

DEDICATION

To my

Dear father

To my

Dear mother

To my

Brothers and sisters

To my

Colleagues

With love.

ACKNOWLEDGMENT

My gratitude and faithful thanks and praise are to Allah, for providing me health, strength, and patience to conduct this study

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Abstract:

This research was conducted to study the effects of adding different levels of water to milk on certain physical properties. Ten (10) liters of raw milk were purchased from the farm of the College of Animal Production Science & Technology. One sample was used as control sample without added water (0%) added water while the other samples were divided into four groups samples with 3%, 10%, 20% and 30% added water. Then laboratory tests on color, taste, density,

boiling and freezing point were carried out. The experimental treatments were repeated 5 times for the different treatments. The results obtained for the density were $(1.033 \pm .00)$ for the control sample and $(1.030 \pm .0054)$ $(1.026 \pm .0013)$ $(1.025 \pm .0083)$ and $(1.024 \pm .0084)$ for samples with 3%, 10%, 20% and 30% added water respectively. A decrease in density is very clear in the samples with added water. The statistical analysis is showed a high significant difference between the control sample and the other samples (3%, 10% 20% and 30%) added water ($P \leq 0.01$). . Also a high significant difference was found between the means of the samples with added water ($P < 0.05$).

The freezing points detected were $(-0.53 \pm 0.00^\circ\text{C})$ for the control sample and $(-0.25 \pm .050)$, $(-0.22 \pm .057)$, (-0.20 ± 0.029) and $(-0.19 \pm .052)^\circ\text{C}$ for samples 3%, 10%, 20% and 30% added water respectively. Also in this case arise in the freezing point with increasing added water, was noticed. The statistical analysis indicated a high significant difference between the values of the control sample and the rest of the samples for this property ($P \leq 0.01$). Also a high significant variation was recorded between the means or the milk samples with added water ($P < 0.05$). Concerning the boiling point the obtained results for the control sample was $(100.17 \pm 0.00^\circ\text{C})$, and $(100.10 \pm .732)$ (99.5 ± 1.46) (95.4 ± 1.516) and $(94.5 \pm 1.525)^\circ\text{C}$ for 3%, 10%, 20%, and 30% added water samples respectively. The boiling point decreased by increased amount of added water. The statistical analysis in dictated high significant difference between the values of the boiling point of the control sample and the samples of added water. ($P \leq 0.01$). .Also a significant difference was found between the means of samples with added water. ($P < 0.05$)

The color was extremely normal for the control sample $(4.0 \pm .00)$, extremely normal for 3% added water samples, $(3.8 \pm .42)$, extremely normal for 10% added

water samples ($3.6 \pm .51$), normal for 20% added water samples ($2.7 \pm .48$) and abnormal for 30% added water samples ($1.7 \pm .82$). Remarkable change in color was associated with percentage of the added water. No significant difference was recorded between color of control and 3% added water samples ($P > 0.05$), while a high significant difference was recorded between above-mentioned samples and the rest of the other samples with added water. Also a high significant difference was found between the means of all samples with added water ($P \leq 0.01$).

The taste of the control sample was extremely palatable (4.0 ± 0.00), for 3% samples extremely palatable (3.9 ± 0.31), for 10% samples extremely palatable ($3.5 \pm .49$), for 20% samples palatable ($2.9 \pm .73$) and for 30% samples unpalatable ($1.8 \pm .78$). Also the taste was not stable, when different levels of water were added to the milk. No significant difference was detected between values of control and 3% and 10% added water samples ($P > 0.05$), while a high significant variation was recorded between the means of samples with added water. ($P \leq 0.01$).

Finally certain recommendations were given.

