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EFFECT OF GUM ARABIC ON NONENZYMATIC BROWNING
OF DEHYDRATED TOMATOES

A

Thesis Submitted to the Sudan University of Science and Technology
In Fulfillment for the Requirements of the Degree of Master of
Science in Food Science and Technology

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August 2005
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DEDICATION

This work is dedicated to the soul of my
father and to my family with good wishes
and hopes

Yousif

ACKNOWLEDGEMENTS

First of all I thank my Almighty God, Allah, who made this study easy. Secondly, I am indeed grateful to:

- Dr. Yousif Mohamed Ahmed Idris, head department of Food Science & Technology, College of Agricultural Studies , Sudan University of Sciences & Technology, for his kind supervision, guidance , suggestions, valuable advices and patience .
- Department of Food Science & Technology, College of Agricultural Studies, Sudan University of Sciences & Technology.
- My family for their patience and encouragement.

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ABSTRACT

In this study the effect of Gum Arabic (GA) on non-enzymatic browning (NEB) and colour of dehydrated tomato was investigated. Blanched tomato homogenate was treated with different concentrations of Gum Arabic (1%, 2.5%, 5%, 7.5% and 10%) and dehydrated at 80°C by conventional cabinet dryer, stored in dark at room temperature for 1,2,3,4 and 12 months was tested. Blanched tomato treated with 1% sodium metabisulfite and dehydrated thereafter was used for comparison.

Colour changes were monitored by using absorbance at 420nm to determine browning index and CIELab system to measure redness, yellowness and lightness.

Addition of Gum Arabic decreased browning development in all storage periods, whereas sodium metabisulfite decreased browning over most of the storage periods, only approaching the untreated values at 12 months. Increase in GA concentrations resulted in more decrease of the NEB, up to 7.5%. A minimum concentration of 5% GA was found to be more effective than 1% sodium metabisulfite to retard NEB.

Sodium metabisulfite treated samples, showed a significant ($P \leq 0.05$) increase in redness (a^+) values in all storage periods ranging between 30 to about 39.

Lightness (L) value increased in an ascending way with GA concentration to range between 27.5-36 compared with 38.5 for the fresh blanched tomato homogenate. There was no significant difference ($P \leq 0.05$) between 5% and 7.5% GA treated sample after dehydration.

There was a minor effect, , on the pH of the dehydrated tomato treated with GA (pH ranged between 4.27-4.37) while an increase was observed in pH to reach 5.15, when sodium metabisulfite was used.

°Brix values increased, for all GA treated samples, from 6.8 to 7.1-8.5 after dehydration and storage.

Moisture content and water activity (a_w) decreased in GA treated samples to range between (15.3%-7.3%) for moisture content and (0.328-0.2675) for a_w .

بسم الله الرحمن الرحيم
ملخص الأطروحة

تمت الدراسة لمعرفة تأثير اضافة الصمغ العربي على اللون ودرجة الاسمرار غيرالإنزيمى للطماطم المجففة.

استخدمت خمس تركيزات من الصمغ العربي (1% و 2.5% و 5% و 7.5% و 10%) وخلطت جيدا مع مخلوط الطماطم المسلوق ومن ثم تم تجفيفها في مجفف صناعي على درجة حرارة 80° م تم تخزين العينات لمدة 1 و 2 و 3 و 4 ثم 12 شهرا على درجة حرارة الغرفة وحفظت العينات بعيدا عن الضوء.

استخدم تركيز 1% من محلول كبريتيت الصوديوم للمقارنة مع الصمغ العربي :و لمعرفة تغير اللون وحدوث الاسمرار غيرالإنزيمي استخدمت طريقتين قياس الامتصاصية عند 420 نانومتر (1)

المطياف اللوني لتقدير درجة الإحمرار والإصفرار والإسوداد(2)

أوضحت النتائج أن الصمغ العربي يخفض درجة الاسمرار الغير إنزيمى في كل فترات التخزين , بينما الكبريتيت أحدثت إنخفاض الاسمرار حتى الشهر الرابع , ولكن عند الشهر الثاني عشر لم يحدث إنخفاض.

زيادة التركيز للصمغ العربي تؤدي لزيادة انخفاض الاسمرار ولكن حتى التركيز 7.5% صمغ عربي فقط.

% وكان أقل تركيز من الصمغ العربي تفوق على الكبريتيت في تقليل درجة الأسمرار هو التركيز 5% .زادت درجة الإسمرار زيادة معنوية للعينات المعاملة بالكبريت لتكون في المدى 30-39

درجة الإسمرار بالمطياف اللوني تراوحت بين 27.5-36 مقارنة ب 38.5 لعينة الطماطم

%الطازجة التي تم سلقها قبل التجفيف.لم يكن هناك فرق معنوى بين التركيز 5% و التركيز 7.5

لم تحدث إضافة الصمغ العربي تأثيرا كبيرا على رقم الحموضة للطماطم المجففة حيث تراوح بين 4.27-4.37 ,ولكن عند المعاملة بالكبريتيت ارتفع الرقم ليصل إلى 5.15 .

ارتفعت المواد الصلبة الذائبة من 6.8 درجة بركس إلى مدى تراوح بين 7.1-8.5 درجة بركس . وحسب التركيز للصمغ العربي المضاف وذلك عقب التجفيف وخلال فترات التخزين

انخفضت النسبة المئوية للرطوبة وكذلك انخفضت قيمة النشاط المائي عند المعاملة بالصمغ العربي ليتراوح الانخفاض بين (15.7%-7.3%) للرطوبة ومدى بين 0.2675-0.328 للنشاط المائي