



Low Temperature Pathogens

INTRODUCTION

This document is intended to be a general guide to those micro organisms that are capable of surviving and growing under refrigerated conditions, and which are capable of causing food borne illness.

Chilling or refrigeration of perishable foods is usually carried out between 0°C and 10°C. This retards both chemical and enzymic reactions and slows the multiplication and activity of micro organisms, thus making the food less likely to transmit food borne infections, and to extend the shelf life of the product. The selection of chilling temperature of a food depends upon the type of food, the storage time required or achievable and the conditions of storage.

All micro organisms have an optimum temperature at which they can multiply in number. Certain bacteria can continue to multiply, even though they are subjected to low temperatures; they are called PSYCHOTROPHS. These organisms are, therefore, important in the storage of refrigerated foods.

Clostridium botulinum - A well known pathogen causing food poisoning by the production of a toxin in the food which is subsequently eaten. It is often fatal, by causing paralysis of the involuntary muscles of the body. Fortunately it is uncommon in this country. This organism can produce resistant spores which can survive in adverse conditions. It should be particularly noted that certain types can survive at very low temperatures and some can continue to slowly produce toxin at temperatures as low as 3.3°C.



Low Temperature Pathogens

Bacillus cereus - This organism can be found in many foods but most commonly in rice and other cereals. High numbers are required to cause food poisoning, it also produces a toxin, and can continue to multiply at temperatures as low as 7°C.

Listeria monocytogenes - An organism which has been responsible for a range of illness, from mild flu like symptoms to meningitis and miscarriage. The *Listeria* group of organisms are widely distributed in nature and are therefore readily found in raw milk, meat and vegetables. Surveys carried out by the Public Health Laboratory Service have found *Listeria monocytogenes* in pre-cooked poultry and chilled meals, and research has demonstrated the organism in a wide range of foods, including soft cheeses, pre-packed salads, salamis and continental sausages, pate, raw and pasteurised milk, sandwiches, ice cream and seafoods. Chilled foods should be free from *Listeria* and every care should be taken to exclude *Listeria monocytogenes* from pre-cooked, ready to eat products which will not be reheated before being eaten.

Multiplication of this organism is very slow, between 0°C and 4°C, but increases between 5°C and 10°C and continues to multiply at an increasing rate up to 45°C. (The optimum temperature for multiplication is 37°C). It is also very salt tolerant and can therefore multiply well in products such as soft cheese.

LCD	COLD				CHILL			WARM		
Refrigerator	28	32	36	39	43	46	50	54	° F	
Thermometer	-2	0	2	4	6	8	10	12	° C	

Store food in your fridge at 4° Centigrade or less



Low Temperature Pathogens

Yersinia enterocolitica - This organism often results in acute gastro enteritis. It has been isolated from many foods including raw and pasteurised milk, ice cream, mussels and oysters, tofu, canned and vacuum packed meat, prawns, beefburger and smoked mackerel pate. Fortunately, the number of cases of this type of food borne illness is low; however, it is unusual in that cells of this bacteria grown at low temperatures are more virulent than those grown at high temperature. It can multiply slowly at temperatures as low as 1°C - 3°C.

SUMMARY

It can be seen from the above that bacteria can multiply under refrigerated conditions, although in general, the lower the temperature the less they will increase. Hygienic processes during production are, therefore, essential to reduce the initial numbers of bacteria in the product. Refrigeration should also be run at a temperature as low as possible, preferably below 5°C as this not only inhibits growth of most of the organisms but will maximise shelf life.