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SOME DATA REFERRING TO MEAT QUALITY EVALUATION : TRYPTOPHAN, GLUCOSAMINE AND HYDROXIPROLINE CONTENTS OF LEAN SIDE SKELETAL MUSCLES.

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SOME DATA REFERRING TO MEAT QUALITY EVALUATION : TRYPTOPHAN, GLUCOSAMINE AND HYDROXIPROLINE CONTENTS OF LEAN SIDE SKELETAL MUSCLES

On meat processing we find a separation of the skeletal muscles on differents qualities as regards to any very simple objetive methods used many years ago, derived from the utility and profit degree of meat in the kitchen.

Taking as a base the data obtained by other authors, Dahl (Acta Chem. Scand., 14, (1960) 227-229) and Wierbicki (VIth Meeting of E.M.R.W., Utrecht (1960)), we have made these tests in order to may justify the classification normaly employed in carcass cutting, having in view its composition by aminoacids and aminosugars, in first case tryptophan and hydroxiproline and in second case, glucosamine content. At same time their correlation, if any, was investigated.

The rate of glucosamine was investigated as a constituent of plasmatic mucoproteins and of those making part of constituent elements of connective tissue, the function of which has not been perfectly cleared up, Kent and Whitehouse (Biochemistry of aminosugars, London 1955).

Materials and methods

The samples tested consisted of 100 g. of the lean side of the 15 pieces into which butchers divide the carcass, and which are as follows:

Hindquarter - Aitchbone
Loin
Topside
Silverside
Rumb
Thick Flank
Leg of Beef

Forequarter - Flank
Clod and Sticking
Brisket
Back Ribs and Top Ribs
Steakmeat
Shin
Subescapular muscle
Brisket

The number of cows studied are eleven. The quality which the market stated for them was : "good". The age of cows varied betweeen 6 and 8 years.

Tryptophan, hydroxiproline and glucosamine contents were determined by methods of Graham and cols. (J. Biol. Chem., 168, 711, 1947), Wierbicki and Deatherage (J. Agr. Food Chem., 2, 878, 1954) and Elson and Morgan (Biochem. J., 27, 1824, 1933), respectively.

Results and discussion

The results obtained appear in Table I as pourcentages of proteins. From this table it is apparent there is only a small difference among extreme values concerning tryptophan and glucosamine contents.

Concerning hydroxiproline and considering these contents from minor to major, it can be observed that it is possible to establish a order of qualities which is very close to that considered commercially, as it is the following : Loin, Rump, Silverside, Steakmeat, Brisket, Topside, Aitchbone, Subescapular muscle, Flank, Thick Flank, Clod and Sticking, Back Ribs and Top Ribs, Shin and the last Leg of Beef.

Under conditions of which our study was made we can observe that the correlation existing between tryptophane and hydroxiproline contents is positive and has a value of 0.49, which determines a signification level ranging from 0.05 to 0.02. The correlation is greater when tryptophan and glucosamine contents are compared, in which case r, has a value of 0.6 at 0.01 level.

The regression lines are G = 0.039 + 0.037 T and T = -0.886 + + 1.453 H, figures 1 and 2.

We may see then that these tryptophane and hydroxiproline contents can be not considered as a index forestablishing a differentiation of the quality of muscle meat of parts into which the carcass is divided.

SUMMARY

In this study we determined the tryptophane, glucosamine and hydroxiproline contents of the differents muscles into which a carcass is divided in cutting.

This values in all the cases produced a positive correlation less or more significative.

By the hydroxiproline contents a classification of the carcass pieces was drawn.

RESUME

Dans cet étude nous avons établi le contenu en triptophane, glucosamine et hydroxyproline des différents muscles, après le dépiècement de la carcasse.

Ces valeurs, dans tous le cas, donnent lieu à una corrélation positive plus ou moins significative.

La classification des pièces de la carcasse est faite d'après le contenu en hydroxyproline.

ZUSAMMENFASSUNG

In dieser Arbeit haben wir den Gehalt an Triptophan, Glucosamin und Hydroxyprolin der verschiedenen Muskel nach Zerstückelung der Hälfte des Schlachtviels bestimmt.

