DEDICATION

To my parents,

My husband

and My two sons and doughter

for their support and

encouragement thourghout this study

Nahid

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NAHID

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Abbreviation

A — Cross – sectional area perpendicular to the direction of flow through – circulation drying, L^2

Ala — Alanine

Arg — Argnine

A_u , A_m — non drying surface and average area of the drying solid

B — Constant

G — Mass velocity of gas, $M / L^2 \theta$

Glu — Glutamic acid

Gly — Glycein

h_C — Heat transfer coefficient for convection $FL / L^2 T \theta$

h_R — Heat transfer coefficient for radiation, $FL / L^2 T \theta$

Hyp — Hydroxyproline

k_m — Thermal conductivity of tray, $FL^2 / L^2 \theta$

k_s — Thermal conductivity of drying solid, $FL^2 / L^2 \theta$

k_Y — Gas phase mass transfer coefficient, mass evaporated /(area) (time), (humidity deference), $M / L^2 \theta (M / M)$

M — Constant

N — Flux of drying mass of moisture evaporated /(area)(time),$M/L^2\theta$ rate of revolution /θ

N_C — Constant flux of drying, $M/L^2\theta$

N_m — is a logarithmic average of the rate N_1, at a moisture content X_1 . ,and N_2 at X_2

Pro — Proline

q_K — Heat flux for conduction, $FL/L^2\theta$

q_C	Heat flux for convection, $FL/L^2\theta$
q_R	Heat flux for radiation, $FL/L^2\theta$
s	Slope of drier, L/L
S	Interfacial surface of solid /bed cross section, L^2/L^2
S_s	Mass of dry solid in a batch , batch drying M mass velocity of dry solid continuous drying ,$M/L^2\theta$
t_G	Dry – bulb temperature of a gas, T
t_R	Temperature of radiating surface, T
t_s	A absolute temperature of surface, T
U_K	Over all heat – transfer coefficient $FL/L^2T\theta$
X	Moisture content of a solid, mass Moisture /mass dry solid ,M/M
X*	Equilibrium moisture content of a solid, mass Moisture /mass dry solid , M/M
y	Humidity (mass moisture/mass dry gas), $M/L^2\theta$
y_S	A absolute Humidity (mass moisture/mass dry gas), $M/L^2\theta$
Z	Length of drier, L
Z_M	Thickness of tray material, L
Z_s	Thickness of drying material, L
λ_s	Latent heat of vaporization at t_s, FL/M
μ	Viscosity ,$M/L\theta$
Δ	Difference
Δ X	Change in moisture

$\Delta\theta$	Change in time
θ	time

Abstract

This study is undertaken to manufacture and utilize gelatin from splits and rejects of hides and skins in tanneries . The splits and rejects cow hides were taken from Al-Nasr tannery in limed conditions. The pelts were well washed and pickled in concentrated sulphuric acid diluted (1:10) using no salt to enhance gelatinization. The process of pickling was allowed to stay for 72 hours at a temp of 40 ºC to allow complete gelatinization. The pelts were subjected to heating to concentrate the gelatin solution under a pressure of 1 bar and 70 ºC.

The solution was cooled to room temperature, 27 ºC and then filtered.

The viscosity of the thin liquor was measured and found to be 1.2 $N.S/m^2$. To raise the viscosity, the thin solution was subjected to evaporation in a single – effect evaporator, where the viscosity was increased to 1.8 $N.S/m^2$. Having set the procedure for the manufacturing process a two –level-factorial experiments were designed with factors including: temp, concentration, time and pressure, the experiments were carried out at low and high levels of each factor.

The factorial experiments showed that time and concentration were significant while temp has a negative effect as it reduces the viscosity, but on the contrary it speeded up the rate of gelatinization, on the other hand pressure was found to be insignificant. From the factorial experiments the optimum factors were specified and a controlled experiments were carried out to produce spray dried gelatin.

Gelatin has many utilization, it can be used as glue for pasting and in water – shut off in oil wells, hence it's adhesive power was investigated and found to be very strong (15.4$N.S/m^2$), but caution must be taken in its application in deep oil wells as the temp. In such wells is high and may reduce the viscosity making the gelatin not be able to close the pores and water may come mixed with the oil.

صناعة الجلاتين من مخلفات الجلود

ملخص البحث

اهتمت هذه الدراسة بصِناعَة اسـتخدام وصـناعة الجلاتيـن مـن بقايـا الجلودِ في المدابغِ. أخذت العينات المسـتخدمة مـن مدبغـة النصـر وهـي فـي مرحلة الجير.غسلت العينات جيدا ثم أضيف حامضِ الكبريتيك المركز ، وخفّـفَ بنسبة (1:10)، بدون اسـتخدام أي ملـحً لتَحسـين عمليـة الجلتنـة. تـم حفـظ العينات في الحامض لمدة 72 ساعة حتى تكتمل عمليـة الجلتنـة. بعـد اكتمـال عملية الجلتنة ، سخن المنتج تحت ضغط 1 **bar** فـي درجـة حـرارة 70 درجـة مئوية وذلك لتركيز المنتج.

تم تبريد المنتج في درجة حرارة الغرفة (27 درجة مئوية) وبعد ذلـك رشح ا لمنتج وقيست لزوجته فكانت 1.2 نيوتن.ث/م ^{2}. اخضع المنتج للتبخيـر وذلك لزيادة اللزوجـة، فكـانت 1.9 نيـوتن.ث/م ^{2}. ولضـبط المنتـج للصـناعات المختلفة تم تصميم تجربتين عـامليتين تحتويـان علـى العوامـل التاليـة: درجـة الحرارة، التركيز، الزمن والضغط،، وأجريت التجـارب فـي مسـتويين (عـالي – منخفض) لكل العوامل.أوضحت التجارب العاملية أن للزمن والتركيز أثر واضح في صناعة الجلاتين، بينما أن للحرارة أثر سالب وذلـك لأنهـا تقلـل مـن لزوجـة المنتج على الرغم من أنها تزيد مـن عمليـة الجلتنـة، مـن جـانب آخـر أوضـحت التجارب أن الضغط لا يؤثر ظاهرياَ في صناعة المنتج.من هذه التجارب العاملية تم أخذ القياس لإنتاج مادة الجلاتين. للجلاتين استخدامات مختلفة فهو يستخدم كلاصق ويستخدم في آبار البترول لقفل المسـامات وذلـك لمنـع اختلاط المـاء بزيت البترول. وأوضحت التجارب أنه فعال عندما يستخدم كلاصق إلا أن هنـاك بعض الاحتياطات عند استعماله في آبار البترول العميقـة وذلـك لارتفـاع درجـة الحرارة في باطن الأرض مما يؤثر على لزوجة الجلاتين ويكون غيـر فعـال فـي قفل المسامات مما يؤدي الي اختلاط الماء بزيت البترول.