

INCIDENCE OF MESOPHILIC AEROMONAS IN FROZEN BEEF, POULTRY AND FISH

Y. El. A. Mahmoud and N. Yehia

Fac. Vet. Med. Tanta Univ., - Kafr-El Shiekh Branch

ABSTRACT

A total of 90 random samples from frozen beef, poultry and fish (30 of each) were collected from different supermarkets at different localities in Kafr-El Shiekh Governorate. The samples were examined for detection of Aeromonas species using two different selective media. Results obtained on Ampicillin Dextrine Agar revealed that the log mean of Aeromonas count was 3.39, 4.23 and 5.10 in beef, poultry and fish samples, respectively, while on modified Bile Irganan Brilliant Green Agar the log mean count was 2.15, 2.10 and 3.38 in beef, poultry and fish samples, respectively. Aeromonas Hydrophila, (46.67 %), (50 %) and (60 %), respectively, in beef, poultry and fish followed by Aeromonas Sobria (30.0%), (33.3%), (23.33%), (16.7%) and (16.7%) and (23.3%), respectively, in beef, poultry and fish. The lower incidences were for Aeromonas Caviae, in beef, poultry and fish samples. The obtained results and the public health significance for these organisms were discussed.

INTRODUCTION

Members of the genus *Aeromonas* are typically aquatic bacteria and sometimes pathogenic for fish and cold blooded vertebrates (**Hobbs and Diane, 1993**). *Aeromonas* grow readily at refrigeration temperature and were isolated from various foods of animal origin like, sea foods, poultry, beef, pork, lambs and raw milk (**Kumar et.al., 2000**). Production of enterotoxins by the members of the genus *Aeromonas* were involved in sporadic human gastroenteritis outbreaks, although there were no fully confirmed food borne outbreaks have been described in the scientific literatures (**Bonnic and Okrend, 1998**). (**Hobbs and Diane, 1993**) reported that there are three types of human illness associated with the gastrointestinal infections due to *Aeromonas spp.* which are small intestinal diarrhoea, classical dysentery involving the large intestine and combination with both. They also reported that the organism may be involved in traveler's diarrhoea. Moreover, *Aer-*

omonas species were isolated from stools of adults and children suffered from diarrhoea and the cultures taken revealed enterotoxin production (*Schmitt, et.al.1998;Merino et.al.1995 and Namdari and Bottone,1990*). Long term studies on diarrhoeaic patients,(*Burke et.al. 1983*) found that *Aeromonas Hydrophila,Aeromonas Caviae and Aeromonas Sobria* were the main species isolated from these cases.In addition,*Burke et.al.,(1984)* isolated heat stable cytotoxic and enterotoxic active strains from patient diarrhoeaic stools consumed fish products and other marine products. Aeromonas bacteraemia after bowel infection was recorded by *Huys et.al., (1995)* in immunocompromised hosts with underlying malignancy as leukaemia and fatality rate of 61%.Skin lesions as ecthymogangangrenosium, associated with septicaemia, aggressive infection does not respond to treatment with antibiotic and incomplete abortion may also occur which require massive doses of antibiotic and extreme surgical debridement(*Hobbs and Diane, 1993*). Therefore this study was planned to elucidate the contamination of frozen beef, poultry and fish meat, with *Aeromonas spp* and to obtain some data about the possible risks for consumers .

MATERIALS AND METHODS

A grand total 90 random samples of frozen beef, poultry and fish (30 of each) were collected from different supermarkets at different localities in Kafr-Elshiekh Governorate. The samples were collected under good hygienic conditions and transferred in an ice box to the laboratory with minimum time of delay. The collected samples were examined quantitatively for incidence of *Aeromonas* species according to *Schmitt et.al.,(1998) and Neyts et.al.,(2000)*.

Quantitative examination:

30 grams of each sample were according to *polumbo et.al, (1985)* aseptically transferred to a sterile stomacher bag contains 270ml of peptone salt solution for preparing the original dilution (10⁻¹). Then 10 fold serial dilution were prepared.Two selective cultural media were used for enumeration,the first Ampicillin Dextrin Agar (ADA) and the second modified Bile Irgan Brilliant Green Agar(mBIBGA)each of 0-1 ml from the original and other serial dilutions were spread over the surface of each solidified media using sterile glass spreader(*Polumbo et.al.,1985*).Both media were

incubated at 30⁵C for 24 hours. After incubation typical colonies were enumerated and three typical colonies were transferred onto Tryptic Soy Agar slants and incubated at 30⁵C for 24 hours . The cultures identified by oxidase, catalase test, Gram stain reaction, biochemical characteristics on mannitole , arginine , ornithine , gas from glucose , csculin hydrolysis and reaction on triple sugar iron agar .

