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Short Communication / *Kısa Bilimsel Çalışma*

The aerobic bacterial flora of the nasal cavity in healthy Anatolian water buffalo calves

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Summary: Nasal swab samples from clinically healthy Anatolian water buffalo calves, breeding in Afyonkarahisar province of Turkey, were collected to determine the bacterial microflora of their nasal mucosa. A total of 160 samples were examined and 165 bacterial isolates were identified by using standard microbiological and biochemical methods. Ninety-seven isolates were detected to Gram positive bacteria (58.8%) and 68 isolates to Gram negative bacteria (41.2%). Ten bacterial genera including *Staphylococcus*, *Micrococcus*, *Corynebacterium*, *Arcanobacterium, Bacillus*, *Escherichia*, *Neisseria*, *Moraxella*, *Pasteurella* and *Mannheimia* were isolated. *Staphylococcus epidermidis* (48.8%), *Staphylococcus aureus* (33.8%), *Mannheimia haemolytica* (25.0%) and *Pasteurella multocida* (17.5%) were determined as the most frequently isolated species from the animals sampled. Also, the isolation rates of *S. epidermidis*, *S. aureus*, *M. haemolytica* and *P. multocida* among the 165 bacterial isolates recovered from samples were 23.6%, 16.3%, 12.1% and 8.4% respectively.

Key words: aerobic bacterial flora, nasal cavity, water buffalo

Sağlıklı Anadolu manda yavrularında nazal boşluğun aerobik bakteriyel florası

Özet: Türkiye'nin Afyonkarahisar ilinde yetiştirilen klinik olarak sağlıklı Anadolu manda yavrularından nazal mukozanın bakteriyel mikroflorasını belirlemek amacıyla nazal sıvap örnekleri toplandı. Toplam 160 örnek incelendi ve 165 bakteriyel izolat standart mikrobiyolojik ve biyokimyasal yöntemler kullanılarak identifiye edildi. Doksanyedi izolat Gram pozitif (%58.8), 68 izolat Gram negatif (%41.2) olarak belirlendi. *Staphylococcus*, *Micrococcus*, *Corynebacterium*, *Arcanobacterium, Bacillus*, *Escherichia*, *Neisseria*, *Moraxella*, *Pasteurella* ve *Mannheimia* cinslerini içeren 10 cins izole edildi. *Staphylococcus epidermidis* (%48.8), *Staphylococcus aureus* (%33.8), *Mannheimia haemolytica* (%25.0) ve *Pasteurella multocida* (%17.5) örneklenen hayvanlardan en sık izole edilen türler olarak belirlendi. Ayrıca, *S. epidermidis*, *S. aureus*, *M. haemolytica* ve *P. multocida* türlerinin örneklerden elde edilen 165 bakteriyel izolat arasındaki izolasyon oranları sırasıyla %23.6, %16.3, %12.1 ve %8.4 şeklindeydi.

Anahtar sözcükler: aerobik bakteriyel flora, manda, nazal boşluk .

The upper part of the respiratory tract can harbour a flora of both resident and transient microorganisms. The composition of this microflora is influenced by the host species and the environment (14). Bacteria growing in the nose and throat extend downwards, when the local resistance of respiratory mucosa is lowered. This state usually cause multiple bacterial infections. Besides, several infectious agents cause respiratory tract diseases are ubiquitous in nature and normal inhabitant of the nasopharynx (10). The studies have been reported on bacterial flora of upper respiratory tract in apparently healthy animals (8, 9, 11, 12). However, the investigations have been done mainly focus on the isolation of *Pasteurella* spp. from healthy water buffalo (4, 5, 6).

The aim of this study was to determine the aerobic bacterial flora of the nasal cavity in clinically healthy Anatolian water buffalo calves.

A total of 80, clinically healthy Anatolian water buffalo calves aged 1-9 months breeding in Afyonkarahisar province of Turkey were examined. Sterile cotton swabs were used to sample the nasal cavities of the water buffalo calves. Two swabs from each animal were collected and put into Stuart transport medium. The swabs were transported to the laboratory in cool chain. Each nasal swab sample was cultured in Columbia blood agar, containing 7% of sheep blood and MacConkey agar media. The plates were incubated under aerobic conditions for 24-48 h at 37 ºC. After the incubation each different colony was examined macroscopically and microscopically. Each different colony was subcultured in blood agar media, containing 7% of sheep blood for further characterisations. Identification of microorganisms was done using standard biochemical tests according to standard manuals

(7, 13). The final identification included genus and bacterial species.

