

Comparative histologic study on local and  
imported luncheon meats in Greece

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S u m m a r y

Greek law demands offals, head meat, skin, and mammary glands to be excluded from luncheon meat production. Histologic examination of 33 tins of locally produced and imported luncheon meats concerning 8 different brands showed that only 10.6% of the former and 28.4% of the latter are in accordance with the law. Histo-metrical evaluation of different tissues content showed the following percentages for imported and locally produced luncheon meat, respectively: connective tissue,  $85.14 \pm 1.58$ ,  $85.97 \pm 1.00$  (no significant difference); muscle tissue,  $1.88 \pm 0.30$ ,  $3.90 \pm 0.40$  (significant difference,  $p > 2\%$ ); rest included amidon,  $12.86 \pm 1.44$ ,  $8.97 \pm 1.02$  (no significant difference). Standards for connective tissue content must be established at lower than the presently reported levels.

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ETUDE HISTOLOGIQUE COMPARATIVE DE LUNCHEON MEAT..DE

FABRICATION LOCALE OU D'IMPORTATION.

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Résumé :

La loi grecque exclut les abats, la viande de tête et les mamelles de la composition des luncheon meat.

Sur 33 boîtes de luncheon meat concernant 8 marques différentes, 10,6 % des fabrications locales et 28,4 % des produits importés étaient conformes.

L'analyse histométrique des différents tissus a donné les résultats suivants :

	Produits importés	Produits locaux	signification de la différence
tissu conjonctif	85,14 $\pm$ 1,58	85,97 $\pm$ 1	NS
tissu musculaire	1,88 $\pm$ 0,30	3,90 $\pm$ 0,4	S p 0,2 %
reste ( dont amidon )	12,86 $\pm$ 1,44	8,97 $\pm$ 1,02	S p 0,1 %

En conclusion , il est nécessaire d'établir des standards fixant la teneur en tissu conjonctif à un niveau plus faible que celui pratiqué actuellement.

Vergleichende histologische Untersuchungen bei Luncheon  
Meat in- und aus-ländischer Herkunft in Griechenland.

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Zusammenfassung

Nach griechischer Gesetzgebung dürfen Innereien, Kopffleisch, Haut sowie Eutersystem zur Herstellung von Luncheon Meat nicht verwendet werden. Histologische Untersuchungen von 33 Dosen Luncheon Meat in- bzw. aus-ländischer Herstellung aus 8 verschiedenen Firmen haben gezeigt, dass nur 10,6% bzw. 28,4% der untersuchten Proben dem Wortlaut der Gesetzgebung entsprechen.

Die histometrische Auswertung des Anteils an verschiedenen Geweben der in-bzw. aus-ländischen Fabrikate stellt sich wie folgt zusammen :

- Bindegewebe  $85,14 \pm 1,58$  bzw.  $85,97 \pm 1,00$  (kein signifikanter Unterschied)
- Muskelgewebe  $1,88 \pm 0,30$  bzw.  $3,90 \pm 0,40$  ( $P > 2\%$ )
- Sonstiges  $12,86 \pm 1,44$  bzw.  $8,97 \pm 1,02$  (kein signifikanter Unterschied)  
(darunter Stärke)

Der gesetzlich festzusetzende Bindegewebsgehalt sollte unter den oben festgestellten Werten liegen.

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## Introduction

According to Greek law certain tissues, such as skin and mammary glands must not be used for luncheon meat production. Also, head meat and offals must be excluded.

On the other hand, there are no connective tissue standards, concerning luncheon meat for the finished product acceptability.

The present study attempts:

1. To detect the existence of prohibited tissues in luncheon meats consumed in Greece.
2. To measure connective tissue content in the finished product.
3. To compare the above parameters between locally produced and imported luncheon meats.

## Materials and Methods

Luncheon meats were supplied from the market of Athens. 33 tins of 8 different brands were examined. The tissues (ten randomly selected blocks from each tin) were sectioned in a cryostat and stained with H & E.

The sections were examined in a moderate magnification and connective tissue content calculated histometrically using a point-counter (Glagolev, 1933, 1934; Prändl, 1960; 1961; Eberlein 1961; Baxevanis, 1962; Wegener, 1962; Mathias, 1969; Rantsios, 1972).

For each group of measurements the mean value, standard deviation and standard error of the mean were calculated. Differences between means were evaluated by student's *t*-test.

## Results and discussion

Table 1 shows the frequency of luncheon meat tins containing tissues not allowed to be used, the presence of which was confirmed histologically.

It appears that for a high percentage of luncheon meats either produced locally or imported, head meat, offals, mammary glands and skin collagen not properly cleared from epidermis, are used.

Table 2 shows the mean values and standard error of the means for different tissues content of the examined eight brands.

Table 1

Number and percentage of luncheon meat tins containing prohibited tissues histologically detected (8 different brands)

Origin	Skin		Salivary Glands		Mammary Glands		Cartilage		Mucus Membrane		Gastro-intestinal tract		More than one prohibited tissues		No prohibited tissues	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Imported n=14	7	50.0	6	42.6	0	0.0	0	0.0	2	14.2	1	7.1	5	35.5	4	28.4
Local n=19	6	31.8	12	63.6	5	26.5	1	5.3	2	10.6	0	0.0	7	37.1	2	10.6
Total n=33	13	39.4	18	54.3	5	15.1	1	3.0	4	12.1	1	3.0	12	36.4	6	18.2

T a b l e 2  
Percentage of tissues contained in luncheon meat

Brands (I-V: imported; VI-VIII: local)	Mean $\pm$ Standard error of the mean		
	Connective tissue	Muscle tissue	Rest included amidon
I	86.15 $\pm$ 2.13	2.08 $\pm$ 0.28	11.78 $\pm$ 2.04
II	89.40 $\pm$ 1.70	1.10 $\pm$ 0.30	9.50 $\pm$ 2.00
III	85.78 $\pm$ 1.66	1.48 $\pm$ 0.28	12.75 $\pm$ 1.72
IV	84.90 $\pm$ 1.40	2.85 $\pm$ 0.05	12.25 $\pm$ 1.45
V	79.60 $\pm$ 2.10	2.05 $\pm$ 0.05	18.35 $\pm$ 2.15
Imported-Total	85.14 $\pm$ 1.58	1.88 $\pm$ 0.30 <sup>@</sup>	12.86 $\pm$ 1.44
VI	86.98 $\pm$ 0.46	3.88 $\pm$ 0.77	9.25 $\pm$ 1.23
VII	84.93 $\pm$ 0.80	4.22 $\pm$ 0.82	10.84 $\pm$ 0.92
VIII	87.56 $\pm$ 1.04	4.50 $\pm$ 0.52	7.94 $\pm$ 1.09
Local-Total	85.97 $\pm$ 1.00	3.90 $\pm$ 0.40 <sup>@</sup>	8.97 $\pm$ 1.02
Grand Total	85.45 $\pm$ 1.01	2.64 $\pm$ 0.43	11.40 $\pm$ 1.17

<sup>@ p > 2%</sup>

The t-test values of Table 2 show that there is no significant differences for connective tissue content between local and foreign luncheon meats. The same applies for the rest of tissues including amidon. However, there is a statistically significant difference for muscle tissue content ( $p < 2\%$ ).

From this point of view it could be claimed that locally produced luncheon meats are of a better quality than imported ones.

Considering the connective tissue content in luncheon meat, it is clear that the mean value  $85.45 \pm 1.01$  represents a rather high percentage resulting in a low quality product. Thus, there is a necessity for establishing standards on lower levels of connective tissue than those presently existing.

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