# The Microbiology Involved in Beef Chilling and Storage

Not many know how microbiology plays a role in beef and primals during storage and chilling stages. A study was conducted to see how much spoilage bacteria is actually found on carcasses within these early stages of production. “Total viable count (TVC), total Enterobacteriacae count (TEC), Pseudomonas spp., lactic acid bacteria (LAB), Brochothrix thermosphacta and Clostridium spp. were monitored on beef carcasses (n 1⁄4 30) and primals (n 1⁄4 105) during chilled storage.” The Core temperature and pH levels were also recorded and monitored during the experiment. Clostridium and Pseudomonas spp. Were common bacteria known to be found on carcasses. Safety regulations require beef to be chilled immediately after it’s been slaughtered to ensure core temperature is lower that 7 degrees Celsius. The process of beef processing includes placing the carcass in a chilling unit right after it has been slaughtered where they remain for 2-3 days. Next the carcass is moved to the boning hall and then to be vacuum sealed where it sits and “matures” for 3-6 weeks. The normal temperature ranges for a carcass before and after chilling is 37-22 degrees Celsius to 9-3 degrees Celsius after chilling. When a meat has been contaminated or experiences spoilage, common characteristics involve discoloration, strong odor, and the production of slime. Bacteria behind the spoilage of carcasses include Ps. fragi, Ps. fluo- rescens and Ps. lundensis. Enterobacteriaceae, Hafnia alvei, Serratia liquefaciens and Pan- toea agglomerans. Lactic acid bacteria and Brochothrix thermosphacta are not as major, but are bacteria found in contaminated beef. This experiement focused on the growth of Pseudomonas spp. and Br. thermos- phacta and lactic acid bacteria on beef carcasses. Three trials were conducted involving 10 carcasses randomly selected out of the chill room in a beef slaughter plant. The core temperature was monitored on two of the carcasses along with the humidity in the chiller. Five different carcasses were measured for pH levels. All 30 of the carcasses were measured at 0, 24, 48, 72, 96 hours. Pooled swabs that were rubbed on the beef are then pulsified for 30s, plated within agar, duplicated, and then incubated at 37 degrees Celsius for 24 hours. Five samples were taken every week for a six week period and were tested. The vacuum beef packages are opened with a sterile knife and then again swabbed and plated in agar to be tested. Each run was tested 3 times and bacterial counts were recorded. The number of bacteria was counted at the beginning of the trial and then at the end. Over the 8-day period, it was recorded that Br. Thermosphacta count increased significantly as well as Pseudomonas spp. It was also recorded that Lactic Acid Bacteria remained constant. Br. Thermosphacta was recorded to be the fastest growing bacteria on beef over the 8-day period during the chilling phase. Researchers also recorded Clostridium to be the fastest growing bacteria in vacuum packed beef. Temperature, humidity, pH levels aid in limiting microbial growth. It was reported that hide contamination led to the spread of the bacteria. Other factors in bacterial growth also rely on season, hide cleanliness, and hygiene practices.

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