

## DETERMINATION OF BACTERIAL SPECIES PATHOGENICITY INVOLVED IN EGG INCUBATION PATHOLOGY

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**Abstract** - For 73 bacterial strains, represented by *Proteus vulgaris* (21 strains), *Escherichia coli* (29), *Staphylococcus aureus* (29) and *Salmonella typhimurium* (5), isolated from embryos and chickens dead after hatching, we have determined *in vivo* pathogenicity. The culture medium incubated for 24 hours was inoculated intraperitoneally in mice. From the 73 bacterial strains, 52 of them (65.77%) proved to be pathogenic, which killed mice, according to the bacterial strain, during 18-72 hours, while 25 strains (34.23%) were not pathogenic. In some bacterial strains without pathogenicity, inoculated in mixture (*Proteus vulgaris* + *Escherichia coli* and *Proteus* + *Staphylococcus aureus*), we noticed a synergic reaction expressed through pathogenicity in mice.

**Key Words:** bacteria, pathogenicity, incubation

**Rezumat - Determinarea patogenității speciilor bacteriene, implicate în patologia infecțioasă de incubație.** La un număr de 73 tulpini bacteriene, reprezentate de *Proteus vulgaris* (21 tulpini), *Escherichia coli* (29), *Staphylococcus aureus* (29) și *Salmonella typhimurium* (5), izolate de la embrioni și de la puii de găină morți după ecloziune, s-a determinat patogenitatea „*in vivo*”. Cultura de 24 ore în bulion nutritiv s-a inoculat intraperitoneal la câte doi șoareci. Din cele 73 de tulpini, 52 (65,77%) s-au dovedit patogene, omorând șoarecele, în funcție de specia bacteriană, în decurs de 18-72 de ore, iar 25 (34,23%) de tulpini nu s-au dovedit patogene. La unele tulpini nepatogene, inoculate în amestec (*Proteus vulgaris* + *Escherichia coli* și *Proteus* + *Staphylococcus aureus*) s-a observat o relație de sinergism, exprimată prin patogenitate pentru șoareci.

**Cuvinte cheie:** bacterii, patogenitate, incubație

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## INTRODUCTION

The causes of the mortality in embryos and chickens at hatching are either incubation errors, or low egg quality (Bergdoll, 1998; Cooper & Gerard, 1994). Many endo- or exogenous infectious factors may also be found, which determine a significant increase in the mortality of embryos and chickens at hatching. In 1963, Kostakev (quoted by Perianu, 2003) has found a case of septicaemia with *Streptococcus faecalis* and *Streptococcus faecium*, in embryos and chickens after hatching, supposing that main infection source was intestine, with consecutive dissemination into ovary and oviduct. In 1965, Broad et al. (quoted by Mânzat, 2001) described egg infection with *Proteus vulgaris*, *Alcaligenes faecalis* and *Pseudomonas fluorescens*.

The present paper has shown the investigations conducted on the determination of *in vivo* pathogenicity in bacterial strains isolated from embryos and chickens dead after hatching.

## MATERIALS AND METHODS

The determination of pathogenicity was done on 73 bacterial strains isolated from embryos and chickens after hatching. The investigated strains belonged to the following bacteria species: *Proteus vulgaris* (21 strains), *Staphylococcus aureus* (18 strains), *Escherichia coli* (29 strains) and *Salmonella typhimurium* (5 strains).

For the determination of *in vivo* pathogenicity, the cultures in liquid medium, for 24 hours, have been inoculated intraperitoneally into two white mice, at a dose of 0.2 ml. After inoculating the bacterial cultures, mice were kept under observation for 10 days.

## RESULTS AND DISCUSSION

Investigations on the determination of *in vivo* pathogenicity in the 73 bacterial strains isolated from embryos and chickens dead after hatching led to the following results (*Table 1 and Figure 1*).

The analysis of obtained results has shown that from 73 investigated strains, 52 of them (65.77%) were pathogenic, killing the mice after intraperitoneal inoculation. The weight of pathogenic strains was different according to bacterial species. The highest number of pathogenic strains of 21 (72.45%) was registered in *Escherichia coli*, followed by *Staphylococcus aureus*, 13 strains (72.43%), *Proteus vulgaris*, 13 strains (61.91%) and *Salmonella typhimurium*, two pathogenic strains (40.00%).

