

## Isolation and Identification of Staphylococci from Intestinal Tract of Domestic Animals, chickens and Man

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### ملخص البحث

بلغت جملة العينات التي تم إختبارها 422 عينة منها 292 أمعاء و130 عينة براز. وعزلت من العينات 95 عزلة بكتيرية تنتمي إلى 11 نوع من جنس المكورة العنقودية، تم تقسيمها إلى مجموعتين: المجموعة السالبة لإختبار تخثر البلازما و الحساسية للنوفوبيوسين وتضم تسعة أنواع، والمجموعة السالبة لإختبار تخثر البلازما والمقاومة للنوفوبيوسين وتضم نوعين.

### Summary

Ninety-five isolates belonging to 11 species of the genus *Staphylococcus* were isolated from 422 samples (292 intestines and 130 stool samples). They were all Coagulase-negative Staphylococci and were divided into novobiocin sensitive (nine species), and novobiocin resistant (two species) groups.

### Introduction

*Staphylococcus* was firstly described in pus by Ogston in 1881 and cultured by Rosenbach in 1884 (Merchant and Paker, 1971). Historically, Staphylococci have been divided into coagulase – positive and coagulase – negative on the basis of their coagulase reaction (Devriese, 1984). They are widespread in nature and their major habitat is believed to include skin, skin glands and mucous membranes of mammals and birds. However, they are sometimes found in other parts of the body such as the pharynx, mouth, mammary glands, intestinal and urinary tracts (Kloos, 1990). Moreover, staphylococci are found in the alimentary tract of man and animal and, thus can easily contaminate meat (Gracy, 1968; Gerrad and Mallion, 1980; Hardt and York, 1990).

This study was carried out to determine prevalence of staphylococci in the intestines of domestic animals, chickens and man.

### Materials and methods

A total of 292 intestines were collected from cattle, sheep, goats, chickens and camels. Also 130 faecal samples were collected;80 of them from humans and 50 from equines. The specimens were labelled, placed in an ice box and immediately transferred to the laboratory.

### Isolation of bacteria:

All samples were cultured onto Blood Agar (Oxoid, CM55) and

MacConkey Agar (Oxoid, CM3) and incubated aerobically at 37°C for 24 hrs. Cultures were examined with the naked eye for growth and colonial morphology as well as any changes in the media. Purification was done by several sub-culturing of typical and well-isolated colonies. The resulting growth was checked for purity by staining with Gram's stain and microscopical examination.

#### **Identification of bacteria**

Identification of the isolated staphylococci, including slide and tube coagulase tests, was carried out according to Barrow and Feltham (1993).

#### **Novobiocin sensitivity test:**

This was determined by the standard disc diffusion method (Cruickshank *et al.*, 1975). Following drying of Nutrient Agar (Oxoid) plates, two ml of diluted culture were spread evenly over the surface of the media. Oxoid discs of novobiocin (5mg) were applied to the surface of the medium and pressed gently using sterile forceps. They were incubated at 37°C for 24-28 hours and zones of inhibition were measured in mm. Sensitivity to novobiocin was indicated by production of an inhibition zone of more than two mm in diameter, measured from the disc margin.

#### **Results**

The rates of isolation of staphylococci from the intestines of domestic animals, man and chickens are shown in Table 1. Ninety-five isolates of staphylococci were isolated from 422 intestinal specimens and faecal samples. They belonged to 11 species, viz *S. capitis*, *S. capitis* subsp. *ureolyticus*, *S. carnosus*, *S. caseolyticus*, *S. epidermidis*, *S. hyicus*, *S. hominis*, *S. sciuri*, *S. simians*, *S. simulans* and *S. xylosus*.

From the results obtained, it is clear that *S. caseolyticus* showed the highest prevalence (Fig.1). In cattle, 31 isolates (62%) of staphylococci that belonged to *S. caseolyticus* (93.5%), *S. hominis* (3.2%) and *S. sciuri* (3.2%) were identified during this study. Four species were isolated from sheep; they were *S. caseolyticus* (64.7%), *S. carnosus* (17.6%), *S. simians* (11.8%) and *S. hyicus* (5.9%). Similarly, *S. caseolyticus* (62.5%), *S. simians* (31.3%) and *S. hyicus* (6.3%) were also isolated from goats. The staphylococci isolated from chickens were members of *S. caseolyticus* (62.5%), *S. simians* (13.8%), *S. hyicus* (12.5%) and *S. xylosus* (6.3%). As for equines, *S. capitis* (50%), *S. capitis* subsp. *ureolyticus* (41.7%) and *S. simulans* 8.3% were isolated and identified. *S. caseolyticus* and *S. carnosus*, one isolate each, from camels, whereas only one *S. epidermidis* was isolated from humans.



