



لَا يُكَلِّفُ اللَّهُ تَفْسًا إِلَّا وُسْعَهَا لَهَا مَا كَسَبَتْ وَعَلَيْهَا {  
مَا اكْتَسَبَتْ رَبَّنَا لَا تُؤَاخِذْنَا إِنْ نَسِينَا أَوْ أَخْطَأْنَا رَبَّنَا وَلَا  
تَحْمِلْ عَلَيْنَا إَصْرًا كَمَا حَمَلْتَهُ عَلَى الَّذِينَ مِنْ قَبْلِنَا رَبَّنَا  
وَلَا تُحَمِّلْنَا مَا لَا طَاقَةَ لَنَا بِهِ وَاعْفُ عَنَّا وَاعْفِرْ لَنَا  
وَارْحَمْنَا أَنْتَ مَوْلَانَا فَانصُرْنَا عَلَى الْقَوْمِ الْكَافِرِينَ {  
البقرة 286

# **Dedication**

To my parents

My brothers,

My husband,

And my sisters

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Before all, the praise and thanks to Allah whom ascribed all perfection and majesty.

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## **Abstract (in English)**

Bread the major food of most the world population, is usually made from flour in addition to other materials to promote its various properties .potassium bromate is one of these materials, addition of potassium bromate to promote properties of bread such as appearance, texture, shape and size, there is a lot of controversy about its health hazard such as kidney failure, hearing loss, respiratory difficulty and causing different cancer .

There are many analytical methods for determination of potassium bromate but they are complicated, expensive and time consuming.

The objective of this research is to develop, simple, easy, and cheap and simple method for determination of potassium bromate in bread.

We took Greater Khartoum as an example (Khartoum, Khartoum-North and Omdurman) collecting a total of twenty seven (27) samples, eighteen (18) from the machinery bakeries and nine (9) from manual bakeries.

Qualitative analysis was carried out using the following reagent: silver nitrate, crystal violet and sulfanillic acid in addition to Thin-Layer chromatography .

Quantitative analysis was carried out using UV-Vis spectrophotometry with crystal violet and sulfanillic acid, and inductively coupled plasma techniques.

The results obtained were as follows: the mean of concentration (ppm) for machinery bread by using sulfanillic acid reagent for Khartoum (9.6), Khartoum-North (8.6) and Omdurman (7.4), but the mean concentration of manual bread for Khartoum (0.6), Khartoum-North (0.5) and Omdurman (0.5). And by using crystal violet reagent (machinery bread) for Khartoum (13.0), Khartoum-North (11.9) and Omdurman (10.7) but the mean concentration of manual bread for Khartoum (0.7), Khartoum-North (0.566) and Omdurman (0.5). by using inductively coupled plasma instrument in machinery bread for Khartoum (84.0), Khartoum-North (73.5) and Omdurman (57.9) but the manual bread for Khartoum (0.00), Khartoum-North (0.00) and Omdurman (0.2).

From the promising qualitative test with sulphanillic acid we were able to introduce and promote the reagent for quantitative work. The reagent proved to be highly stable, sensitive and cheap. It is the first time for this reagent to be used for quantitative determination of bromate in baked materials. Further study's could be carried to increase its sensitivity and selectivity.

## مستخلص البحث

الخبز هو الغذاء الرئيسي لمعظم سكان العالم ، ويصنع من الدقيق إلى جانب بعض المواد الأخرى والتي تهدف لتحسين خواصه المختلفة ، ومن هذه المواد برومات البوتاسيوم. الهدف من إضافة برومات البوتاسيوم تحسين خواص الخبز مثل المظهر والملمس والشكل والحجم. إلا أن هنالك ادعاءات عن مخاطره الصحية حيث يعتقد انه يتسبب في العديد من الأمراض. مثل الفشل الكلوي وفقدان السمع وصعوبة التنفس والسرطانات المختلفة.

توجد العديد من الطرق لتحليل برومات البوتاسيوم لكنها معقدة ومكلفة من حيث الطريقة والوقت . يهدف البحث لإيجاد طريقة بسيطة ورخيصة وسهلة وثابتة تجاه التغيرات الكيميائية. أخذ البحث العاصمة المثلية كمثال (الخرطوم – الخرطوم بحري – أم درمان) وأخذ مجموع (27) عينة شملت 18 عينة من المخابز الآلية و 9 عينات من المخابز اليدوية. أجريت عليها تحاليل وصفية باستخدام كواشف نترات الفضة ، وصبغة البلورة البنفسجية وكاشف حمض السلفانيك بالإضافة إلى كروماتوغرافيا الطبقة

الريقة ثم أجريت تحاليل كمية باستخدام الأشعة المرئية وفوق البنفسجية لكاشفي البلورة البنفسجية وحمض السلفانيك ، واستخدام جهاز مزدوج البلازما الحسي.

كانت النتائج لمتوسط التركيز ( بالجزء من المليون ) للعينات (الخبز الآلي) باستخدام كاشف حمض السلفانيك في الخرطوم ( 9.6) والخرطوم بحري (8.6)) وامدرمان (7.4). ومتوسط التركيز للخبز اليدوي في الخرطوم (0.6) والخرطوم بحري (0.5) وأم درمان (0.5) وباستخدام صبغة البلورة البنفسجية الخرطوم (13.0) والخرطوم بحري (11.9) وأم درمان (10.7) أما الخبز اليدوي في الخرطوم (0.7) والخرطوم بحري (0.6) وأم درمان (0.5) وباستخدام جهاز مزدوج البلازما الحسي للخبز الآلي الخرطوم (84.3) والخرطوم بحري (73.5) وأم درمان (57.9) أما الخبز اليدوي في الخرطوم (0.00) والخرطوم بحري (0.00) وأم درمان (0.2).

ومن النتائج المفيدة للتحليل الوصفي لكاشف حمض السلفانيك بحثت الدراسة لنقل وتطوير الكاشف إلى التحليل الكمي وذلك بالتحكم في ظروف التفاعل (الحمضية) حيث يتميز الكاشف بالثبات العالي تجاه التغيرات الكيميائية والحساسية وعدم التكلفة. وبما أن هذا الكاشف لم يستخدم في التحليل الكمي من قبل لذا نعتبره كاشف كمي جديد لقياس كميات برومات البوتاسيوم في المخبوزات ويمكن أن يبحث مستقبلاً إمكانية زيادة حساسيته وانتقائيته.