

Determination of Antibiotic Residues in Milk

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ABSTRACT

Antibiotic residues refer to the remnants of antibiotics, their metabolites, or by-products found in animal products such as meat, milk, and eggs following the application of antibiotics. Milk quality can be impaired due to antibiotic residues surpassing the Maximum Residue Limit (MRL), leading to serious health concerns worldwide and in Sri Lanka, including antibiotic resistance and other adverse effects. Since milk is a highly consumed product globally, to guarantee its safety, it is essential to conduct thorough testing to detect and quantify these residues. This study aimed to investigate the presence of amoxicillin, a commonly utilized veterinary antibiotic, in pasteurized milk. The analysis was conducted employing Thin Layer Chromatography (TLC), High-Performance Liquid Chromatography (HPLC), and Ultra High-Performance Liquid Chromatography (UHPLC). TLC results indicated no visible spots associated with amoxicillin in the milk sample, which implies that it may either be absent or present at levels below detection. The HPLC method revealed a peak at a retention time (RT) of 3.610 mins with characteristic UV peaks at 276, 228, and 194 nm for the amoxicillin standard solution. In the HPLC analysis of the pasteurized milk sample, a peak was observed at RT 4.085 mins with a UV peak at 276 nm, indicating the necessity for further verification. UHPLC analysis using isocratic and gradient techniques showed amoxicillin peaks at RTs of 2.950 and 2.949 mins, respectively, but corresponding peaks were not detected in the pasteurized milk sample. This confirmed that amoxicillin residues were either absent or below the detectable level in the pasteurized milk samples analyzed. As a result, the pasteurized milk samples were confirmed to be free of amoxicillin residues, ensuring compliance with safety regulations in Sri Lanka.