

Popular Article

Public Health Concern: MRSA (Methicillin-Resistant *Staphylococcus aureus*) on Milk and Milk Products**Pyare Lal¹, Amit Kumar Pandey², Narendra Singh Rathore², Anil Moolchandani³**¹Ph.D Scholar, Department of Veterinary Biochemistry, College of Veterinary & Animal Science, RAJUVAS, Bikaner-334001, Rajasthan, India²Assistant Professor, Department of Veterinary Biochemistry, College of Veterinary & Animal Science, RAJUVAS, Bikaner-334001, Rajasthan, India³Associate Professor, Department of Veterinary Biochemistry, College of Veterinary & Animal Science, RAJUVAS, Bikaner-334001, Rajasthan, India**Abstract**

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacterium that poses a hazard on a global scale and has been designated as a priority pathogen by the World Health Organization (WHO). Methicillin-resistant *Staphylococcus aureus* (MRSA) is more pathogenic and resistant to a wider range of antibiotics. It can cause mild to severe illnesses in humans and animals and sometime it causes death also. The epidemiology of the occurrence of MRSA infection is also quite diversified. There is numerous reports have been documented that's show the MRSA infections arising from milk and milk products and spread between farmers and other people engaged in the dairy business. Therefore, It has drawn attention as a public health concern. Farmer's milking practises and the preparation of milk for milk-based products both pose potential risks for MRSA transmission to people. Food poisoning is frequently caused by MRSA contamination of milk and milk products. When people consumed MRSA-contaminated milk and milk products pose a risk of spreading the MRSA infection.

Key Words: MRSA, Enterotoxin, HACCP, WHO, *Staphylococcus aureus*

Introduction

The spread of microorganisms that are resistant to antibiotics, such as methicillin-resistant *Staphylococcus aureus* (MRSA), is currently worsening a precarious situation. β -lactam antibiotics, a class of antibiotic medications that includes penicillin and cephalosporin, are ineffective against the bacterium MRSA. The MRSA infection can result in a number of complications, such as ventilator-associated pneumonia, chronic wound infection, bloodstream infection (bacteremia), and septic diseases, some of which can be fatal. It has been extensively reported in recent years that MRSA has been found in milk and milk products derived from animals, which has triggered public awareness regarding MRSA transmission from animal-derived foods to humans. The source of MRSA transmission has been identified as a variety of animal-derived foods, including beef, poultry, pig, dairy cow's milk, dairy sheep's milk, and dairy products.

The most common cause of mastitis in dairy cows is *Staphylococcus aureus*, particularly methicillin-resistant *Staphylococcus aureus* (MRSA). This MRSA strain can easily transfer to the milk during the milking process especially in dairy cows with subclinical mastitis. This MRSA strain can emerge from the teats of dairy cows to contaminate milk without causing organoleptic alterations in milk. There have been multiple examples of MRSA infections coming from dairy milk, milk products, and MRSA transmission between dairy industry workers and farmers. The prevalence of MRSA in cow's milk can rise as a result of unnecessary antibiotic use and substandard management of dairy farm. Earlier research has identified the hospital acquired Methicillin-resistant *Staphylococcus aureus* (HA-MRSA) and community acquired Methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infections. Another type of MRSA, known as LA-MRSA (Livestock associated Methicillin-resistant *Staphylococcus aureus*), has been discovered in recent studies. It has been demonstrated that veterinarians, breeders, workers in the dairy industry, and anybody in close contact with dairy cows are at high risk when dairy cows are infected with LA-MRSA. Human LA-MRSA infections, which are caused by milk and milk products, can cause mild to severe skin and soft tissue infections. Treatment with antibiotics may become more challenging if methicillin-resistant *Staphylococcus aureus* is present. Before the consumption of food derived from animals can eventually pose a concern to human health, LA-MRSA prevalence needs to be addressed early on. The hazard of MRSA infection cases to human

health can be reduced through research on the transmission of MRSA that is derived from foods of animal origin, such as milk and dairy products.

Public Health Importance

A common source of food poisoning is MRSA contamination of milk and milk-derived products. The presence of emesis with or without accompanying diarrhoea may be a symptom of gastroenteritis, which is clinically manifested as such. Ingestion of one or more Staphylococcal enterotoxins, which are produced in milk and milk products that have been contaminated with MRSA, is the cause of these poisoning incidents. Within 24-48 hours of the start of the symptoms, systemic poisoning resolves naturally. Although the precise prevalence is still unknown, MRSA is likely the most frequent cause of food poisoning in the United States. On selective Baird-Parker medium, the number of coagulase-positive Staphylococcus is counted along with the detection of traditional bacteria for risk evaluation in milk and milk products. After consuming milk and dairy products, it is important to monitor the disease's course, the development of toxic cells, and the existence of toxic cells. As a result, low levels of *Staphylococcus aureus* and MRSA contamination in most food products are allowed in some nations (for example, French cheese with 103 CFU/g of *Staphylococcus aureus* infection is not typically seen as posing a concern to the public's health).

Prevention of food intoxication by MRSA from milk and milk products

The increased prevalence of MRSA-related milk and milk product poisoning cases urges taking the appropriate protective measures. These safety measures must be followed to prevent contamination during food preparation, production and processing. Maintaining appropriate hygiene standards while handling, processing and milking dairy animals can greatly reduce the chance of contaminating milk and milk-based products. According to the findings of a recent study on growth requirements of *Staphylococcus aureus* and MRSA, both can grow at temperatures as low as 8 °C and a water activity of 0.867. When milk is left at room temperature for long durations, mostly at picnics or large gatherings, *Staphylococcus aureus* and MRSA can proliferate and create Staphylococcal enterotoxin (SE), which causes milk poisoning in a significant number of persons. Staphylococcal enterotoxin produced by MRSA is extremely resistant to heating and pasteurisation. Heating milk for an hour can lower the amount of toxins, but only autoclaving at 15 psi for 20 minutes can totally remove the toxin. Home salted cheese has a higher risk of MRSA contamination because MRSA is known to grow well on salt medium. Due to the risks of MRSA

contamination in milk and milk products, it is important to offer counselling to industrial workers, breeders, and the public in general.

Conclusion

Milk and milk products are worked as potential vehicles to spread MRSA. If milk and milk products are infected with MRSA, enterotoxins can be detected in milk and milk products that is a significant public health risk associated with the MRSA's multidrug resistance and its enterotoxigenic qualities. In order to produce milk and milk products that are of high quality and safe for consumption, hygiene monitoring in milk processing and handling must be done regularly. To ensure the quality and safety of milk and milk products, it is crucial to implement good manufacturing practises and the hazard analysis critical control point (HACCP) system.

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