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Effect of Gum Extracts on the Textural and Bread-Making Properties of a Composite Flour Based on Sour Cassava Starch (Manihot esculenta), Peanut (Arachis hypogaea) and Cowpea Flour (Vigna unguiculata)

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Abstract : Gluten intolerance and the unavailability of wheat flour in some parts of the world have led to the development of gluten-free bread. However, gluten-free bread generally results in a low specific volume, and to remedy this, the use of hydrocolloids and bases has proved to be very successful. Thus, the present study aims to determine the optimal proportions of gum extract of Triumffetapentendraand sodium bicarbonate in breadmaking of a composite flour based on sour cassava starch, peanut, and cowpea flour. To achieve this, a BoxBenkhendesign was used, the variable being the amount of extract gums, the amount of bicarbonate, and the amount of water. The responses evaluated were the specific volume and texture properties (Hardness, Cohesiveness, Consistency, Elasticity, and Masticability). The specific volume was done according to standard methods of AACC and the textural properties by a texture analyzer. It appears from this analysis that the specific volume is positively influenced by the incorporation of extract gums, bicarbonate, and water. The hardness, consistency, and plasticity increased with the incorporation rate of extract gums but reduced with the incorporation rate of bicarbonate and water. On the other hand, Cohesion and elasticity increased with the incorporation rate of bicarbonate and water but reduced with the incorporation of extract gum. The optimate proportions of extract gum, bicarbonate, and water are 0.28;1.99, and 112.5, respectively. This results in a specific volume of 1.51; a hardness of 38.51; a cohesiveness of 0.88; a consistency of 32.86; an elasticity of 5.57, and amasticability of 162.35. Thus, this analysis suggests that gum extracts and sodium bicarbonate can be used to improve the quality of gluten-free bread.

Keywords : box benkhen design, bread-making, gums, textures properties, specific volume
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