All 160 samples belong to 80 healthy water buffalo calves were cultured in Columbia blood agar, containing 7% of sheep blood and MacConkey agar. One hundred sixty-five bacterial isolates were detected on Columbia blood agar plates, 97 of these were Gram positive (58.8%) and 68 Gram negative bacteria (41.2%). Thirteen isolates were recovered from MacConkey agar plates, all of these were *Escherichia coli*. Ten different bacterial genera including *Staphylococcus*, *Micrococcus*, *Arcanobacterium, Corynebacterium*, *Bacillus*, *Escherichia*, *Neisseria*, *Moraxella*, *Pasteurella* and *Mannheimia* were isolated. The most frequently isolated species from the nasal cavity of the animals sampled were *Staphylococcus epidermidis* (48.8%), *Staphylococcus aureus* (33.8%), *Mannheimia haemolytica* (25.0%) and *Pasteurella multocida* (17.5%). Other species isolated were *E. coli*, *Bacillus* spp., *Micrococcus luteus, Arcanobacterium pyogenes, Corynebacterium bovis, Neisseria* spp. and *Moraxella bovis.* Also, the isolation rates of *S. epidermidis*, *S. aureus*, *M. haemolytica* and *P. multocida* among the 165 bacterial isolates recovered from samples were 23.6%, 16.3%, 12.1% and 8.4% respectively. The results from the isolation of the aerobic microorganisms from the nasal cavity of Anatolian water buffalo calves were showed in a Table.

This study showed that the various of bacterial flora colonized the nasal cavities a part of the upper respiratory tract of apparently healthy Anatolian water buffalo calves. In the present study, 165 bacterial isolates were identified and the Gram positive bacteria determined as dominant among the isolates. The predominating types of species in animals differ according to body niche. Most of the Gram positive bacteria isolated in this study are common commensals on the mucous membranes of upper respiratory tract of healthy animals (14). Also, the teichoic acid, found in the cell wall of Gram positive bacteria, is an important factor facilitates the colonization of these bacteria to nasal mucosa (1). Generally, it is considered that Gram negative bacteria are responsible for systemic infections (14). The water buffalo calves examined in this study were clinically healhty. It was considered that isolation of Gram positive bacteria as dominant may be associated with these reasons. This finding was in agreement with previous studies in other wild and domestic animals (3, 9, 11, 12). The investigations were done mainly focus on the isolation of *Pasteurella* spp. from healthy or with hemorrhagic septicaemia water buffalo. The percentage of healthy water buffalo's carriers of *P. multocida* were reported as 4.05% in Iran (5), 2.7% in Sri Lanka (6) and 0.4% in Malaysia (4). Similarly, *M. haemolytica* (25.0%) and *P. multocida* (17.5%) were isolated at high rate in this study in spite of the animal's healthy appearance. According to Baker (2), stress factors with or without viral infections interact to suppress the muco-ciliary clearence mechanism, which allow the proliferation of commensal bacteria in the respiratory tract.

Table. The aerobic bacteria isolated from nasal cavity of Anatolian water buffalo calves
Tablo. Anadolu manda yavrularının nazal boşluğundan izole edilen aerobik bakteriler

Genera	Species	Frequency / No. Of animals sampled	Proportion
Gram positive bacteria			
Staphylococcus	*epidermidis*	39/80	48.8%
Staphylococcus	*aureus*	27/80	33.8%
Micrococcus	*luteus*	10/80	12.5%
Corynebacterium	*bovis*	4/80	5.0%
Arcanobacterium	*pyogenes*	6/80	7.5%
Bacillus	spp.	11/80	13.8%
Gram negative bacteria			
Escherichia	*coli*	13/80	16.2%
Neisseria	spp.	12/80	15.0%
Moraxella	*bovis*	9/80	11.2%
Pasteurella	*multocida*	14/80	17.5%
Mannheimia	*haemolytica*	20/80	25.0%

In conclusion, this study provided a nucleus of information regarding bacteria encountered in the upper respiratory tract of healthy animals. None of the bacteria isolated from Anatolian water buffalo calves in this study commonly act as primary pathogens; however, *Arcanobacterium, Pasteurella* and *Mannheimia* spp. are recognized opportunistic pathogens capable of causing disease if they pass the normal defences of the host. It was considered that this study can help for the respiratory tract problems of water buffalo calves and be improved for more useful results.

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