

**Department of Food Science and  
Technology  
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**Technological and Nutritional Aspects of  
Kisra Bread  
Intended for Non-Insulin Dependent  
Diabetes  
Mellitus Patients**

**By**

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بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

Dedication

To my Mother ,to the  
Soul of my late Father,

To my Brothers and Sisters,  
And  
To my Husband

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## ABSTRACT

Studies were carried out on the effect of adding wheat bran (WB) to sorghum flour of 72% extraction rate on the physicochemical, technological and organoleptic quality of kisra bread. The high fibre kisra bread was tested for its glycemic properties by feeding non-insulin dependent diabetic (NIDD) subjects.

Sorghum flours (SF) were fermented with and without addition of starter for 4, 8, and 12h. and checked for changes in pH, total titratable acidity, total solids, total soluble solids and reducing sugars content.

Decrease in pH and increase in titratable acidity was observed, but addition of WB after fermentation was found to influence their levels. Addition of WB after fermentation as well increased the pH from 3.7 to 5.3 and decreased the titratable acidity from 5.7 to 5.9. Also addition of WB after fermentation to sorghum batter was accompanied by significant ( $P \leq 0.05$ ) increase in viscosity while it was coupled with significant ( $P \leq 0.05$ ) decrease in spreadability of fermented batter.

The moisture content of kisra bread (KB) containing WB was significantly ( $P \leq 0.05$ ) higher (66.87) compared with KB without wheat bran (61.84). Also increase in protein content (12.10-13.50) was observed.

Sensory evaluation of KB containing WB showed significant ( $P < 0.05$ ) superiority of products in compared with KB not containing wheat bran.

In blood glucose level of non-insulin dependant diabetic patients was significantly reduced when fed KB containing 28% WB compared to feeding non wheat bran sorghum kisra bread, the thing that encourage the use of wheat bran in preparation of kisra bread intended for non-insulin dependant diabetics in Gedarif State.

بسم الله الرحمن الرحيم

## ملخص الأطروحة

أجريت هذه الدراسة لمعرفة تأثير إضافة نخالة القمح لدقيق الذرة من صنف الصفراء المستخلص بنسبة 72% على جودة الكسرة السودانية من النواحي الفيزيائية والكيميائية والحسية، كما غطت الدراسة تأثير الكسرة المحتوية على نسبة مقدره من نخالة القمح على مرضى السكري غير- المعتمدين على هرمون الأنسولين الطبي.

تم تحضير عينات من الكسرة المعدة بالطريقة التقليدية المعروفة بإضافة وبدون إضافة الخمار التقليدي لمدة 12 ساعة. وتم تقدير كل من تركيز-أيون-الهيسروجين (pH)- والحموضة- المعاييرتوكميةالألياف-والبروتينوالسكرياتالمختزللكل-4 ساعات- للعجينة-المخمرة-.

دلت الدراسة على أن عملية التخمير تقلل من تركيز ايون الهيسروجين وتزيد من الحموضة المعايير قوأن إضافة نخالة القمح بعد التخمير أست إلى ارتفاع ايون الهيسروجين (3.7-5.7 pH) ) وبالتالي عملت على تقليل الحموضة المعايير (5.7-5.9). نتيجة لإضافة نخالة القمح للدقيق المقشور والمقشور غير مقشور. كما لوحظ أيضاً أن إضافة نخالة القمح بعد التخمير أست إلى النقص في السكريات المختزلة في الدقيق المقشور والدقيق غير مقشور. كذلك أست إضافة نخالة القمح إلى دقيق الذرة إلى الزيادة في لزوجة العجينة في الدقيق المقشور والدقيق غير مقشور كما صاحب اللزوجة نقص في درجة انتشار العجينة على السطح. من ناحية ثانية فقد وجد إن الكسرة التي تحتوي على نخالة القمح أعلى رطوبة (66.87). مقارنة بالكسرة الخالية من نخالة القمح (61.84). وتحتوي على نسبة أعلى من البروتين (13.50).

12.10-

أما التقييم الحسي لأنواع الكسرة للمختلفة فقد دل على-  
التفضيل الواضح للكسرة المحتوية على نخالة القمح مقارنة-  
بالكسرة للخالية منها..

عند تناول مرضى للسكري غير- المعتمدين على الأنسولين-  
لعينات الكسرة للمختلفة أثبتت الدراسة أن- أفضل العينات هي-  
العينة التي تحتوي على 28% نخالة قمح- (تخمير لمدة 12 ساعة)-  
مقارنة بالعينات التي تحتوي على نخالة القمح وخمرت لمدة أقل (8  
ساعات)- كملحوظ الانخفاض الملحوظ في مستوى السكر في دم-  
مرضى للسكري غير- المعتمدين على الأنسولين بعد ساعتين من-  
تناول المرضى لوجبة الكسرة مما يدل على إمكانية التفكير في-  
إستخدام نخالة القمح لإعداد كسرة للنزلة لهذه المجموعة من المرضى-  
كبديل للكسرة للتقليدية عالية السكريات-