

## Meal form for space foods

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As for the meal to eat in a spaceship, liquid must not be scattered. As for the meal to eat in a spaceship, ingredients must not be scattered. Therefore viscosity is necessary moderately. For a commercially available drink, we think that we can prevent a spatter in the outer space by acquiring viscosity using various thickeners. We used the nutritional aid drink that balance of the nourishment was thought about for a drink. In addition, a lot of thickeners are commercially available, too. We made meal by using the third generation thickener in that. The condition of food with thickener becomes thick; we check it by using line-spread-test: LST. We evaluated those foods by using LST.

Keywords: Thickener, line- spread-test:LST, Liquid

## The need of the nourishment management based on the gene analysis in space foods

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Now that long-term space stay was enabled, the need of space foods to maintain health increases. Various diseases become the problem in the space. An example includes osteoporosis, high blood pressure, fatty liver, decline, hyperglycosemia of the muscle. It is necessary to become healthier by consuming space foods. The astronaut participates from all over the world. Their dietary habits are different each. Therefore a universal meal is necessary. In addition, it is necessary to think about the physiologic change of the astronaut. Based on the genetic analysis result that each astronaut has, it is in particular necessary to provide the nutrient which each astronaut needs. One with one of the weight and body fat changes by a genetic difference even if we eat the same space foods because basal metabolic rates are different. Many researchers came to perform nourishment management based on a gene analysis result on the earth. We think that it will be necessary to do nourishment instruction based on a gene analysis result in future likewise in the space.

Keywords: Gene analysis, Nourishment instruction, Space foods

## Blood sugar level change after the disaster food intake as space foods (First report)

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A long-term stay was enabled in the space, and the study of space foods became the very important study for life support. It is necessary to prevent the lack of vitamins and the mineral. In addition, it is necessary to prevent hyperglycemia after a meal. The possibility that various diseases were caused by long-term space stay by accumulated data was pointed out (osteoporosis and fatty liver, decline, cataract, high blood pressure of the muscle). The meaning that the nutritious meal is delicious is important. In addition, as for the disaster food used in the earth, long-term preservation is possible at normal temperature. We can use the disaster food as space foods. Therefore we thought about the combination of menus which prevented hyperglycemia after a meal in lower than 10 g per day with salt to use disaster food as space foods this time. We really report it because I performed the blood sugar level measurement after a meal. The menus which we made of the day are as follows.

Breakfast: pork miso soup

Lunch: seaweed udon

Dinner: five kinds of vegetables rice and yellowtail with the Japanese radish

Keywords: Space food, Disaster food, Blood sugar level

## Taste and olfactometry result to think about the application for space foods

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A long-term stay in the space was enabled.

Therefore the health care of the astronaut is important.

The meal in particular is pleasure of the astronauts, and it becomes each other's communication tools.

Taste and the sense of smell become the very important sense to enjoy a meal.

Taste and the sense of smell may change from a change of the bloodstream in the outer space, too. It is necessary to consider it about taste change and olfactory change in the space, and to do the seasoning of space foods. Taste and olfactory are changing by age. Therefore we report the result because we investigated taste and olfactory ability from 40 years old to 70 years old for sense of recognition. We want to make use of this result for space foods development.

Keywords: Space food, taste , olfactory

## The use of the insect as space foods

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A food production is a very important problem in space. The technology development for production of animal protein in particular is important. We think that the use of the insect is the most effective efficiently to produce animal protein in a narrow spaceship. We suggested the space foods using a silkworm pupa, a grasshopper, a larva of a wasp, an escargot, the white ant so far. We introduce "Pani" eaten this time as a precious protein source in Africa, Botswana. It is the insect which occurs when it rains in December and April. It is the food which is more expensive than beef. I remove the internal organs and boil it and am dried afterwards. We can save it when we dry up it. We store it during one year and eat. We put it in soup. We fries it with a tomato and onion and oil. We fries it with milk. It is the insect "Pani" which we want to add to space foods by all means.

Keywords: Insect foods, Pani, Space foods