

Importance of the microbe management in Space foods

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[Background]

The long-term space stay era is coming. A space station and future moon base, the life-support system in Mars station become very important. It is important that we fix the living environment. The accumulation of data will be carried out by more and more researchers from now on. We build the mini-earth in the space, and the human needs fundamental researches to become able to live on other planets. Furthermore, I will advance to the applied study to perform a real experiment in space. The meal is very important so that an astronaut accomplishes a duty lively well. It is clear from the impression of the astronaut the meal "is pleasure in space duty", and "to be time for rest". However, like this important meal may be going to take the life of the astronaut in space. In other words it is the food poisoning outbreak due to the microbe. It is required in the long-term space stay era to think about food safety, relief.

[Purpose]

Therefore this study think about the microbe crisis control in the cooking process. For example, in a spaceship, on the moon base, a plant factory in Mars station, we thought about the microbe crisis control performed in the future.

[Method]

We examine the past food poisoning example that happened on the earth and clarify what kind of situation food poisoning was caused in. We will do check about crisis control effect. We think about the measurement of crisis control important point of the plant factory and/or cooking process in the space.

[Result and Discussion]

As for the food poisoning caused on the earth, for example in Tokyo, there was the really most outbreak number in July, in the past 10 years. The number of the food poisoning patients had most in May, the cases were 12.6 cases and 332 people on the average. Noro-virus was most high number (995) of the species of food-poisoning bacteria in the H21, in Tokyo. We need to check about compound food which was many food processing. Many people's hand and finger touch the food. The pollution of the bacteria from a human finger is becoming the problem because of the food poisoning. Because of the sterilization about the indigenous bacteria in the fingers of the astronaut is need of space food manuals.

[Example]

Staphylococcus aureus

Man's respiratory pages, skin and superficial wounds are common sources of *S. aureus*. *S. aureus* is allowed to grow in foods, it can produce a toxin which is heat stable and may not be destroyed. Good personal hygiene while handing foods will help keep *S. aureus* out of foods.

<Control measures of Staphylococcus aureus>

- 1) Keep hot food hot and cold food cold (below 5 centigrade and above 60 centigrade)
- 2) reheat food to steaming hot before serving (at least 75 centigrade)
- 3) cook food heat to at least 75centigrade
- 4) wash and dry the hands properly
- 5) avoid handling food without gloves

Clostridium botulinum

It has caused death in approximately 30 percent of the case; and it occurs mostly in home-canned foods. Cl. Botulinum can exist as a heat-resistant spore, and can grow and produce a neurotoxin in under processed, home-canned foods. The botulinum toxin is destroyed by boiling the food for 10 minutes.

<Control measures of Clostridium botulinum>

- 1) keep hot food hot and cold food cold (below 5 centigrade and above 60 centigrade)
- 2) bottle only high acid fruits at home
- 3) add citric acid
- 4) When making vegetable in oil or flavoured oils to use only acidified or dried vegetables

Keywords: Space foods, microbe, food poisoning, HACCP, Crisis control manual