UTILIZATION OF GONGOLASE (*Adansonia digitata* L.) AND GUDDIEM (*Grewia tenax* (forsk) Fiori) AS FUNCTIONAL FOODS IN BREAD AND BISCUIT MAKING

By

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Thesis submitted to the University of Khartoum in partial fulfillment of the requirements for the Degree of Master of Science (Agric).

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July 2004
To my dear father …
who still alive

To my dear mother …
who gave a lot

To my brothers and sisters…

To whom I love
ACKNOWLEDGEMENTS

Great thanks and gratitude to Allah ….

I wish to acknowledge the generosity of all those people who placed their valuable time and knowledge at my disposal. My thanks are especially due to Professor Abdelmoniem Ibrahim Mustafa for his patience in putting me in the way. To Food Science and Technology Department, Faculty of Agriculture, University of Khartoum, instructors and colleagues for their helpful comments. To Food Research Center and Industrial Research and Consultancy Center Staff for their advice and support in several practical stages. To Sudanese Standards and Metrology Organization, Siega Flour Mills and Wheata Flour Mills Laboratories Staff for their permission to complete the research analytical studies. To Babiker Ibrahim Babiker and Asham for their grateful help assistance in baking practice. To Dr. Gamaa Abdel Gadir for his encouragement and support. I am deeply grateful to Dr. Abu Al Gasim Ahmed Yagoub in spending his time and energy to supply valuable facts and opinions for this research.
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ABSTRACT

This study was carried out to assess the nutritional and technological aspects related to incorporation of Gongolase and Guddiem at various ratios in bread and biscuit.

Chemical analysis of the prepared samples of Gongolase and Guddiem showed 6.0 and 4.4% ash, respectively, 2.8 and 7.03% protein, respectively and 6.9% and 1.2% crude fibre in Gongolase and Guddiem, respectively. Iron content was found to be 6 and 7 mg/100g in Gongolase and Guddiem, respectively, Calcium content was found to be 247 and 41 mg/100g, respectively. Potassium was found in high amount in Gongolase, as 2500 mg/100g. Ascorbic acid was 344.3 mg/100g in Gongolase, Guddiem contained 30.3 mg/100g.

Technological parameters assessed for bread and biscuit flours and their substitutions (5, 10 and 15% for bread flour and 15, 20 and 25% for biscuit flours) showed that falling number values were insignificantly affected (P≥ 0.05) either by Gongolase or Guddiem substitution. Wet and dry gluten percentages were significantly decreased (P≤ 0.05) in Gongolase and Guddiem flour blends. Water
absorption of the blends was indicated by the Farinograph to increase in Gongolase flour blends and decrease in Guddiem flour blends. Also the dough stability showed a decrease with incorporation of Gongolase and Guddiem.

Physical characteristics of Gongolase bread showed significant decrease ($P<0.05$) in volume and specific loaf volume values with the increase in Gongolase percentage, while a significant increase ($P<0.05$) was observed in 5% Guddiem bread and a significant decrease ($P<0.05$) was shown in 10 and 15% Guddiem bread. In biscuit incorporation of Gonglase and Guddiem have significantly increased ($P<0.05$) the spread ratios. Sensory evaluation results showed that Guddiem bread and biscuit, blends were highly accepted by the panelists. Gongolase bread and biscuit, blends were not accepted in their higher levels of substitution but only at 5 and 15% Gongolase bread and biscuit, blends, respectively.

Bread and biscuit blends showed a deviation in their chemical composition from the controls. With respect to percentage increase in Gongolase and Guddiem, a significant increase ($P<0.05$) was observed in ash, crude fibre, ascorbic acid, iron, calcium and potassium contents (Gonglase bread and biscuit blends).
ملخص الأطروحة

لا يمكنني قراءة النص العربي بشكل طبيعي. الرجاء تقديم نص قراءة بإحدى اللغات الإنجليزية أو العربية المكتوبة بشكل صحيح للإجابة على السؤال.
(P ≤ 0.05) 

\[ P(0.05) \] 

\[ \text{نسبة تفوقية القبيض بسكتة} \] 

\[ \text{عينات في بينما القنقل} \] 

\[ \text{نسبة زيادة} \] 

\[ 15% \] 

\[ \text{المحكم} \] 

\[ \text{قيمة في القياسية العينة} \] 

\[ \text{الزيادة} \] 

\[ \text{والخبز} \] 

\[ \text{الكيميائي} \] 

\[ \text{التحليل} \] 

\[ \text{نتائج أظهرت} \] 

\[ (P(0.05)) \] 

\[ \text{العينة وكذللك} \] 

\[ (mg/100g) \] 

\[ \text{عانصر} \] 

\[ \text{منعوري} \] 

\[ (mg/100g) \]
INTRODUCTION

Food is the cornerstone of good health and enjoyable life. Nowadays the most apparent and irritant health problems are the increasing numbers of those who suffer from cancers and cardiovascular diseases. It was proved that the dietary habits have a major role in the aetiology of these diseases. Anaemia and osteoporosis are examples for dietary related health problems in Sudan and developing countries. With this view, improving our dietary habits and food quality is the aim of nutritionists and health workers all over the world.

Functional foods a new term in food technology world was appeared to solve our health problems through healthy foods. Traditional food, natural foods and new food formulations are all under study as major participants in functional foods. In Sudan local fruits like Gongolase and Guddiem are rich in nutrients which affect health positively. The objectives of this study are to incorporate Gongolase and Guddiem at different levels in breads and biscuits to show the effect of the addition in the nutritive value and the quality parameters of the products.
CONCLUSIONS

Incorporation of Gongolase and Guddiem in bread and biscuit caused a significant increase \((P \leq 0.05)\) in ash, crude fibre, ascorbic acid, iron, calcium and potassium contents (in Gongolase bread and biscuit blends), beside a significant decrease \((P \leq 0.05)\) in protein content.

A 5\% Guddiem substitution in bread showed a significant increase \((P \leq 0.05)\) in volume and specific volume better than the control, beside high preference by panalists.

The increment of Guddiem percentages in biscuit blends had a good influence on the quality of final products (spread ratio and preference).

Increment of Gongolase percentage in bread (5, 10 and 15) caused a depression in volume and specific loaf volume and sensory evaluation scores, but 5\% Gongolase bread blend showed an acceptance from panalists.

Incorporation of Gongolase in biscuit increased the spread ratio, but significant decrease \((P \leq 0.05)\) was occurred with increasing level of substitution. Also significant decrease was shown in sensory evaluation scores with increase level of substitution, but 15\% level of substitution was accepted.

RECOMMENDATIONS

Gongolase and Guddiem can be added to bread and biscuit to enhance their fibre, ascorbic acid, iron and calcium contents, also incorporation of Gongolase will enhance their potassium content.

Guddiem enhances bread and biscuit quality, with 5\% considered suitable range in bread, 15, 20 and 25\% are suitable ranges in biscuit.
Further studies are needed to verify effect of Gongolase low levels as improver in bread making.

Further studies are needed to establish Guddiem and Gongolase uses in other food industries such as jam, jelly and juices.

Further studies are needed to evaluate the dietary role and functional properties of other Sudanese local fruits.

REFERENCES


