

## ISOLATION AND IDENTIFICATION OF BACTERIAL CAUSATIVE AGENTS FROM CATTLE WHICH SUFFER FROM RESPIRATORY MANIFESTATIONS

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### ABSTRACT

*This investigation was carried out to determine the incidence of bacterial respiratory pathogens in cattle. A total 300 samples were collected from the respiratory system of 200 sample of 100 slaughtered cattle, 50 apparently healthy cattle and 50 animals with respiratory affections.*

*Bacteriological examination of these samples from recent slaughter and living cattle resulted in isolation of 150 (65.22%) and 80 (37.78%), respectively. The results showed that 230 animals were positive with an incidence of (76.67%), of which some cases showed mixed infection and few had one bacterial isolate in a pure form in culture. The total numbers of isolates were 214 of which 70 (28.09%). Staphylococcus spp. 90 (42.06%), E. coli, 25 (11.66%) Proteus spp. 15 (7.01%), Pasteurella spp., 9 (4.21%), Citrobacter spp. and 15 (7%) Pseudomonas spp. Besides, the antibiotic sensitivity test was done in vitro on some pathogenic respiratory bacterial isolates. Most microorganism were sensitive to enrofloxacin.*

### INTRODUCTION

Cattle are considered the most important farm animals, cattle are the main source of milk, meat and hides. Cattle are susceptible to many respiratory pathogens, the most serious of them are the bacterial pathogens (*Blood and Henderson, 1979*).

Many aerobic bacterial agents causes respiratory disorders in cattle. *Actinomyces pyooens*, *P. haemolytica*, *E. coli*, *Ps. aeruginosa*, Haemophilus and Salmonella were incriminated in the aetiology of respiratory diseases in cattle (*Fischer, 1975, Garoiu et al., 1982, Sing and Singh, 1980 and Barboura, 1997*).

Indole-negative pasteurllae, producing dermonecrotic pasteurella toxin were isolated from the nose of calves in a herd with enzootic bronchopneumonia *Ehlers et al. (1993)*. On the other hand, *virtalal et al. (1996)* suggested that a synergistic effect between mycoplasma species and *P. multtiocida* which were isolated from respiratory samples of cattle.

*P. muttocida* and *P. haemolytica* were covered from pneumonia lungs of stressed feeder calves than died from bovine respiratory tract disease, (*Putdy et al., 1997*). Six strains of *Corynebacterium* spp. were isolated from 137 slaughtered cattle with an incidence of 4.5% *El-Enbaw (1986)*.

Examination of 33 diseased cattle lungs were done by *Collins et al. (1988)* and the infection was attributed to *Pasteurella* species, mycoplasma and *S. aureus*.

This study was done to show the predominant respiratory bacteria among cattle.

## MATERIALS AND METHODS

A total of 300 samples were collected from respiratory system of cattle (200 samples were from 100 slaughtered cattle, 50 of apparently healthy cattle and 50 from diseased ones). Samples were collected from cattle were nasal swabs, tracheal swabs, laryngeo tracheal swabs and

heart blood. The samples collected by sterile cotton swabs. From freshly slaughtered cattle and immediately transferred to the laboratory for cultivation. Lung samples were collected from congested lung areas of the slaughtered cattle, in sterile plastic bags and transported on ice box for bacteriological examination. Collected samples were inoculated onto enrichment media (peptone water, nutrient media and loffers media), then inoculated onto nutrient agar, blood agar, mannitol sal agar and MacConkey agar plates and incubated aerobically at 37°C for 24-48 hours. Suspected growing colonies were characterized on the basis of morphological and colonial appearance according *Finegold and Martin, (1982)*. The pure colonies were identified biochemically according to *Koneman et al. (1983)* and *Kries and Holt (1989)*. The pathogenicity and virulence of some isolated strains *P. multocida* to mice were determined according to *Wilson and Miles (1975)*. Susceptibility of the most predominant pathogenic isolates to different chemotherapeutic agents was tested the disc diffusion method according to *Finegold and Matin (1982)*.