Diese Werte stehn, in allen Fällen, in einer positiven mehr oder

TABLE I

Tryptophan, Glucosamine and Hydroxiproline contents as % N x 6.25

Sample	Tryptophan	Glucosamine	Hydroxiproline
Aitchbone	1.47±0.17	0.097±0.011	1.50±0.12
Loin	1.37±0.05	0.095±0.009	1.01±0.14
Topside	1.59±0.09	0.096±0.037	1.47±0.16
Silverside	1.48±0.06	0.083±0.012	1.28±0.29
Rump	1.37±0.02	0.103±0.008	1.27±0.24
Thick Flank	1.65±0.07	0.102±0.010	1.66±0.25
Leg of Beef	1.62±0.05	0.091±0.008	2.67±0.48
Flank	1.32±0.06	0.084±0.009	1.61±0.24
Clod and Sticking	1.53±0.09	0.089±0.012	2.04±0.20
Brisket	1.31±0.06	0.087±0.012	1.45±0.24
Back Ribs & Top Ribs	1.88±0.09	0.117±0.014	2.22±0.61
Steakmeat	1.65±0.05	0.106±0.014	1.37±0.31
Shin	1.49±0.06	0.095±0.010	2.23±0.44
Subescapular muscle	1.54±0.07	0.102±0.008	1.53±0.37
Brisket	1.60±1.58	0.087±0.012	1.58±0.28

minder bedeutenden Wechselbesiedlung.

Die Sortierung der Stücke der Schlachtviehhälften ist nach dem Gehalt an Hydroxyprolin gemacht.