ملخص البحث

أجري هذا البحث لدراسة الآثار المترتبة عن إضافة مستويات مختلفة من الماء إلى اللبن الخام على بعض خواصه الفيزيائية، تم شراء عشرة لترين من مزرعة كلية علوم وتكنولوجيا الإنتاج الحيواني أخذت منه عينة لبن دون إضافة ماء تمثل عينة الشاهد بينما قسمت العينات الأخرى إلى المجموعات التالية: عينات بنسبة 3% و 10% و 20% و 30% ماء مضاف ومن ثم أجريت إختبارات معملية على اللون، الطعم، الكثافة، درجة الغليان ودرجة التجمد، وكررت المعاملات المعملية خمس مرات لكل مجموعة، النتائج المتحصل عليها لخاصية الكثافة كانت ($1.033 \pm .00$) لعينة الشاهد و ($1.030 \pm .0054$) و ($1.025 \pm .0013$) و ($1.026 \pm .0083$) و ($1.025 \pm .0084$) لعينات 3% و 10% و 20% و 30% ماء مضاف على التوالي، ويلاحظ الإنخفاض الواضح للكثافة في العينات المضاف إليها الماء، أظهر التحليل الإحصائي وجود فرق معنوي عالي بين عينة الشاهد وبقية العينات (3%, 10%, 20%, 30%). ($P \leq 0.01$) كما أوضح أيضاً وجود فروقات معنوية عالية بين متوسطات العينات امضاف إليها ماء ($P < 0.05$).

بلغت درجة التجمد ($-0.53 \pm .00^\circ\text{C}$) لعينة الشاهد و ($-0.25 \pm .050$) و ($-0.22 \pm .057$) و ($-0.20 \pm .029$) و ($-0.19 \pm .052$) $^\circ\text{C}$ للعينات المحتوية على 3% و 10% و 20% و 30% ماء مضاف على التوالي، ويلاحظ الإرتفاع الواضح في درجة التجمد بارتفاع نسبة الماء المضاف.

أظهر التحليل الإحصائي وجود فرق معنوي عالي ($P \leq 0.01$) بين عينة الشاهد وبقية العينات لهذه الخاصية، كما لوحظ أيضاً وجود فرق معنوي عالي بين متوسطات العينات المضاف إليها الماء ($P < 0.05$).

أما بالنسبة لدرجة الغليان فقد وجدت درجة الحرارة (100.17 ± 0.00) $^\circ\text{C}$ لعينة الشاهد و ($100.10 \pm .732$)، (99.5 ± 1.46) و (95.4 ± 1.516) و (94.5 ± 1.525) $^\circ\text{C}$ للعينات 3% و 10% و 20% و 30% ماء مضاف على التوالي ويلاحظ إنخفاض هذه الدرجة بزيادة نسبة المئويه للماء المضاف كما أبان التحليل الإحصائي وجود فرق معنوي عالي بين عينة الشاهد و عينات الماء المضاف ($P \leq 0.01$). ورصد أيضاً ذات الفرق بين متوسطات عينات الماء المضاف ($P < 0.05$).

لم يتم رصد أي فرق معنوي بين عينة الشاهد وعينات 3% ماء مضاف ($P>0.05$) ، بينما رصد فرق معنوي عالي بينهما وبقية عينات الماء المضاف الأخرى ($P<0.05$) ، أيضاً رصد فرق معنوي عالي بين متوسطات كل العينات المضاف إليها الماء ($P<0.05$).

أما اللون فقد كان طبيعياً للغاية لعينة الشاهد ($4.0 \pm .00$) وأيضاً لعينات 3% ماء مضاف (3.8 \pm .42) و 10% ماء مضاف ($3.6 \pm .51$) وطبيعي لعينات 20% ماء مضاف ($2.7 \pm .48$) وغير طبيعي لعينات 30% ماء مضاف ($1.7 \pm .82$) ويلاحظ أن هناك تغيراً في اللون على إرتباط كميته الماء المضاف.

طعم عينة الشاهد كان مستساغاً للغاية ($4.0 \pm 0 .00$) وأيضاً مستساغاً للغاية لعينات 3% ماء مضاف ($3.9 \pm .31$) و لعينات 10% ماء مضاف ($3.5 \pm .49$) ومستساغ لعينات 20% ماء مضاف ($2.9 \pm .73$) وغير مستساغ لعينات 30% ماء مضاف ($1.8 \pm .78$) ، ($P<0.05$) ويلاحظ تغيير الطعم حسب نسبة الماء المضاف للبلن.

لم يرصد فرق معنوي بين عينة الشاهد وعينات 3% و 10% ماء مضاف ($P>0.05$) بينما رصد فرق معنوي عالي بينهما وبقية عينات الماء المضاف ($P<0.05$).
وأخيراً قدمت توصيات محددة بهذا الخصوص.