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Microbiology of Food preservation

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Editorial

Psychrotrophs are less heat resistant than mesophiles, which are in turn less heat resistant than thermophiles; and Gram- positives are more heat resistant than Gram-negatives. Most vegetative cells are killed instantaneously at 100°C. Bacterial spores are undeniably more heat resistant than vegetative cells; thermophiles produce the most heat resistant spores while those of psychrotrophs and psychrophiles are most heat sensitive. Since spore inactivation is the chief concern in producing appertized foods, much higher temperatures are utilized in appertization processes. Yeast ascospores and the asexual spores of moulds are just somewhat more heat resistant than the vegetative cells and will regularly be killed by temperatures at or below 100°C, for example in the baking of bread. Ascospores of the mould Byssochlamys fulva, and a few other ascomycetes do show a more marked heat resistance and can be an incidental reason for issues in canned fruits which get a relatively mild heat process.

The heat resistance exhibited by the bacterial endospore is expected principally to its ability to keep exceptionally low water content in the central DNA-containing protoplast; spores with higher water content have a lower heat resistance. The dehydration of the protoplast is maintained by the spore cortex, an encompassing layer of electronegative peptidoglycan which is likewise liable for the spore's refractile nature. As the cortex is dissolved during germination and the protoplast rehydrates, so the spore's heat resistance decreases. Suspension of a germinated spore population in a strong solution of a non-permeant solute, for example, sucrose will invert this course of rehydration and restore the spore's heat resistance.

The total picture is presumably more complicated than this, be that as it may, since other features of the spore like its high content of divalent cations, especially calcium, are thought to make some commitment to heat resistance. Stationary phase cells are for the most part more heat resistant than log phase cells. Heat sensitivity is likewise reliant upon the composition of the heating *menstruum*; cells will in general show more prominent heat sensitivity as the pH is increased over 8 or diminished below 6. Fat increases heat resistance. A more specific illustration of medium effects on heat sensitivity occurs in fermenting where the ethanol content of beer has been shown to profoundly affect the heat sensitivity of a spoilage Lactobacillus; a perception that has suggestions for the pasteurization of low alcohol beers.

If a canned food contains viable micro-organisms capable of growing in the product at ambient temperatures, then, at that point it will spoil. Organisms might be persistent because of a inadequate heat process, under processing, or of post process contamination through container leakage. Spoilage by a single spore former is often diagnostic of under processing since seldom would such a failure be extreme to the point that vegetative organisms would endure. The spore forming anaerobes Clostridium can be either predominantly *proteolytic* or *saccharolytic* however the two activities are regularly accompanied by gas production. *Thermophilic* organisms commonly associated with spoilage of low acid canned foods are the *saccharolytic* organism C. *thermosaccharolyticum*, B. *stearothermophilus* and *Desulfotomaculum nigrificans*. Leakage is the most common cause of microbiological spoilage in canned foods. Cans are the most common containers used for retorted products, although glass jars, rigid plastic containers and soft pouches are also sometimes used.

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