**Table 1: Prevalence rate of coagulase-negative staphylococci in the intestines of man, domestic animals and chickens examined.**

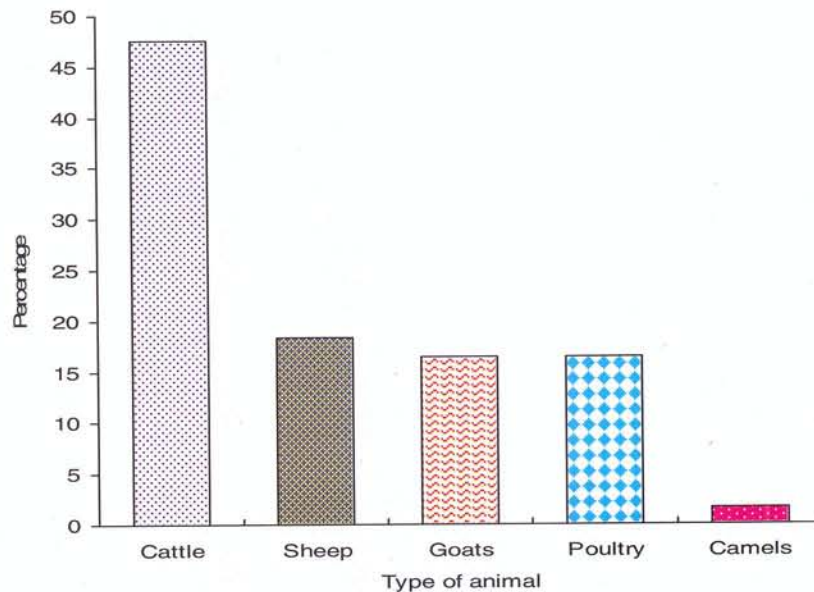
Source	No. samples examined	No. positive for <i>Staphylococci</i>	Prevalence rate (%)
Cattle	50	31	62.0
Sheep	80	17	21.3
Goats	80	16	20.0
Chickens	50	16	32.0
Camels	32	02	06.3
Equines	50	12	24.0
Humans	80	01	01.3
Total	422	95	22.5

### Discussion

The results obtained from this study showed that all isolates were coagulase negative staphylococci and this is in agreement with the finding of Husebye *et al.* (1992) who included coagulase negative staphylococci in the normal microbial flora of the upper gastro-intestinal tract of healthy old people. Similarly, Czironk *et al.*, (1997) have reported that overgrowth by Gram-positive organisms, mainly coagulase-negative staphylococci, had occurred in the intestine and other body sites. In humans, the isolation of *S. epidermidis* reported in this study is in agreement with Goncharova *et al.* (1989) who have isolated the same species from the intestine of children. Apart from humans, *S. epidermidis* was also isolated from the gut of rabbits (Canganella *et al.*, 1992).

According to the results of this study, we may suggest that staphylococci act as normal microbial flora of the intestine and have usually no pathogenic role but under certain circumstances such as lowered host resistance or an intestinal injury, a disease may occur. Carter (1986) has mentioned that disturbances of the intestinal bacterial microbial flora subsequent to antibiotic therapy may allow establishment and multiplication of disease producing organisms, such as staphylococci, resulting in staphylococcal enteritis.

In the present study, the rate of isolation of staphylococci from the intestines was higher in animals than man; this might be due to the nature of animal feeds which are exposed to contamination by dust and soil. This is particularly observed in cattle because of their wide and opened grazing areas and for this reason the rate of isolation was higher in cattle than in any other species of animals examined. On the other hand, human diet is well cared for, hygienically prepared and, unlike that of animals, is seldom



**Fig. 1: The prevalence of *Staphylococcus caseolyticus* in the intestines of some domestic animals and chickens.**

exposed to contamination. Thus the rate of isolation of Staphylococci from the human intestine was very low.

#### Acknowledgements

The authors thank the Director General, Animal resources Research Corporation for permission to publish this article.

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