CHAPTER 9

DECONTAMINATION OF FOOD AS A MEANS OF PREVENTION OF SALMONELLOSIS IN MAN

9.1 Introduction

Salmonella are micro-organisms which are relatively sensitive to physical and chemical changes in their environment. Consequently their numbers in foods can be reduced by comparatively moderate treatments with heat, chemicals, radiation or other well-known means used for decreasing the load of micro-organisms.

In a Salmonella prevention and control programme such decontamination procedures have to be combined with other preventive measures. These include, in particular, reduction of the Salmonella contamination of the food animals before and during slaughter to a level which does not constitute a public health hazard. When successfully carried out this measure will lead to a decrease in the load of Salmonella entering the food chain. Further important measures include preventing contamination during and after processing and inhibiting the growth of possible contaminating organisms during storage, distribution and the final preparation of the food before consumption.

Measures for preventing and reducing the Salmonella contamination of living food animals, on the farm and during transport, and carcasses and meat in connexion with the slaughtering, are dealt with in Chapters 4, 5 and 6 respectively. This chapter concentrates on possible ways to decontaminate foods and food products. These are limited since most available methods alter to a certain extent, the desired quality and composition of the products treated and may thus make the products unacceptable to the consumers. In particular this applies to the addition of chemicals such as disinfectants and preservatives. Obviously, washing and cleansing of the food surface will, to a certain extent, reduce the contamination but this alone will not render the product Salmonella-free. The appropriate use of heat or ionizing radiation with or without simultaneous treatment with other agents may, however, reduce the load of contamination to a satisfactory degree of safety without causing undesirable alterations in composition or acceptability. Certain other means for inhibiting growth of the Salmonella, such as adjustment of the pH, the acidity or the water activity, are also considered in this connexion although the usefulness of their application to otherwise ready-made food products depends on many factors, which include the type of product to be treated. The decontamination procedures used for reducing the number of viable Salmonella in food products are based on available information on the various factors affecting growth and survival of these organisms. In the following the effects of the most important of these factors are discussed.

9.2 Factors affecting growth and survival of Salmonella

Effect of heat, chilling and freezing on Salmonella

As mentioned before, under normal conditions Salmonella are able to grow at temperatures of $\geqslant 8^{\circ}C$ but, under experimental conditions, growth has been observed after prolonged storage at $5^{\circ}C$. The organisms can survive for months and even years in frozen products although there is a reduction in the number of viable cells. On the other hand it has been shown that adequate heat treatment will kill the Salmonella. The various serotypes and strains do not vary much in their resistance to heat. Heat processing for safety, however, suffers from two drawbacks: (i) any heat treatment changes the organoleptic characteristics of foods, particularly of fresh food of animal origin and (ii) processing by heat requires large amounts of energy.