Manuscript ID: foods-3958549

Title: Impact of different types of lipids on the quality of frozen dough and bread

Dear Editor and Reviewers,

We sincerely appreciate you for taking the time out of your busy schedule to review our manuscript and for providing insightful comments and constructive suggestions. Your feedback has been extremely helpful in improving the quality and clarity of our research. We have carefully considered all suggestions and revised the manuscript accordingly. The detailed responses to each comment are provided below, and all corresponding revisions have been marked in red in the revised version.

We truly appreciate your efforts in handling our manuscript and coordinating the review process. If there are any remaining questions or further revisions required, please don't hesitate to contact us. We would be pleased to address them.

Sincerely,

On behalf of all authors, Rui Gao, the first author

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Title: Impact of different types of lipids on the quality of frozen dough and bread

Point-by-point response to Comments and Suggestions for Authors

Reviewers' Comments:

Reviewer :1

Comments 1: The title and abstract are adequate, but the abstract should include the experimental design and a final sentence about the study's innovative contribution to the food industry. In the case of keywords, avoid using the same ones as in the title.

Response 1: We sincerely appreciate the reviewer's valuable comments and apologize for the incomplete information in the original abstract. In the revised version, the final sentence has been modified to highlight the innovative contribution of this study in elucidating lipid–protein–water interactions and its practical relevance to the frozen bakery industry. Additionally, the keywords have been refined to avoid overlap with the title, ensuring better compliance with the journal's requirements. Please refer to the revised Abstract section. (Page 2, Line 9-22)

Comments 2: The first paragraph of the introduction should better capture the reader's attention, include an explicit hypothesis that guides the experimental approach, and improve the presentation of the specific objectives (the use of bullet points is recommended).

Response 2: Thank you very much for your valuable suggestion. We have revised the first paragraph of the introduction to make it more engaging and to clearly present the research hypothesis and objectives. Specifically, we added a concise hypothesis stating that oils with different degrees of saturation may affect the structure and quality of frozen dough by regulating water migration and gluten–protein interactions. The specific research objectives have also been clarified. Please refer to the revised Introduction section. (Page 2, Line 23-41)

Comments 3: The technical specifications of the equipment used should be included,

as well as the purity or grade of the reagents used.

Response 3: Thank you very much for your valuable comment. We sincerely apologize for the omission of the technical specifications of the equipment and the purity or grade of the reagents in the original manuscript. We have now carefully revised the manuscript to include detailed information regarding the equipment used and the purity or grade of all reagents, ensuring the clarity and reproducibility of the study. Please refer to the revised Materials and Methods section. (Page 3-5, Line 70-169)

Comments 4: The experimental design applied should be explicitly stated, as well as the statistical analyses used for that experimental design.

Response 4: Thank you very much for your insightful comment. We have revised the manuscript to clearly describe the experimental design and the statistical analyses applied. Specifically, we added detailed information on the experimental grouping, replication, and data processing methods. All experiments were conducted in triplicate, and the results are expressed as mean ± standard deviation (SD). Statistical analyses were performed using one-way analysis of variance (ANOVA), and significant differences among means were determined using Duncan's multiple range test at a significance level of $p < 0.05$. Please refer to the revised Materials and Methods section. (Page 3-5, Line 70-169)

Comments 5: Tables and figures should include more quantitative comparative analyses, for example, establishing correlations between the iodine value (IV) and the texture parameters of bread or dough.

Response 5: Thank you for your valuable suggestion. We sincerely apologize for the lack of correlation analysis among parameters in the previous version. We fully recognize the importance of establishing such relationships among the experimental results. In response to your comment, additional quantitative analyses have been incorporated into Section 3.7.1 to address this issue. Specifically, in the bread texture section, the correlation between iodine value (IV) and bread hardness was analyzed and discussed. The results indicated that higher IV values were associated with lower bread hardness, providing evidence for the relationship between lipid unsaturation and bread

texture. Please refer to the revised Results and Discussion section. (Page 11-12, Line 325-343)

Comments 6: The number of freezing cycles evaluated should be increased, and a complete sensory evaluation should be incorporated to allow the instrumental results to be related to consumer perception.

Response 6: Thank you for your valuable suggestion. We agree that including more freezing cycles and a comprehensive sensory evaluation would enhance the depth of the study and strengthen the link between instrumental data and consumer perception. However, this work primarily focused on revealing the physicochemical mechanisms underlying lipid effects during frozen storage, and due to limited time and the defined scope of this study, additional freezing cycles and sensory analyses were not conducted. We acknowledge the importance of these aspects and will consider them in our future studies to further validate and expand the present findings.

Comments 7: Additional key instrumental measurements should be included, such as DSC, FTIR, XRD, colorimetry, Aw, and CLSM, which will strengthen the interpretation and correlation between structure, texture, and bread quality.

Response 7: Thank you for your constructive suggestion. We fully agree that incorporating additional instrumental analyses such as DSC, XRD, colorimetry, Aw, and CLSM would further enhance the interpretation of the relationships among dough structure, texture, and bread quality. Considering the current research scope and experimental conditions, we have supplemented the study with Fourier Transform Infrared Spectroscopy (FTIR) analysis to investigate protein secondary structure changes and verify lipid–protein interaction mechanisms. The relevant results have been added and discussed in Section 3.5. We also acknowledge the importance of other analytical techniques and plan to include them in future studies to achieve a more comprehensive understanding. Please refer to the revised Results and Discussion sections. (Page 9-10, Line 279-297)

Comments 8: The discussions are mostly descriptive and require a better interpretation

of the lipid-protein-water interaction mechanisms. Scientific depth should be strengthened through a more analytical discussion that relates the experimental results to specific physicochemical mechanisms (lipid-protein interactions, water migration, ice crystal formation, and changes in the gluten network).

Response 8: Thank you very much for your valuable suggestion. We agree that the previous discussion was mainly descriptive and lacked an in-depth interpretation of the lipid–protein–water interaction mechanisms, for which we sincerely apologize. In the revised version, we have strengthened the scientific depth of the discussion by providing a more analytical interpretation of the experimental results. Specifically, we elaborated on the physicochemical mechanisms of lipid–protein interactions, water migration, ice crystal formation, and changes in the gluten network during the freeze–thaw process. These additions aim to better explain how different types of lipids influence the structural integrity and quality characteristics of frozen dough and bread. Please refer to the revised Results and Discussion section. (Page 5-12, Line 170-366)

Comments 9: The contextualization of the findings in relation to previous studies (preferably from the last 5 years) needs to be improved.

Response 9: Thank you very much for your valuable suggestion. We apologize for the insufficient comparison and discussion of our research background with recent studies. We agree that strengthening the connection to the latest research would better contextualize this work. Therefore, we have added several references from the past five years in the Introduction section to highlight recent advances in lipid functionality and their effects on dough and bread quality. These additions provide a clearer research background and theoretical basis. Please refer to the revised Introduction section. (Page 2-3, Line 23-69)

Comments 10: The technological and industrial scalability implications should be discussed in greater detail.

Response 10: We sincerely appreciate your valuable suggestion and apologize for not providing sufficient discussion on the technological and industrial scalability implications in the original manuscript. We agree that a more detailed discussion of the

technological and industrial significance would enhance the practical relevance of this study. In the revised version, we have expanded the related discussion to further clarify the technological and industrial implications of this work. Specifically, this study holds practical significance, as selecting appropriate lipid types can improve dough handling properties, reduce processing losses, extend product shelf life, and enhance product stability and quality during large-scale production through optimized lipid selection. Please refer to the revised Introduction section. (Page 3, Line 60-69)

Comments 11: Improve the overall presentation of the manuscript through more fluid organization and better integrated comparative figures (we recommend reviewing the FOODS author guidelines and using the Word template and Endnote plug-in for citations).

Response 11: We sincerely appreciate your valuable suggestion. We acknowledge your comment regarding the need to improve the overall presentation of the manuscript and apologize for the lack of smooth organization and insufficient figure integration in the previous version. In response to your advice, we have carefully revised the manuscript to enhance its logical coherence, overall fluency, and readability. Meanwhile, the figures have been reorganized and integrated to improve comparative clarity and visual consistency. In addition, the manuscript has been reformatted in accordance with the Foods author guidelines. Please refer to the revised version for details. (Page 5-12, Line 170-366)

Comments 12: The wording of the conclusions should be improved to make them more interpretively robust. Also include the limitations of the study and possible future lines of research, as well as its specific application in the food industry.

Response 12: We sincerely thank the reviewer for the valuable suggestion. We agree that the conclusion section in the previous version lacked sufficient interpretive depth. In response, we have revised the conclusion to provide a clearer and more comprehensive interpretation of the findings. Additionally, we have included the study's limitations, proposed future research directions, and emphasized the practical applications of the results in the food industry. These revisions aim to further enhance

the overall significance and practical relevance of the study. Please refer to the revised conclusion section. (Page 13, Line 367-381)

Comments 13: Reduce the Ithenticate similarity index (20%).

Response 13: We sincerely thank the reviewer for pointing out this issue. We have carefully checked the manuscript and revised the sentences with high similarity to reduce the Ithenticate similarity index. All potentially overlapping expressions have been rephrased to ensure originality while maintaining scientific accuracy. The revised version now shows a similarity index below 20%.