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# QUALITY EVALUATION OF SOME IMPORTED CANNED BEEF IN ALEXANDRIA SUPERMARKETS

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## ABSTRACT

*A total of 50 random samples of imported canned beef were collected from different supermarkets in Alexandria and were examined physically,chemically and bacteriologically. The physical examination revealed that 96% of examined canned beef samples fulfilled the legal requirements. The chemical examination indicated that the mean values of pH, moisture, sodium chloride, T.V.N and phosphate were within the permissible limits. Bacteriological examination of all examined samples revealed that the mean values of the total aerobic plate count, total anaerobic bacterial count, total Staphylococci count were* $9.48X10^3 \pm 2.8X10^3$, $4X10^2 \pm 7.7X\ 10$ *and* $2.5\ X\ 10 \pm 2.3$ *cfu/gram, respectively. The incidence of the isolated coagulase positive Staphylococcus aureus from the examined samples was3%. The public health significance of the isolated microorganisms as well as quality evaluation of some imported canned beef on the basis of the Egyptian standard specifications was discussed.*

## INTRODUCTION

Canning means preservation of food in hermetically sealed containers through the action of heat, which is the principal factor to destroy microorganisms. The hermetically sealing is necessary to prevent re-infection and passage of gas. Canning designed to destroy the bacteria responsible for butulism (*Clostridium butulinum*) by using combination of heat treatment, nitrates and ascertain levels of pH.

Meat products that can be stored at room temperature without the risks of microbial spoilage are considered to be shelf stable products. These products are popular for camping and other activities where refrigeration may not available in addition they are convenient products to have on hand without further cooking. Egyptian standard specification of canned beef No. 3491 (2000) as the product must be free from spore formers and non-spore formers bacteria that cause spoilage, and also it has to be free from mould and yeasts growths and *Clostridium botulinum* and its toxins.

In adequate thermal processing and postprocess, contamination can result in the presence of food borne pathogens in cooked ready to eat meat products.

Bacillus cereus has been implicated as responsible agent in many of food borne intoxications ***(Banwart, 1989 and Granum, 1997)***. *Bacillus cereus* could be isolated from the examined canned beef meat samples ***(El-Ansary, 2000)***.

Clostridium species were considered as potential food poisoning as reported by ***Skoczer (1981)*** who stated that over 34% of the isolated organisms were responsible for spoilage of canned meat and belonging to the genus Clostridium.

Other pathogenic microorganisms like *Clostridium perfringens*, can be isolated by ***Gaugusch et.al.(1967)***,while *Klebsiella spp, Enterobacter spp*., *Proteus spp*. and Havnia could be isolated by ***Refai et. al. (1993)*** and *Staphylococcus aureus* can be isolated by ***Radwan (2004)***. In spite of canning benefits, adulteration may be occured as a result of improper percentage of ingredients such as high moisture, fat, connective tissue

and low protein content. Also, there is a risk of public health hazard due to adding of some chemicals as preservatives, flavour or colour enhancer as nitrites which is responsible for the development of nitrosamine which incriminated as a predesposing factor for cancer ***(Gray and Randall, 1979).***

The present study was conducted to evaluate the quality of some imported canned beef meat collected from different supermarkets from different areas at different sanitation levels in Alexandria city.

## MATERIAL AND METHODS

Fifty random samples of imported canned beef were collected from supermarkets in Alexandria city. The samples were transferred as rapidly as possible to the laboratory where they were subjected to the following examination:

**1- Physical examination *(Awad, 1983)*:**

Physical examination for examined cans were done externally for expired date, growth weight, size of can, colour of can, control number, external manifestation of internal spoilage as swell, flipper or springer and finally, the abnormal conditions as rust and damage. The internal examination for examined cans was done according to FAO (1992) for the following items:

a) Detection of gasses by smelling and flaming.

b) Detection of gelatin liquefaction.

c) Coloration of surface and can side.

d) Odour, colour and consistency of cut surface.

**2- Chemical examination by determination of:**

1) pH value ***(AOAC, 1990)***.

2) Moisture percentage ***(AOAC, 1990)***.

3) Sodium chloride content ***(AOAC, 1990)***.

4) Total volatile bases. (T.V.B.) ***(Person, 1976)***.

5) Phosphate content ***(Person, 1981)***.

**3- Bacteriological examination:**

Each can was aseptically opened and portions of 10 grams were taken under aseptic condition, weighted then transferred into sterile homogenizer containing 90 ml of sterile peptone water (0.1%), the content were homogenized for 2 minutes at 1400 rpm, and then allowed to stand for about 5 minutes at room temperature. One ml from the original dilution was transferred to 9 ml of sterile peptone water (0.1%) to prepare a dilution of 1: 100 from which further decimal serial dilutions were prepared and duplicate portions were spread on the corresponding media for bacteriological examination as follow:

a) Total aerobic plate count ***(ICMSF, 1978)***.

b) Total anaerobic plate count ***(Gudkov and Sharpe, 1966)***.

c) Staphylococci count ***(ICMSF, 1978)***.

d) Isolation and identification of *Staphylococcus aureas* ***(Cruickshank, et al., 1975)***.

