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Rheological characteristics of composite flour substituted by moringa leaf flour (*Moringa oliefera*) for bread-making.

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Abstract: *Moringa oleifera is a versatile plant with major nutritional and health benefits. This study showed that composite flour with 2.5% moringa has good rheological properties and could be used as a substitute for wheat flour in bakery products.*

• Introduction

Wheat flour is a traditional ingredient in bakery products, but it is low in fiber and certain minerals. Consumers are looking for healthier, nutrient-rich foods. Moringa leaf flour is an interesting alternative, as it is highly nutritious and contains essential vitamins, minerals, and phytochemicals. Moringa is also used as a food fortifier in many parts of the world, making it a promising ingredient for enriching bakery products. This study aims to compare the rheological properties of wheat flour with those of composite wheat and moringa flour, to determine whether partial replacement of wheat flour by moringa flour can improve nutritional characteristics without affecting rheological properties.

• Material and method

- ❑ Four (4) types of composite flours were prepared, namely MWF1 (2.5% moringa flour (MF) and 97.5% wheat flour (WF)); MWF2 (5% MF and 95% WF); MWF3 (7.5% MF and 92.5% WF); and MWF4 (10% MF and 90% WF).
- ❑ To determine the effect of the partial replacement of wheat flour with moringa flour on the rheological properties, an analysis of these properties was carried out using the "Chopin+" protocol of the Chopin Mixolab.

• Results and discussions

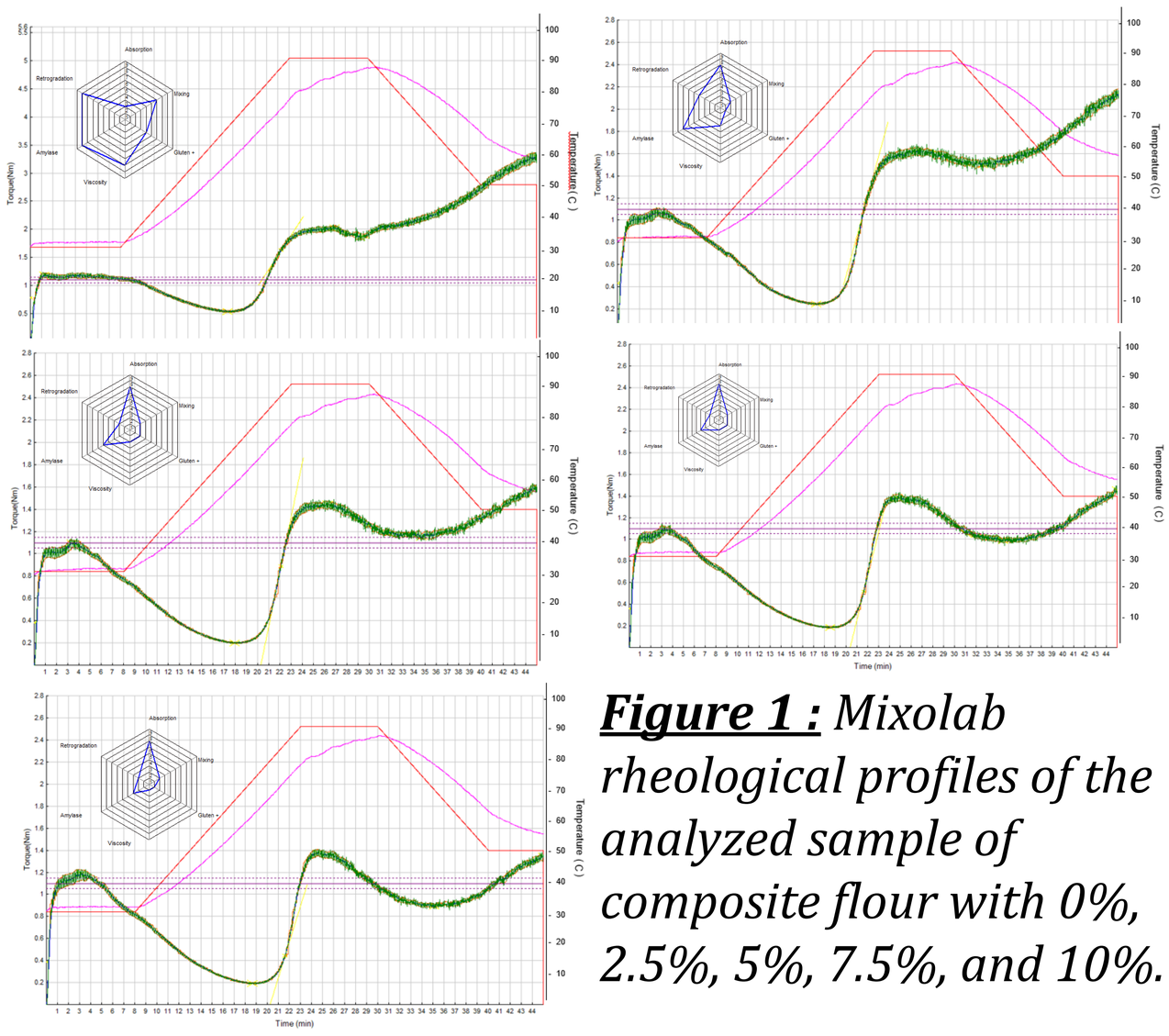

Figure 1 : *Mixolab rheological profiles of the analyzed sample of composite flour with 0%, 2.5%, 5%, 7.5%, and 10%.*

- ❖ The partial replacement of moringa flour with wheat flour would improve the water absorption capacity of the composite flours.
- ❖ Moringa flour would therefore reduce the resistance of composite flour doughs and protein quality during kneading.
- ❖ Adding high quantities of moringa flour to wheat flour could affect the good quality of the composite flours obtained.
- ❖ Moringa increases the shelf life of the composite flours.

• Conclusions

Moringa flour can therefore be used as a substitute for wheat flour in bread-making products, but with a substitution rate not exceeding 2.5% to preserve their rheological properties.