

الآية

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قال الله تعالى:

يَا أَيُّهَا الَّذِينَ آمَنُوا إِذَا قِيلَ لَكُمْ تَفَسَّحُوا فِي الْمَجَالِسِ فَافْسَحُوا
يَفْسَحِ اللَّهُ لَكُمْ ۗ وَإِذَا قِيلَ انشُزُوا فَانشُزُوا يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا
مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ ۗ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ (١١)

صدق الله العظيم

(سورة المجادلة الآية 11)

Dedication

To my beloved mother..

To my dear father..

To my sisters and brothers ..

To my beloved husband ..

*I dedicate my work and I wish that ALLAH blesses all
of them.*

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The full praise and thanks be to Almighty ALLAH who has given me the health, strength and patience to complete this research.

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ABSTRACT

Kissra is traditionally prepared by fermenting sorghum grain flour and then baked it into bread sheets. In this study a total of 75 lactic acid bacteria (LAB) and 19 of yeast isolates have been recovered from fermented kissra dough and characterized at species strain level with molecular tools. RAPD analysis was performed initially to cluster the isolates using two different primers R2 and M13. Species identification was based on sequence analysis of 16S rRNA gene. Nine clusters of LAB PCR products sequenced and subjected to nucleotide BLAST. Three isolates (4%), (group 1L) showed 100% homology towards *Pediococcus acidilactic*, and five isolates (6.7%), (group 9L) showed 100% homology towards *Lactococcus lactis* subsp. *lactis* strain SFL. Among the rest of the 67 lactobacillus isolates, one isolate (1.6%), (group 2L) showed 100% homology towards *L. murinus*, also same percentage 1.6% (group 4L) reported as *L. casei* strain IMAU70007, two isolates (2.9%), (group 5L) showed 100% homology towards *L. plantarum* strain KLAB4. The same percentage 2.9% (group 8L) were showed similarity 100% towards *L. fermentum*. Four isolates (5.9%), (group 7L) showed 100% homology towards *L. casei* strain SWU30436, 20.9% (14 isolates), (group 3L) were showed similarity 100% towards *L. plantarum* strain 1.0557CGMCC, while the majority of the isolates 64.2% (43 isolates), (group 6L) showed 100% homology towards *L. plantarum* strain CSI7. Phylogenetic analysis was performed using software MEGA 6.0. For yeast The 18S-28S ITS region was amplified using the fluorescence labelled CY5-Y-ITS1 forward primer and YITS4 reverse primer. By the ITS-PCR profiles, the isolates were divided into two groups of yeasts. The blast sequence query showed that members of groups 1Y and 3Y identity (100%) with the genomic DNA sequence of *Saccharomyces cerevisiae*, while group 1C and 5C identity (100%) with the genomic DNA sequence of *Candida xylopsoci*.

Proximate values of kissra from standard culture were compared with those of kissra brought from the market. There were variable values in protein, fat, oil, moisture, ash, carbohydrate and fibre contents of different types of kissra. All minerals were significantly different ($P < 0.05$) and invitro protein digestibility was found higher in the control. On the other hand, tannins and polyphenols were found low in the control compared to all other types of kissra. For phytic acid, two types of standard kissra and the control showed no significant difference. Sensory evaluation showed that the kissra which made from standard culture, had the higher score in all quality attributes compared with kissra from market.

المخلص

يتم اعداد الكسرة تقليديا عن طريق تخمير دقيق الذرة الرفيعة ويلي ذلك خبزها على شكل شرائح رقيقة. في هذه الدراسة تم استخلاص 75 عزلة من بكتريا حمض اللبن و 19 عزلة من عجينة الكسرة المخمرة ووصفت السلالات المعزولة بالطرق الجزيئية. ووصفت السلالات المعزولة بواسطة الطرق الجزيئية. بداية تم اجراء الاستنساخ العشوائي للحمض النووي منزوع الهيدروجين للعزلات في شكل مجموعات باستخدام نوعين مختلفين من جزء من تسلسل (DNA) وهما برايمر (R₂) و (M₁₃). بواسطة تحليل تتابع القواعد النترجينية للحمض النووي الرايبوزي في منطقة الجين 16s (rRNA) تم التعرف على الانواع. تم الحصول على تسعة مجموعات من بكتريا حمض اللبن من تفاعل البلمرة المتسلسل وخضعت لبرنامج تحليل النيوكليدات (BLAST) الالكتروني . 4% (ثلاث(مجموعة 1L) أظهرت نسبة تطابق 100% مع *Pediococcus acidilactici* و 6.7% (خمسة عزلات) (مجموعة 9L) تطابقت 100% مع *Lactococcus lactis* subsp. lactis strain SFL. من بين 76 عزلة من البكتريا وجد أن 1.6% (عزلة واحدة) (مجموعة 2L) أظهرت 100% تطابق مع *L. murinus*. وأيضاً نفس النسبة 1.6% (مجموعة 4L) أظهرت تطابق 100% مع *L. casei* strain IMAU70007. 2.9% (عزلتين) (مجموعة 5L) تطابقت 100% مع *L. plantarum* strain KLAB4. ذات النسبة 2.9% (مجموعة 8L) تشابهت 100% مع *L. fermentum*. 5.9% (4 عزلات) (مجموعة 7L) تطابقت 100% مع *L. casei* strain SWU30436. 20.9% (14 عزلة) (مجموعة 3L) تشابهت 100% مع *L. plantarum* strain 1.0557CGMC. بينما أغلبية العزلات 64.2% (43 عزلة) (مجموعة 6L) أظهرت تطابق 100% مع *L. plantarum* strain CSI7. بواسطة استخدام البرنامج الالكتروني (MEGA 6.0) تم اجراء تحليل النشأة والتطور الجيني. أما بالنسبة للخماير فقد تم إستنساخ منطقة 18S و 28S في الحمض النووي منزوع الهيدروجين باستخدام البريمر المتوهج (CY5) كبريمر أمامي والبريمر (YITS4) كبريمر عكسي. قسمت نتيجة تحليل تفاعل البلمرة المتسلسل العزلات إلى مجموعتين. نتيجة تتابع النيوكليدات في (BLAST) أظهرت أن مجموعة (1Y) و (3Y) تطابقت 100% مع *Saccharomyces cerevisiae*. بينما أظهرت مجموعتي (1C) و (5C) تطابق 100% مع جينات الحمض النووي منزوع الهيدروجين للنوع *Candida xylopsi*. تمت مقارنة القيم التقريبية للكسرة المصنعة من البادئ القياسي مع تلك المطلوبة من السوق. هنالك قيم متباينة في مكونات (الرطوبة، الرماد، البروتين، الزيت، الألياف والكربوهيدرات) لأنواع الكسرة المختلفة. هنالك فروقات معنوية في الاملاح المعدنية و البروتين المهضوم حيث وجدت أعلى في العينة المرجعية من ناحية اخري التانينات وعديد الفينولات كانت أقل في العينة المرجعية. بالنسبة لحمض الفايثك , أظهر نوعان من الكسرة القياسية والعينة المرجعية عدم وجود فروقات معنوية. التقييم الحسي لعينات الكسرة القياسية أظهرت درجات عالية في كل معايير الجودة والقبول العام.

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