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**Risk factors of bovine clinical mastitis and antimicrobial resistance of mastitis-causing *Escherichia coli* in Shandong, China**

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**Abstract:**

**Background/Objective:** Culling of dairy cattle is closely related to the economic benefits of the farm. Many reasons can led to the culling of cows. Among these, mastitis is the main reason for the serious economic loss of dairy industry, and also the harm of global public health. However, little is known about cow culling situations, antimicrobial resistance and virulence factors of mastitis-causing Escherichia coli in Shandong, China.

**Methods:** A cross-sectional study was conducted in 16 randomly selected dairy herds to identify the reasons of cow culling, to assess the risk factors and to isolate the major etiological agent of clinical mastitis (CM).

**Results:** The overall culling rate of dairy cows was 25.24%. And 81.66% of the culled cows occurred before their fourth parity. The most common reasons for culling were mastitis (32.91%) and reproductive failure (28.38%). The investigated herds had CM rates ranging from 4.17 to 10.64%. Herd size, the filler material in cow bed, management of milking parlors, cleaning of quarters before milking, disinfection of teat cups every time, hygiene of breast and leg and the nipple score were identified as risk factors associated with CM. From the 101 milk samples analyzed by cultured, 92 bacteria were yielded. The predominant bacteria were Escherichia coli (31.52%), Streptococcus species (27.17%) and Staphylococcus aureus (15.22%). The majority of the E.coli isolates, which belonged to phylogeny group A, were defined as commensal strains. Virulence genes iucD was detected in 91.67% of the E.coli isolated, followed by iss (83.33%). All of the 29 E.coli isolates were resistant to at least one antimicrobials tested. Resistance to ciprofloxacin or levofloxacin was most common (100%), which might due to mutations (Ser83Leu/Asp87Asn) in the gyrA gene. Prevalence of multidrug resistance (resistance to >3 antimicrobials) was 62.07% (18/29).

**Conclusion:** This study emphasizes the need for prevention and control of mastitis to lower the culling hazard in Shandong. Moreover, it is necessary to strengthen the rational use of antimicrobials and infection control measures in dairy farms in order to reduce the emergence of drug-resistant bacteria.

**Keywords:** cow culling, bovine mastitis, antimicrobial resistance, risk factors, China