Dedication

To my father
To my mother
To my husband
To my daughter
To my Brothers and Sisters

Acknowledgment

I wish to present my special thank to everybody helped to make this thesis possible, by supporting and providing me the valuable information which is required for this research, so please allow me to dedicate my acknowledgment of gratitude towards the followings:

First, I would like to thank my supervisor Dr. Kamal Mohamed saeed for his most support and encouragement.

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Abstract

Physiochemical and thermodynamic properties of a composite sample of *Anogeissus Leiocapus* gum were studied using standerd methods. The average values of a different Characterization methods were determined to obtain the mean values of: moisture, ash, nitrogen and protein, specific rotation, intrinsic viscosity, refractive index, ph of The gum. The results of this characterization as the mean values of all proprieties as follows : 10.7 %, 2.6 %, 0.7, 4.5, - 43.8, 0.43, 1.333, 5.00 respectively. cationic composition of gum sample was also determined for eight elements: potassium (K), Calcium (Ca), Magnesium (mg), Copper (Cu), Sodium (Na), Zinc (Zn), Irion (Fe) and Lead (pb). The results is: 494.4, 356.7, 285.7, 95.5, 50.5, 8.5, 4.9, 0.3 respectively. The solubility of *Anogeissus leiocarpus* gum in water was determined and found to be 65.5 % . molecular weight of polymer by osmotic pressure was found to be 6.82746 $\times 10^5$ Da.

The thermodynamic properties of the gum solution (partial specific volume of gum sample and the solvent (water), volume fraction of both, and density of solid) was studied and the values was found to be: 0.7, 1.001, 0.41, 0.59, 0.881 respectively. The changes in Chemical potential of gum sample in a different concentration of gum solution was calculated and were

found to be in the range (-0.84 to -7.47× 10^{-3} Jg^{-1}). The changes in Gibbs free energy of mixing were found to be in the range (-0.74 to -4.33×10^{-2} Jg^{-1}).

الملخص

تمت دراسة الخصائص الفيزيوكيميائية و الثيرموديناميكية لعينة صمغ الصهب باستخدام الطرق القياسية. حيث قدر متوسط قيم بعض الخصائص مثل:(محتوى الرطوبة, محتوى الرماد, نسبة النيتروجين والبروتين, الدوران الضوئي النوعي, اللزوجة, معامل الانكسار, الرقم الهيدروجيني) وسجلت النتائج على التوالي كما يلي: 10.7%, 2.6%, 4.5 ,0.7, º43.8-, 0.43, 1.333, 5.00. تم حساب المحتوى الكاتيوني للعناصر الآتية : بوتاسيوم, كالسيوم, ماغنسيوم, نحاس, صوديوم, زنك, حديد, رصاص وكانت النتائج كألآتي: 494.4, 356.7, 285.7, 95.5, 50.5, 8.5, 4.9 على التوالي. الذوبانيه لصمغ الصهب 65.5%. قدر الوزن الجزيئي للبوليمر بواسطة خاصية الضغط الإزموزي 6.82746×10^{5} دالتون.

العوامل الثيرموديناميكية للصمغ وهي:(الحجم الجزئ النوعي لعينة الصمغ و الماء, الكسر الحجمي لكليهما, كثافة الصلب) وجدت على التوالي : 0.7, 1.001, 0.41, 059, 0.881. التغير في الجهد الكيميائي للعينة و الماء في تراكيز مختلفة محلول الصمغ وجد في المدى (0.84- إلى 7.47 -×10^{-3} جول/جرام) و التغير في طاقة جبس الحرة وجدت في المدى (0.74 إلى 4.33-×10^{-2} جول/جرام).

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