## RESULTS

The samples of canned beef meat examined had normal colour, acceptable odour and normal consistency.

The chemical examinations revealed that the pH values, moisture percentage, sodium chloride content, total volatile bases and phosphate content were within the permissible limits. (Table 1)

**Table (1):** Mean values for chemical examination of canned beef samples (n=50).

| Test | Mean values | ±S.E |
|---|---|---|
| pH value | 6.1 | 0.02 |
| Moisture percentage | 55.2% | 0.3 |
| Sodium chloride content | 2.2% | 0.06 |
| Total volatile nitrogen base TVN (mg/100g) | 25.9 | 0.8 |
| Phosphate content | 0.31% | 0.01 |

**Table (2):** Mean values of bacterial counts for the examined canned beef meat samples (n= 50).

| Microbial count | Mean values | ± S.E. |
|---|---|---|
| Total aerobic plate count | $9.48 \times 10^3$ | $2.8 \times 10^3$ |
| Total anaerobic plate count | $4 \times 10^2$ | 7.7 X 10 |
| Total Staphylococcus count | 2.5 X 10 | 2.3 |

**Table (3):** Incidence of the recovered microorganisms from the examined canned beef meat samples (n=50).

| Isolated organisms | No. of +ve samples | % |
|---|---|---|
| *Staphylococcus aureus* | 2 | 4 |

## DISCUSSION

All examined samples were acceptable in odour,colour,consistency and externally without rust formation, therefore, the imported canned beef meat samples examined were fulfilled the legal requirements of the Egyptian standard specification of canned beef No. 3491, (2000). The chemical examination of canned samples revealed that the pH values, moisture percentage, sodium chloride content, total volatile base and phosphate content were within the permissible limits table (1). Nearly similar findings about these items were recorded by ***Mousa et. al. (1993), El-Khawas (1996), El-Ansary (2000) and Radwan (2004).*** Canned meats-low-acid food, are thermally processed to produce condition known as "commercial sterility" in which all pathogenic bacteria as *Clostridium botulinum* spores have been destroyed, as well as more heat resistant organisms, which if present could produce spoilage under normal conditions of storage and distribution ***(APHA, 1992).***

The summarized results in table (2) illustrated that the mean value of total aerobic, anaerobic and Staphylococcus counts in imported canned beef meat were 9.48 X $10^3$, 4 X $10^2$ and 2.5 X 10 CFu/g. The obtained result for aerobic plate count was nearly similar to those recovered by ***Refaie et. al., 1993.***

Concerning the anaerobic plate count, similar findings was reported by ***El-Khawas, 1996 and Radwan (2004)***. Hence the obtained results were agree to those recorded by Egyptian standard specifications of canned beef No. 3491, (2000) which revealed that canned meat must be free from anaerobic spore forming bacteria. Regarding to Staphylococcus count in the examined imported canned beef samples, similar findings were also reported by ***El-Ansary (2000) and Radwan (2004).*** The ability of *Staphylococcus* to produce enterotoxic substances seems highly probably that some of the earlier cases of canned food poisoning, where the causal agent was considered to be heat stable toxin, may have been due to post-process contamination with Staphylococci. Also, the storage temperature was more important than salt in controlling growth of Staphylococcus. ***(Whitting et. al., 1984)***.

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# تقييم جودة بعض معلبات اللحوم البقرية المستوردة المتواجدة فى محلات السوبر ماركت بمدينة الإسكندرية

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**معهد بحوث صحة الحيوان – فرع الإسكندرية**

تم جمع عدد خمسون عينة عشوائية من معلبات اللحوم البقرية المستوردة من محلات السوبر ماركت بمدينة الإسكندرية وذلك للتعرف على الحالة الصحية والبكتريولوجية لها. وقد دلت نتائج الفحص الظاهرى على أن لون العينات المختبرة طبيعى ولها رائحة مقبولة وقوامها طبيعى ولا توجد عليها عفن، كما أن العينات خارجيا لا يوجد عليها صدأ. كما أظهر الفحص الكيميائى أن متوسط تركيز الأس الهيدروجينى ومتوسط نسبة الرطوبة ومتوسط نسبة ملح الطعام ومتوسط النيتروجين الكلى المتطاير وكذلك متوسط نسبة الفوسفات فى الحدود الآمنة والمسموح بها طبقا للمواصفات القياسية المصرية.

ولقد أسفر الفحص الميكروبيولوجى على تواجد متوسطات أعداد الميكروبات الهوائية والميكروبات اللاهوائية وميكروبات العنقود الذهبى كالآتى: $9.48\times10^{3}$ ، $4\times10^{2}$ ، $2.5\times10$ على التوالى. كما تم عزل بعض الميكروبات المرضية ذات الأهمية الصحية للإنسان والمفرزة للتوكسينات مثل ميكروب العنقود الذهبى من عدد اثنين عينة معلبات لحوم بقرية وبنسبة 4%.

هذا وقد تمت مناقشة الأهمية الصحية لمعلبات اللحوم البقرية المستوردة.