DETERMINING THE TEXTURE OF CHARQUI MADE FROM MATURED, DEFROSTED, AND SALTED BEEF USING COMMON SALT (NaCl)

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I. INTRODUCTION

The term 'charqui' originates from the Quechua word 'ch'arki', with ancestral roots. It refers to a product made from lean meat, typically cut into thin strips or chunks, salted dry or in brine, and sun-dried [1; 2]. The English term 'jerky' likely derives from charqui and denotes a sun-dried, salted, nitrite-cured meat product [1; 3; 4]. This category also encompasses various meat products from diverse origins, such as 'carne de sol' from northeastern Brazil, 'carne seca' from Mexico, 'cecina' from Spain, 'biltong' from South Africa, 'kilishi' from Nigeria and the African Sahara, 'kaddid' from Africa and South Asia, 'pastirma' from the eastern Mediterranean Sea, and 'bresaola' from Italy [1; 5; 6; 7].
Nguyen and Nguyen [8] highlight that the traditional sun-drying method primarily involves direct solar radiation, ensuring beef slices are cut uniformly for consistent drying.
The aim of this study was to produce and characterise charqui from matured, thawed, and salted meat using common salt, and to determine its texture.

II. MATERIALS AND METHODS

The experiment was conducted in the Laboratory of Physical Properties of Biomaterials at the Faculty of Agricultural Engineering, University of Concepción, Chillán Campus.

For this study, three cuts from the hindquarter were utilized: the Striploin (LL), corresponding to the longissimus lumborum muscle (from the 10th rib to the lumbar vertebrae); the Eye of Round (PG), located at the back of the thigh, corresponding to the semitendinosus muscle; and the Sirloin Tip (PR), corresponding to the quadriceps femoris muscle.

Regarding texture, pieces from each charqui slice, measuring 3 cm^2 in area and 2 mm in thickness, were cut longitudinally to the muscle fibers. The value was measured using a Kramer® brand press in the INSTRON® Universal Test Equipment model 4467 H1998, with control over the area and thickness of each sample. The lowering speed was set at 10.00 $mm*min^{-1}$. Three repetitions of each cut were performed for each day of ripening. The same procedure was carried out for Equs® charqui, with three replicates.

For statistical analysis, a repeated samples experimental design was employed, considering time as a treatment factor for all commercial beef cuts. The assumptions of normality and homogeneity were previously analyzed using the Shapiro Wilk and Bartlett's tests respectively, with the data showing a normal distribution. The analysis was performed using descriptive statistics, analysis of variance, and the Kruskal-Wallis test, using the statistical program InfoStat Version 2019e.

III. RESULTS

Table 1 presents the values of maximum strength (N), slope ($N*mm^{-1}$), and hardness (N*mm) for LL charqui, PG, and PR, across different days of ripening. It can be observed that the three parameters evaluated for LL charqui fluctuate over time. However, no significant difference is noted for maximum strength ($p>0.05$), slope ($p>0.05$), and hardness ($p>0.05$). Furthermore, these values do not significantly differ ($p>0.05$) from those of Equs® charqui.

Table 1 – The values for maximum strength (N), slope (N*mm-1), and hardness (N*mm) of beef charqui, prepared with striploin (LL), eye of round (PG), and sirloin tip (PR) cuts across various days of maturation, and their comparison with Equs®* charqui.

Day	LL			PG			PR		
	Maximum strength	Slope	Hardness	Maximum strength	Slope	Hardness	Maximum strength	Slope	Hardness
2	3202.69^{a*}	808.04^{a}	7069.21^{a}	1728.86^{a}	524.09^{a}	3930.64^{a}	3338.26^{cd}	942.39^{bcde}	7353.80^{d}
5	4022.82^{a}	896.80^{a}	7596.82^{a}	2563.76^{a}	876.06^{a}	4420.78^{a}	2794.64^{bcd}	888.55^{abcde}	5948.60^{cd}
10	3527.52^{a}	944.27^{a}	8397.70^{a}	3900.68^{a}	792.94^{a}	10306.72^{a}	2040.27^{abc}	698.49^{ab}	3766.37^{abc}
15	2965.11^{a}	948.69^{a}	5833.40^{a}	2417.45^{a}	680.05^{a}	5580.68^{a}	1346.98^{ab}	429.40^{ab}	2694.71^{ab}
20	2008.73^{a}	876.22^{a}	3192.37^{a}	2540.94^{a}	512.87^{a}	6881.08^{a}	3757.05^{cd}	1044.60^{cde}	5665.83^{bcd}
25	2825.51^{a}	780.80^{a}	6672.13^{a}	2358.39^{a}	506.95^{a}	5049.37^{a}	3217.45^{d}	1282.20^{e}	5141.99^{bcd}
30	2645.64^{a}	663.69^{a}	5998.06^{a}	2998.66^{a}	778.97^{a}	5807.34^{a}	1555.71^{abcd}	365.45^{ab}	3876.49^{abcd}
45	3935.58^{a}	1282.60^{a}	6887.22^{a}	1373.83^{a}	476.70^{a}	2896.73^{a}	2420.14^{abcd}	743.44^{abcd}	4535.70^{abcd}
60	2744.97^{a}	872.26^{a}	4819.57^{a}	1708.73^{a}	420.53^{a}	4875.01^{a}	3210.74^{d}	1168.10^{cde}	6433.29^{cd}
75	2989.27^{a}	807.91^{a}	7060.43^{a}	2481.88^{a}	489.48^{a}	6429.87^{a}	2159.07^{abcd}	588.32^{abc}	4393.23^{abcd}
90	2934.23^{a}	1106.30^{a}	4449.14^{a}	1372.49^{a}	385.78^{a}	3032.10^{a}	910.07^{a}	308.38^{a}	1801.95^{a}
Equs®	3600.00^{a}	1367.60^{a}	6300.15^{a}	3600.00^{a}	1367.60^{a}	6300.15^{a}	3600.00^{cd}	1367.60^{de}	6300.15^{bcd}

Different letters apply to the same column and medians with a common letter are not statistically different (p>0.05) in the Kruskal Wallis test.
*Equs®: Commercial jerky made from unripened beef.

IV. CONCLUSION

The importance of texture in the preparation of charqui should be emphasised, as it allows for the optimisation of resources. In the three cuts of meat, the values of the parameters analysed fluctuated over the course of the maturation period and there was no significant difference for maximum strength (p>0.05), slope (p>0.05) and hardness (p>0.05).

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