroxypropylmethylcellulose, gluten-free proteins, emulsifiers, etc. are elaborated here. Significant attention is paid to enzymes and possibilities of their use. The literary research is written legibly and balanced from the point of view of the focus of the work.

Material and Methodology

The material section describes the several types of flour and other raw materials needed to make the dough. It is evident from the control values of the falling number that the flours had different enzymatic activities. Was it caused by different granulations of flour or was it the effect of the raw material? Adjusting the falling number was difficult by the addition of the enzyme alpha-amylase. How many attempts had to be made to reach the falling number of 62 s? How would you explain the low enzyme consumption of white sticky rice when the fall number here was the highest value, or was it an error? In the description of the individual methods of determination, it would be useful to present the used instruments with the help of photo documentation.

Results and Discussion

The Results section is separate from the Discussion, which complicates the reader's contact with the results to some extent. It would be more appropriate to incorporate the discussion immediately into the presented results. This would make the work more compact. It has been shown that the dough's resistance to stretching can be affected by alpha-amylase. However, according to the author, there is a significant effect of granulation. How would you explain that the L values of Extra fine flour do not differ significantly after the addition of enzymes, when the differences in resistance were significant? I consider the information that the addition of alpha-amylase reduced the viscoelasticity of the gels to be valuable. How is this reflected in the quality of the products? As can be seen from the other results, the application of alpha-amylase and its effect on the values of G' , G'' and η_s were dependent on the used raw material.

Scanning electron microscopy shows the effect of kneading on control and alpha-amylase-containing doughs. Significant differences are evident from the pictures. To better understand the presented images, it would be appropriate to describe the individual microstructures.

The results of the bakery evaluation show that the addition of alpha-amylase had an effect on the specific volume of bread but baking losses were not mostly significant. Flexibility, chewability and other parameters were also evaluated.

Mendelova univerzita v Brně

Fakulta agronomická

In the discussion, the author tries to explain the disproportions in the achieved results. The issue requires further verification.

I consider to be valuable the information in the Recommendations for Research and Practice that the enzyme α -amylase can be used as an improving agent in the development of gluten free products. It is a bit of a disadvantage of the whole work that there are some unfortunately often frequented shortcomings, for example in the labelling of tables and inaccurate references in the text to them.

Final evaluation of the doctoral dissertation:

The submitted dissertation of Vikendra Dabash, M.Sc. enriches the issue of rice dough production and products with a number of new findings. Valuable data that have been obtained can be used effectively in the production of gluten-free bread. Based on these facts, after careful study of the dissertation, provided that the questions in the text in bold italics are answered, it meets the requirements of Act No. 111/1998 Coll., On Higher Education Institutions and on Amendments to Other Acts (Higher Education Act), as amended. regulations, and therefore I recommend accepting it for the defense as one of the prerequisites for the award of the academic title of "doctor" in short Ph.D.

Date of signature 11.3.2022

Dissertation opponent's signature:

