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Effect of three functional ingredients on technical, sensorial and microstructure properties of flat bread: Response surface methodology aiding functional food development

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Consumers' interest for Functional Foods (FF) particularly those with Dietary Fiber (DF) seem to be increasing due to its health benefits. DF-rich products could be created by substituting a proportion of their constituents with DF. In this study, a response surface methodology experimental design with 20 different combinations from three Functional Ingredients (FI); Inulin (IN), Guar Gum (GG) and Waxy Wheat Flour (WWF) was used. Ingredients were substituted and added to bread with the purpose of creating fiber-rich Arabic bread with acceptable quality and health benefits. However, these substitutions could cause alterations to bread properties. Therefore, bread quality was submitted to instrumental (toughness, elasticity) and physical (volume, diameter, color, height) and sensory (hardness, elasticity, color, flavor) assessment. Furthermore, bread microstructure and the impact of FI on protein-starch matrix was visualized using scanning electron microscopy. The results showed that only IN significantly ($p < 0.05$) changed bread toughness and showed no influence on bread elasticity. Furthermore, neither GG nor WWF showed any impact on toughness and elasticity. Volume and diameter only significantly ($p < 0.05$) decreased with WWF addition. However, for combinations of IN with GG and IN with WWF, only diameter significantly ($p < 0.05$) increased. Weight loss only increased with IN and GG combination. The bread microstructure showed that the addition of different FI could affect the protein-starch matrix and microstructure to some extent. The supplemented bread with FI was different than the control in flavor, chewiness and overall acceptability. The sensory attributes would need to be considered for optimizing a formulation for further studies.

Biography

Mr Yaseen Galali is a Former Postgraduate Researcher at University of Plymouth. He has completed graduation in 2008 in Food Science from Salahaddin University-Erbil. He is also the Demonstrator and assistant lecturer at University of Plymouth (UoP).

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