FOOD BORNE PATHOGENS

Foodborne pathogens can exist in raw or improperly processed and handled foods. Whether pathogenic microorganisms will be present in sufficient numbers to cause disease or produce toxins depends on the growth and survival characteristics of particular organisms and on the conditions to which the foods are exposed. Infectious bacteria growing in food products have varied metabolic rates and growth characteristics and are affected by nutrient composition and storage conditions, among other factors. Many bacteria are capable of growth and/or survival under extreme conditions of food processing and storage (i.e., low or high temperature, high salt, low pH), although toxigenic bacteria generally require very specific growth conditions for toxin production. Pathogenic bacteria have varied heat resistance and some produce spores, which increases their heat resistance and their ability to survive extreme conditions. Although viruses and parasites do not grow in food products, they are capable of surviving at sufficient numbers to cause infection

The majority of the pathogens that contaminate food products are natural inhabitants of the environment, soil, plants, and animals. Their survival and growth in foods is affected by a wide range of factors, which have been categorized as intrinsic and extrinsic. Application of combined or synergistic effects of these intrinsic and extrinsic factors in food preservation is the basis of barrier or “hurdle” technology.

Intrinsic Factors Affecting Growth and Survival

A number of factors intrinsic to foods affect microbial growth and survival. These include pH, moisture content, oxidation-reduction potential, nutrient content, antimicrobial constituents, and biological structure.

Extrinsic Factors Affecting Growth and Survival

Extrinsic factors are those factors associated with the storage environment that can affect both a food and the associated microorganisms. These include heat treatment, storage temperature, relative humidity of the environment, presence and concentration of gases, and presence and activity of other microorganisms.

Molds are able to grow over a wide range of pH, osmotic pressure, nutrient content, and temperature. Many molds, such as *Asprgillus, Cl~idosporium*a, nd *Tlzu171iiiidium,* are able to grow under refrigeration conditions on eggs, meats, and fruits. Yeast can grow in both the psychrotrophic and mesophilic temperature ranges.

Storage temperature may be the most important parameter affecting the spoilage and safety of highly perishable, ready-to-eat foods. Improper temperature control has been an important contributing factor in foodborne disease outbreaks. Freezing is not an effective method of killing pathogens. In fact, improper thawing temperatures can result in microorganism growth.