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 swap 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 ekle 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.
Moraxella bovis. Also, the isolation rates of Bacillus carriers of buffalo. The percentage of healthy water buffalo’s spp. from healthy or with hemorrhagic septicaemia water epidermidis multocida considered that isolation of Gram positive bacteria as examined in this study were clinically healhty. It was (25.0%) and Mannheimia haemolytica cavity of the animals sampled 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 healthy. 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 clearance 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

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

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.

References


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