International Poultry Production's
Poultryhealth BYTES
YOUR OWN REFERENCE SOURCE ON POULTRY HEALTH

011 - Salmonella - II

Naming and classification

Salmonella all belong to the genus Salmonella which is a member of the family Enterobacteriaceae, which also includes other well known poultry bacteria such as E. coli, proteus and klebsiella. The genus Salmonella contains only two species.

The larger of these, S. enterica, contains some 2,500 paratyphoid strains. Using the example of Salmonella enteritidis, these are correctly named in the following style Salmonella enterica subspecies enterica serovar enteritidis. Needless to say, this is a bit of a mouthful so in everyday usage we just refer to it as Salmonella enteritidis. Several serotypes of salmonella contain variants. In the case of S. enteritidis these are known as phage types (PTs) and in the case of S. typhimurium they are known as definitive types (DTs).

Bacterial morphology and growth

Salmonella can be described as non-sporing rods or bacilli and typically measure 0.7-1.5 x 2.0-5.0μm. The Gram stain, which differentiates all bacteria in to Gram positive or Gram negative depending on properties in their wall associated with stain uptake, defines salmonella as Gram negative.

Typically, paratyphoid salmonella are motile and this motility is produced by whip-like appendages known as flagella. In the laboratory salmonella grow well under aerobic or anaerobic conditions. Salmonella grow well at 37°C but also grow quite acceptably at temperatures up to 45°C. This is made use of in the laboratory in that we can culture for salmonella at 42°C as at this temperature many of the other bacteria that can be present in samples, especially samples of faecal origin, do not grow. This is important because in many samples salmonella are often the minority organism and culturing for salmonella can be aptly described as a microbiological hunt for a needle in a haystack!

Susceptibility of salmonella

Salmonella are normally heat sensitive. Cooking destroys salmonella in poultry meat and heat (for example 57°C for 70 minutes) can eliminate salmonella that are inside intact eggs. Pasteurisation is used to control salmonella in liquid egg.

However, cooking processes that allow the yolk to remain liquid such as 'soft boiled eggs,' will permit salmonella to survive. Heat/steam treatment is commonly practised to rid poultry feed of salmonella. At lower temperatures this is commonly referred to as 'pelleting' while at higher temperatures it is known as 'conditioning'.

Irradiation will remove salmonella from poultry products but in most countries this practice is not liked by consumers. Disinfectants kill salmonella but they do not always totally rid a poultry house of salmonella. Various chemicals have been used to rid poultry feeds of salmonella.

Survivability of salmonella

S. enteritidis has been known to survive in poultry litter and feed for more than two years but in litter its ability to survive depends upon litter pH and water activity.