The presence and isolation of non-pathogenic strains, at different percentage (27.55-60.00%), according to bacterial species, explained that the mortality of embryos and chickens after hatching was also determined by other non-infectious factors.

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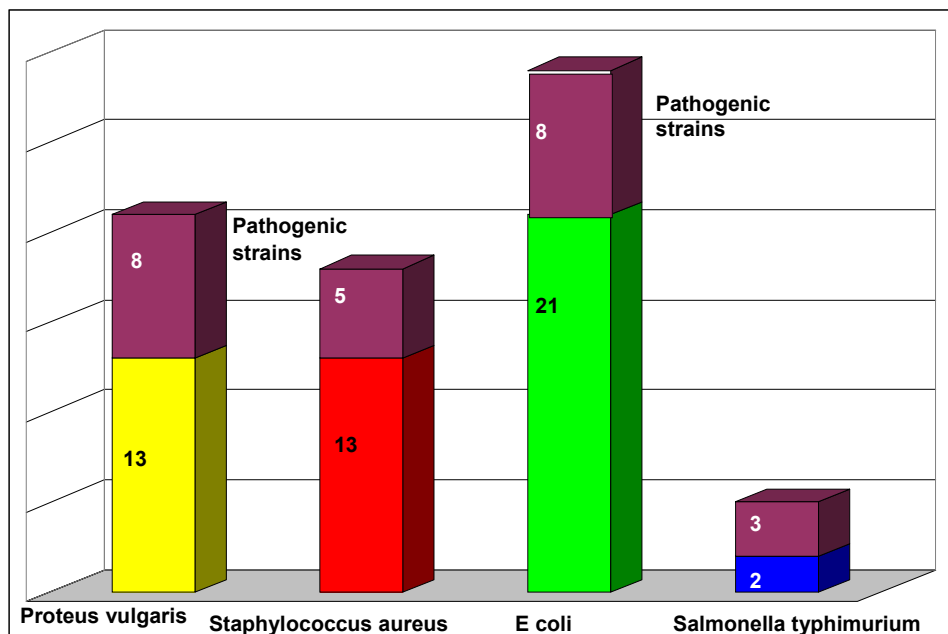


Fig. 1 – Results of determining *in vivo* pathogenicity of bacterial strains

Table 1

Results of determining *in vivo* pathogenicity of bacterial strains

No	Bacterial species	Number of strains	Dose/ Inoculation mode	Results			
				Pathogenic strains		Non-pathogenic strains	
				No.	%	No.	%
1.	<i>Proteus vulgaris</i>	21	0.2/i.p	13	61.91	8	38.09
2.	<i>Staphylococcus aureus</i>	18	0.2/i.p.	13	72.23	5	27.77
3.	<i>Escherichia coli</i>	29	0.2/i.p.	21	72.45	8	27.55
4.	<i>Salmonella typhimurium</i>	5	0.2/i.p.	2	40.00	3	60.00
<b>Total</b>		<b>73</b>		<b>52</b>	<b>65.77</b>	<b>25</b>	<b>34.23</b>

## CONCLUSIONS

The investigations on the determination of *in vivo* pathogenicity in bacterial strains isolated from embryos and chickens dead after hatching led to the following conclusions:

From the 73 isolated strains belonging to species *Proteus vulgaris* (21), *Staphylococcus aureus* (18), *Escherichia coli* (29) and *Salmonella typhimurium* (5), 52 strains (65.77%) were pathogenic for mice and 25 strains (34.23%) were not pathogenic.

The weight of pathogenic strains was different, according to the bacterial species.

The highest number of pathogenic strains, 21 (72.45), was registered in *Escherichia coli*, and the lowest number, 8 (38.09%), in *Proteus vulgaris*.

The presence and isolation of non-pathogenic strains demonstrate that the death of embryos and chickens after hatching is also caused by non-infectious factors.

The non-pathogenic strains, inoculated in mixture, homogenized 1/1 (*Proteus vulgaris* + *Escherichia coli* and *Proteus vulgaris* + *Staphylococcus aureus*) had a synergic reaction, becoming pathogenic for mice.

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