## RESULTS

Table (1) results revealed that the bacterial isolates were 150 (65.22% and 80 (34.78%) in recent slaughtered and living cattle animals respectively. Table (2) illustrated that the number and incidence of bacterial isolates in 100 tracheal swabs and 100 lung tissues was 80 (53.33%) and 70 (46.67%), respectively. While Table (3) revealed that number and incidence of bacterial positive samples in apparently and diseased cattle were 0 (44.44%) and 50 (55.56%).

**Table (1):** Rate of bacterial isolation from respiratory system of cattle.

Source and types of samples	No. of samples	Positive		Negative	
		No	%	No	%
Slaughtered Cattle (different parts of resp. systems)	200	150	75	50	25
Living cattle (nasal swabs)	100	70	70	30	28.57
<b>Total</b>	<b>300</b>	<b>230</b>	<b>76.67</b>	<b>70</b>	<b>23.33</b>

**Table (2):** Types of infection and incidence of bacteriological positive cases in slaughtered cattle.

Source and types of samples	Total no. of samples	Positive		Negative	
		No	%	No	%
Trachea swabs	100	80	53.33	20	40
Lung tissues	100	70	46.67	30	60
<b>Total</b>	<b>200</b>	<b>150</b>	<b>75</b>	<b>50</b>	<b>25</b>

N.B. No. of isolates ( %).

**Table (3):** Results of bacteriological examination of living cattle.

Source and types of samples	Total no. of samples	Positive		Negative	
		No	%	No	%
Apparently healthy cattle	50	40	44.44	10	100
Diseased cattle	50	50	55.56	0	0
<b>Total</b>	<b>100</b>	<b>90</b>	<b>90</b>	<b>10</b>	<b>100</b>

Table (4) revealed the presence of *E. coli* 90 (42.06%) and *Staph. aureus* 60 (28.04%) and *Citrobacter* 9 (4.21%).

Table (5) illustrate that bacterial isolates in slaughtered cattle were 175 (58.41%) and in living animals were 89 (41.59%).

**Table (4):** The incidence and occurrence of pathogenic and potentially pathogenic bacteria in samples from examined cattle.

Bacterial species	Slaughtered (200)		Living cattle (100)				Total	
	No.	%	Healthy cattle (50)		Diseased ones (50)		No. of isolates	Isolation rate %
			No.	%	No.	%		
<i>S. aureus</i>	50	40	0	0	0	15.6	60	28.04
<i>P. multocida</i>	5	4	1	4	5	7.81	11	5.14
<i>P. haemolytica</i>	3	2.4	1	4	0	0	4	1.87
<i>Ps. aeruginosa</i>	0	0	0	0	15	23.44	15	7.00
<i>E. coli</i>	50	40	15	60	25	39.06	90	42.06
Proteus	15	12	5	20	5	7.81	25	11.68
Citrobacter	2	1.6	3	12	4	6.25	09	4.21
<b>Total</b>	<b>125</b>	<b>100</b>	<b>25</b>	<b>100</b>	<b>64</b>	<b>100</b>	<b>214</b>	<b>100</b>

**Table (5):** The total bacterial groups in examined cattle.

Bacterial group	Slaughtered cattle (200)		Living ones (100)		Total (300)	
	No.	%	No.	%	No.	%
<i>Staph. aureus</i> *	50	40	10	11.23	60	28.03
<i>Pasterulla</i> spp.**	8	6.20	7	7.89	15	7.50
<i>Ps. aureuginos</i> **	0	0	15	16.85	15	7.50
<i>E. coli</i> **	50	40	40	44.90	90	42.05
Proteus**	15	12	10	11.23	25	20.56
Citrobacter**	2	1.52	7	7.84	9	4.20
<b>Total</b>	<b>125</b>	<b>58.41</b>	<b>89</b>	<b>41.59</b>	<b>214</b>	<b>100</b>

\* Gram positive group.

\*\* Gram negative group.

**Table (6):** Results of antibiotic sensitivity test to some pathogenic representative bacterial strains (8 isolates of each type m.o.).

