

# الآية

قال تعالى:

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(الزمر: الآية 9)

# **Dedication**

To my dear father

To my dear mother

To my brother and sisters

To my husband

To all my teachers

To all my friends

I dedicate you this research

# Acknowledgement

First of all, I would like to thank *Allah* for giving me the strength to finish this study.

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# Abstract

The basic physical properties of milk components is critical in determining the usefulness of milk components in food formulations and in determining quality attributes and acceptability of foods containing these components, we study physical properties of raw milk of sheep, goat ,cow and camel in Aljazeera Farms Sudan, Milk samples were collected from farm, and analyzed for their physical features, including, color, viscosity, surface tension, density, refractive index, freezing point, and boiling point, were compared with the physic characteristics of the fresh natural milk samples from camel, cow, goat and sheep. Therefore these elements were compared with the physico-chemical properties of fresh natural milk samples from buffalo, cow and goat. The results were also compared with reported milk quality from different countries and World Health Organization (WHO) standards. We found that all the physical properties of available milk meet the requirements of the WHO, except for viscosity that is below world standards.

This study aims to identify the concentration of the chemical elements of different types of milk in Aljazeera Farms using X-ray Fluorescence, and to monitoring of the concentration of these elements for different dairy products of milk producers (quality control). Also study the effect of change in different temperatures on those elements. The study was conducted on 16 milk samples taken from four types of cattle (cow-camel- goat- sheep) in the Elnuba area of ElJazeera governorate. The samples were heated at different temperatures (0, 30, 60, 100) °C using the X-ray fluorescence technique to detect the ratios of some milk constituents and the comparison of milk types. The results showed high

calcium, iron and barium at temperature (0) °C, and low heating elements (30, 60, 100) °C in cow's milk.

Calcium and manganese at (0) °C and low element ratios at 30, 60, 100 in camel milk, On iron, calcium and manganese at a temperature of (0) °C with a slight decrease of the rest of the elements at (30, 60, 100) °C in goats' milk. The milk of the sheep obtained the highest percentage of iron, calcium and manganese at (0) °C and the low percentage of elements at the level (30, 60, 100) °C, and comparing the types of milk with elements at different temperatures and low component ratios with the increase in heating. Temperature (0) °C for the containment of the highest ratios of the beneficial elements of the human body.

# المستخلص

الخواص الفيزيائية الأساسية لمكونات اللبن أمر بالغ الأهمية في تحديد مدى فائدة مكونات الحليب في المستحضرات الغذائية وفي تحديد سمات الجودة وقبول الأطعمة التي تحتوي على هذه المكونات، في هذه العمل تم دراسة الخصائص الفيزيائية لحليب الأغنام والماعز والبقر والإبل في مزارع البان بولاية الجزيرة السودان. تم جمع عينات اللبن من المزرعة، وتم تحليلها لدراسة خصائصها الفيزيائية، بما في ذلك اللون واللزوجة والتوتر السطحي والكثافة ومعامل الانكسار ونقطة التجمد ونقطة الغليان، تمت مقارنة النتائج مع الخصائص الفيزيائية لعينات الحليب الطبيعي الطازج من البقر والإبل والماعز والضأن. وتمت مقارنة النتائج أيضاً مع جودة الحليب من عدد من البلدان ومعايير منظمة الصحة العالمية. لقد وجد أن جميع الخواص الفيزيائية للحليب مجال الدراسة تفي بمتطلبات منظمة الصحة العالمية، باستثناء اللزوجة التي تقل عن المعايير العالمية.

كما تهدف هذه الدراسة أيضاً إلى تحديد تركيز العناصر الكيميائية لأنواع مختلفة من الحليب في مزارع الجزيرة باستخدام جهاز الأشعة السينية ، ورصد تركيز هذه العناصر لمنتجات الألبان المختلفة لمنتجاتي الألبان (مراقبة الجودة). أيضاً دراسة تأثير التغير في درجات الحرارة المختلفة على تلك العناصر. أجريت الدراسة على 16 عينة لبن مأخوذة من أربعة أنواع من الانعام (البقر - الجمال - الاغنام - الضأن) في منطقة النوبة بمحافظة الجزيرة. تم تسخين العينات في درجات حرارة مختلفة (0 ، 30 ، 60 ، 100) درجة مئوية باستخدام تقنية الأشعة السينية للكشف عن نسب بعض مكونات الحليب ومقارنة أنواع الحليب. وأظهرت النتائج ارتفاع الكالسيوم والحديد والباريوم في درجة الحرارة (0) درجة مئوية، وبدأت العناصر في الانخفاض (30، 60، 100) درجة مئوية في حليب البقر. وانخفاض الكالسيوم والمغنيز في (0) درجة

مئوية وانخفاض نسب العناصر في 30 و 60 و 100 في حليب الإبل، وتذبذب نسب الحديد والكالسيوم والمنغنيز عند درجة حرارة (0) درجة مئوية مع انخفاض طفيف في بقية العناصر في (30، 60، 100) درجة مئوية في حليب الماعز. حصل حليب الأغنام على أعلى نسبة من الحديد والكالسيوم والمنغنيز عند (0) درجة مئوية ونسبة مئوية منخفضة للعناصر على المستوى (30، 60، 100) درجة مئوية، ومقارنة أنواع الحليب بعناصر في درجات حرارة مختلفة ونسب منخفضة للمكونات مع زيادة في درجة الحرارة (0) درجة مئوية لاحتواء أعلى النسب للعناصر المفيدة في جسم الإنسان.

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