RESULTS

Table (1): The log mean value of Aeromonas count using two selective media from the examined samples n = 90

Samples	No. of the v + samples	Ampicillin Dextrine Agar			Modified Bile Irgasan Brilliant Green Agar		
		Max.	Min.	Mean	Max.	Min.	Mean
Frozen meat	30	3.69	2.23	3.39	2.43	1.00	2.15
Frozen poultry	30	4.53	2.18	4.23	2.34	1.25	2.10
Frozen fish	30	5.38	3.46	5.10	2.66	1.40	2.38

Table (2): Incidence of Aeromonas species isolated from frozen beef, poultry and fish n = 90

Species samples	Aeromonas hydrophphilla		Aeromonas Sobria		Aeromonas Caviae	
	No.	%	No.	%	No	%
Frozen Beef	14	46.67	9	30.0	7	23.33
Frozen Poultry	15	50.0	10	33.3	5	16.7
Frozen Fish	18	60	7	23.3	5	16.7

RESULTS & DISCUSSION

Table (1) Reveales that the log mean values of *Aeromonas* in frozen beef, poultry and fish samples on Ampicillin Dextrine Agar media ranged from 3.69 to 2.23 with a mean value 3.39; 4.53 to 2.18 with a mean value of 4.23 and from 5.38 to 3.46 with a mean value of 5.10, respectively. While the log mean values of *Aeromonas* counts on modified Bile Irgason Brilliant Green Agar were ranged from 2.43 to 1.00 with a mean value 2.15; 2.34 to 1.25 with a mean value of 2.10; and from 2.66 to 1.40 with a mean value of 2.38, respectively.

The obtained results reveal that Dextrine Agar medium was more selective and detected more *Aeromonas* positive samples than the mBIBGA that which antagonize the results obtained by *Neyts, (1995)*. The fish samples showed high *Aeromonas* count than poultry and beef samples and this prove that the *Aeromonas spp.* Is more aquatic inhabitant and the seafood is considered as the main source for *Aeromonas* bacteria and the beef and poultry were contaminated from the surrounding environment (*Merino et.al., 1995 and Okrend et.al. 1987*). Nearly similar results were reported by (*Gobate and Jemmi, 1993, Gobate and Jemmi, 1995, Bonnic and Okrend, 1998 and Kumar et.al., 000*). Concerning the incidence of *Aeromonas hydrophila* group, it was noticed that higher incidence (60 %) was recorded with fish followed by poultry (50%) and beef (46.67%) on the other hand, *Aeromonas Sobria* was higher in poultry (33.3%) than beef (30.0%) and fish (23.3%), (Table 2). Moreover, *Aeromonas caviae* was higher (23.33%) in beef than poultry (16.7 % for each). Nearly similar incidence results of *Aeromonas hydrophila* group were reported by (*Buchanan and Palumbo, 1985, Gobat and Jemmi, 1993, Gobat and Jemmi, 1995, (Schmitt et.al., 1998 and Neyts et.al., 2000)*). The results of this work indicated that *Aeromonads* are present in the examined samples and the use of more than one media gave best results which supported by what they said by *Neyts et.al., (2000)*.

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مدى تواجد ميكروبات الأيرومونات فى لحوم الأبقار والدواجن والأسماك المجمدة

د . يحيى السيد على محمود - د . نادر يحيى مصطفى

تم جمع 90 عينة من لحوم الأبقار والدواجن والأسماك المجمدة (30 من كل نوع) من أسواق مختلفة بمحافظة كفر الشيخ. وتم نقلها إلى المعمل فى كولمان للفحص الكمي والنوعي لميكروب الأيرومونات وأوضحت نتائج الفحص الكمي أن المتوسط اللوغاريتمى للميكروب فى عينات اللحوم والدواجن والأسماك 3.39 و 4.23 و 5.10 على الترتيب باستخدام الأمبسيلين دكسفين أجار - بينما كان المتوسط اللوغاريتمى بالفحص الكمي باستخدام البييل أجارسان بريلينت جرين المعدلة كالاتى 2.15 و 2.10 و 2.38 فى عينات اللحوم والدواجن والأسماك على الترتيب. ودلت نتائج الفحص على أن استخدام البييل أجارسان بريلينت جرين أجار المعدلة أكثر دقة فى عد ميكروب الأيرومونات من استخدام الأمبسيلين دكستين أجار. كما أوضحت النتائج أن لميكروب الأيرومونات هيدروفيليا تواجد بنسبة 46.67% و 50.0% و 60.0% فى عينات اللحوم والدواجن والأسماك على الترتيب أما بالنسبة لميكروب الأيرومونات سوبريا تواجد بنسبة 30% و 33.3% و 23.3% فى عينات اللحوم والدواجن والأسماك على الترتيب. ودلت النتائج على أن نتائج تواجد ميكروب الأيرومونات كافية 23.33% و 16.7% و 16.7% على الترتيب فى عينات اللحوم والدواجن والأسماك وقد نوقشت النتائج التى تم الحصول عليها وتم مقارنتها بنتائج الباحثين السابقين وكذلك تم مناقشة الأهمية الصحية لهذا الميكروب.