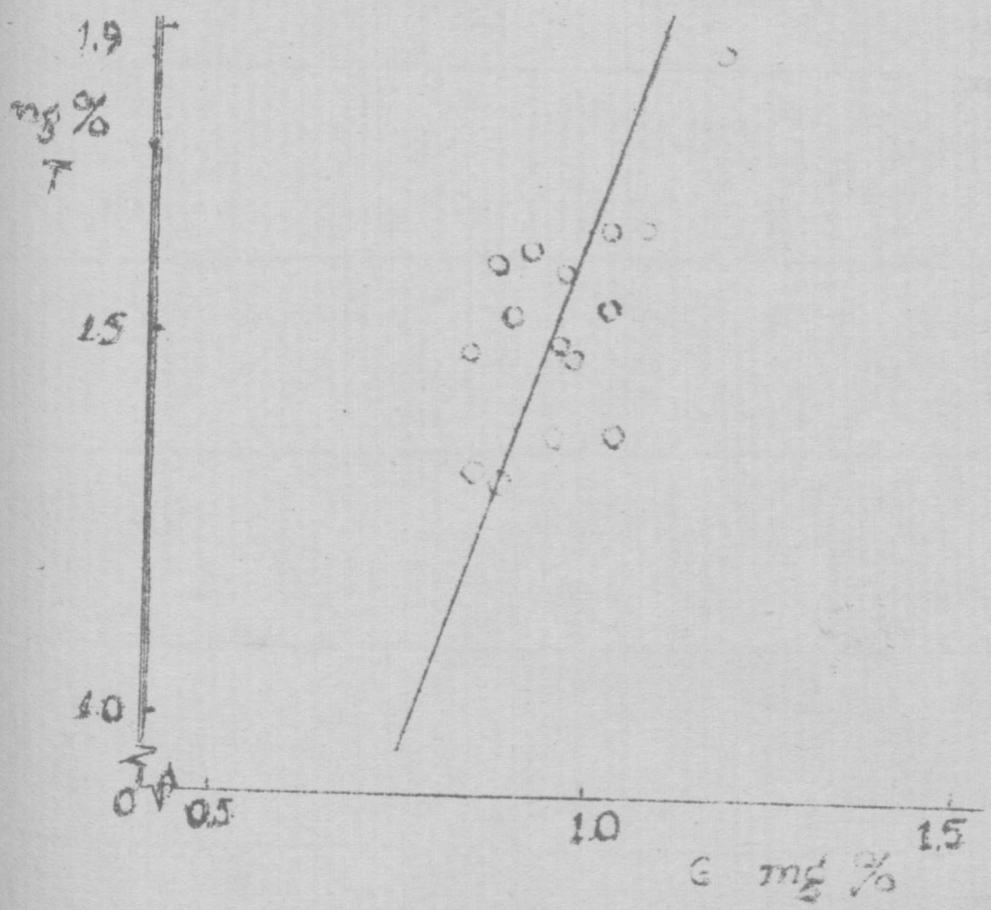

Fig. 1

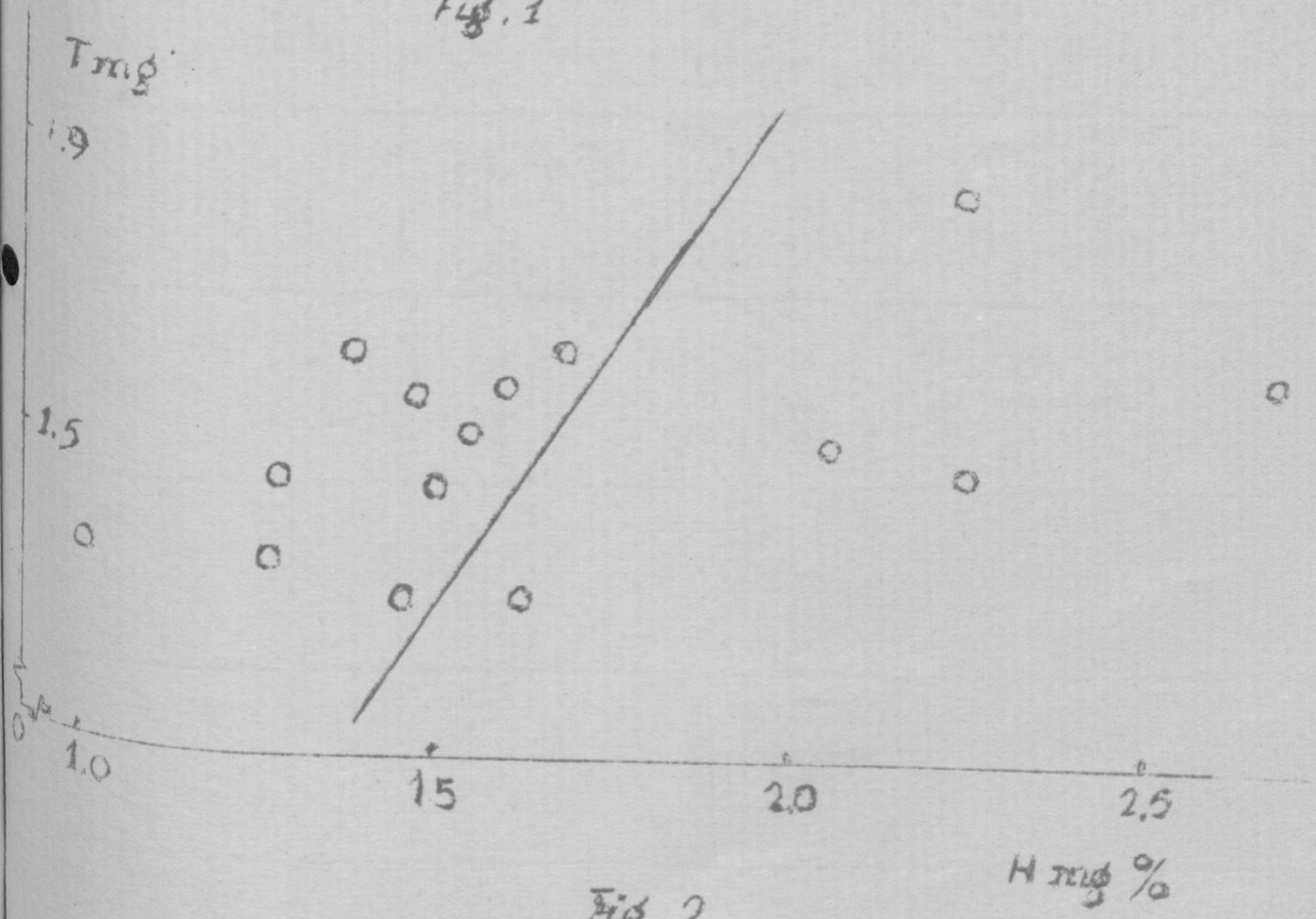

Fig. 2