Antibiotic disc	1		2		3		4		5		6		7	
	R	S	R	S	R	S	R	S	R	S	R	S	R	S
Ampicillin	5	3	8	0	8	0	4	4	8	0	8	0	0	0
Tetracycline	8		3	5	8	0	4	4	8	0	8	0	0	0
Gentamycine	8	0	5	3	8	0	8	0	8	0	8	0	0	0
Streptomycine	3	5	4	4	8	0	8	0	8	0	8	0	0	0
Erythromycine	4	4	6	2	8	0	8	0	8	0	8	0	0	0
Enerofloxacin	0	8	0	8	0	8	0	8	0	8	0	8	0	8

R = Resistance

1= *Staph. aureus*3 = *Ps. eruginosa*6 = *Proteus* spp.

M = Moderate

2 = *Pasteuriella* spp.5 = *E. coli*7 = *Citrobacter* spp.

S = Sensitive

## DISCUSSION

The results emphasize the role of bacterial pathogens as a complicating cause in respiratory diseases in cattle. The results agreed with the obtained ones by *Palatary and Newhall (1985)*.

Examination of 300 samples (Lung and Nasal swabs) from affected cattle revealed that 76.67% of them were harboured pathogenic bacteria such high incidence of isolation was also reported by *Zaid (1996)*.

The obtained results revealed that *Staph. aureus* isolated percentage 28.09% were agreed with the results obtained by *Abo-Aikhail and El-Naenaey (2003)*. While *E. coli* isolates percentage (42.06%) was higher than obtained by *Abo-Aikhail and El-Naenaey (2006)* due to these cattle reared and sever stress and less nutrition some of strains of *Pasteuriella* species were resistant and some other ones were sensitive to ampicillin, tetracycline, gentamycine, strepomycine and erythromycine, these results are like to results obtained by *Ungureanu et al. (1988)*.

*Pasteurella* species incidence(7.01%)in this study was high to obtained by *Al-Human et al. (2004)* due to sever stress factors affected on the cattle in our study.

The incidence of other obtained bacterial agents were 7.5% (*Ps. aureuginosa*), 2.56% (*Proteus* species) and 4.20% (*Citrobacter* species), which nearly agreement with the other one obtained by *Abo-Aikhail and El-Naenaey (2003)*.

This study results were revealed that most of the examined strains were all resistant to Ampicilline tetracycline, genamycine, streptomycine and Erythromycine which agreed with *Abo-Aikhail and El-Naenaey (2003)* and more sensitive to enerofloxacine.

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## عزل وتصنيف المسببات البكتيرية المعزولة من الأبقار التي تعاني أعراض تنفسية

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أجريت هذه الدراسة لمعرفة دور البكتريا فى الإصابات التنفسية للماشية وقد تم تجميع 300 عينة من الجهاز التنفسي بهذا المرض الذي يصيب الماشية منها 200 عينة من الماشية المذبوحة، 50 عينة من الماشية السليمة ظاهريا، 50 عينة من الحيوانات المصابة بأعراض تنفسية. وقد تبين من نتائج هذه الدراسة أوضحت بأن عدد العينات المصابة بالمسببات البكتيرية كان 150 (65.22%) من إجمالي 200 عينة مأخوذة من أبقار حديثة الذبح، 80 (34.78%) من حيوانات سليمة ظاهريا (عدد 50)، وعدد الحيوانات المصابة بالمسببات البكتريا 230 حيوان بنسبة (76.67%) بعض الحالات المصابة تم عزل منها أكثر من ميكروب بكتيرى والأخر واحد فقط، كما أوضحت هذه الدراسة أنه تم عزل أنواع عديدة من الميكروبات البكتيرية كالتالي: الميكروب العنقودى 60 (28.04%)، القولوى 90 (42.06%) ، البروتيس 25 (11.66%)، والباستيرلا 15 (7.01%)، ستروبكتر 9 (4.21%) وأيضا ميكروب السيدوموناس إريجنوزا 15 (7.0%) وتبين من هذه الدراسة أن أغلب كل العزلات البكتيريا حساسة لمضاد الإنترفولوكساسين ومعظمها غير حساسة لمضاد الأمبسلين.