

FOOD MICROBIOLOGY



SALMONELLA

Salmonella is a rod-shaped, motile bacterium (nonmotile exceptions *S. gallinarum* and *S. pullorum*), nonspore forming and Gram-negative. There is a widespread occurrence in animals, especially in poultry and swine. Environmental sources of the organism include: water, soil, insects, factory surfaces, kitchen surfaces, animal feces, dairy products, eggs, raw meats, raw poultry, and raw seafoods, to name a few.



LISTERIA

Listeria monocytogenes is a Gram-positive bacterium, motile by means of flagella. Some studies suggest that 1-10% of humans may be intestinal carriers of *L. monocytogenes*. It has been found in at least 37 mammalian species, both domestic and feral, as well as at least 17 species of birds and possibly some species of fish and shellfish. It can be isolated from soil, silage, and other environmental sources. *L. monocytogenes* is quite hardy and resists the deleterious effects of freezing, drying, and heat remarkably well for a bacterium that does not form spores. Most *L. monocytogenes* are pathogenic to some degree.



E. COLI O157:H7

Currently, there are four recognized classes of enterovirulent *E. coli* (collectively referred to as the EEC group) that cause gastroenteritis in humans. Among these is the enterohemorrhagic (EHEC) strain designated *E. coli* O157:H7. *E. coli* is a normal inhabitant of the intestines of all animals, including humans. When aerobic culture methods are used, *E. coli* is the dominant species found in feces. *E. coli* serotype O157:H7 is a variety of *E. coli* that produces large quantities of one or more related, potent toxins that cause severe damage to the lining of the intestine.



AEROBIC PLATE COUNT

An Aerobic Plate Count (APC) test results in the enumeration of the total aerobic bacterial population of a sample. No bacterial identifications are made; however, the resulting CFU (colony forming unit) can be applied to internal acceptance criteria for a product or Environmental HACCP sample. This is also a useful test to gauge freshness of a product or validate sanitation procedures.



YEAST & MOLD

A yeast and mold test provides an enumeration of the total yeast and mold population of a sample. No identifications are made, but the resultant data can be applied to internal acceptance criteria for a product or process. Both yeasts and molds cause various degrees of deterioration and decomposition of foods. They can invade and grow on virtually any type of food at any time; they invade crops such as grains, nuts, beans, and fruits in fields before harvesting and during storage. They also grow on processed foods and food mixtures.



TOTAL COLIFORMS & E. COLI

Coliforms are often referred to as "indicator organisms". In and of themselves they are not pathogenic; however, their presence in the environment can indicate that conditions are favorable for pathogens to be present. Generic *E. coli* is also a coliform, but of fecal origin. The presence of generic *E. coli* in a sample indicates fecal contamination. The Total Coliform/*E. coli* test is a fast and inexpensive way to assess the cleanliness of an environment or food, and can also be used to obtain information regarding the potential for other contamination.



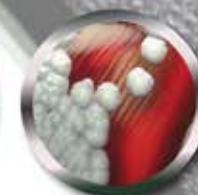
ENTEROBACTERIACEAE

Enterobacteriaceae are a large family of Gram-negative, facultatively anaerobic, rod-shaped bacteria that do not form endospores. The organisms are distributed worldwide with some being saprophytes and others being plant and animal parasites. Many species are of considerable economic importance due to their pathogenic effects on agriculture and livestock.



STAPHYLOCOCCUS AUREUS

Staphylococcus aureus is a Gram-positive spherical bacterium which upon microscopic examination appears in pairs, short chains, or as bunched, grape-like clusters. Some strains are capable of producing a highly heat-stable protein toxin that causes illness in humans. Staphylococcal food poisoning is the name of the condition caused by the enterotoxins which some strains of the bacteria can produce.



BACILLUS CEREUS

Bacillus cereus is a Gram-positive type of bacteria that can cause food-borne illnesses. It is an aerobic spore former that is commonly found in soil, on vegetables, and in many raw and processed foods. *Bacillus cereus* food poisoning is a general description, as two recognized types of illness are caused by two distinct metabolites. The diarrheal type of illness is caused by a large molecular weight protein, while the vomiting type of illness is believed to be caused by a low molecular weight, heat-stable peptide.



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