

## Necessity of the allergic management on Mars emigration - Especially of the buckwheat flour cooking -

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### Purpose

It is necessary to choose ingredients without the allergen as space foods. However, it is difficult to limit a meal because the meal is culture. This study studied the soba which was easy to cause an allergy. The buckwheat flour in particular drifts in air. Therefore the buckwheat flour may pollute various places. We studied pollution with the soba in a cooking process.

### Method

At first I boiled soba with a pan. We took out soba and boiled udon with the same pan. We washed a pan and boiled udon. We detected a soba allergen with an examination of allergy kit (a nanotrap: a product made in Morinaga biochemistry research institute).

### Result

A soba allergen was detected under conditions of all.

### Conclusion

The buckwheat flour drifts in air. The pan which boiled soba is polluted with a soba allergen. The soba allergen does not disappear by using hand-washing. The soba allergen removal is difficult. We will think that a study for a more detailed allergenic removal is necessary in future.

Keywords: Allergy, buckwheat, Space foods

## The row motion which assumed muscular strength maintenance in the space

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### Purpose

Quantity of muscle decreases because of zero gravity in the space. Therefore the astronaut is obliged to carry out exercise. It is necessary to carry out an effective activity. Therefore I performed a study to strengthen quadriceps femoris muscle with much quantity of muscle most. This study is fundamental researches on the ground. It was intended to clarify a muscle reinforcement effect of the row motion.

### Method

We had member of the University N rowing-Club, six male cooperate and recorded motion of row result for one year. We went to check the healthy degree investigation athlete course in Aichi health plaza one year later at the exercise and measured the muscular strength of the quadriceps femoris muscle. A result, increase of the muscular strength was seen generally. However, the statistical significant difference did not appear.

### Conclusion

We checked the result at the quantity of the strengthen quadriceps femoris muscle. However, we knew the big need that exercised of the load more because statistical significant difference did not appear in one year. Because the astronaut stays in the space station for six months or one year, we think that it is necessary to try an exercise method to take the load more.

Keywords: Boating, The muscle reinforcement, Quadriceps femoris muscle

## Sensuality examination of space insect food - MDRS Crew 137 Team NIPPON -

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### Purpose:

When we think about emigration to Mars, it is important that we build a life-support system. It is essential to establish the technique of a food production and the food storage in a spaceship in particular and the space station. To that end, choice and the processing technique of ingredients are necessary on the space foods (by-product, high value of nutrition, high unit harvest). The consumption of the insect food by much population (many different countries) is promoted even if it is on the earth. Therefore the use of the space foods of the insect is the means that is necessary in securing of food. Because we applied it at closed colony facilities (MDRS), we report that.

### Method

We offered the meal using the insect in 2-week closed colony facilities (MDRS Crew 137 Team NIPPON) and performed a sensuality examination. Four different kinds of insect which we used "silkworm pupa boiled in soy source" "baby bee boiled in soy source" "grasshopper boiled in soy source" "seal insect boiled in soy source". The subject (three male and three female) filled out a writing by oneself expression questionnaire about "taste" "incense" "appearance" "quantity" "general score" at ten points of perfect scores.

### Result

All six people ate all the insects and performed a sensuality examination. The subject answered for the impression that ate an insect. "I can eat if I do not watch shape of insects" "The subject answered about the taste that ate an insect. "It was salty-sweet taste and the taste was delicious"

### Conclusion

If an insect becomes the powder, it is easy to eat more. If an insect becomes the powder, we can cook it with other foods as protein. We want to use more insects as space foods in future.

Keywords: space foods, insects, MDRS

## Meal management in the space - Using of the disaster food as space foods-

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### Purpose:

We used the disaster food that I could store at normal temperature for five years as space foods. We put a disaster meal together and built many menus. We report the result that ate these menus in MDRS during two weeks.

### Method:

In the case of disaster food, meals to steep in water or hot water are often found. In this case, we made disaster food by using hot water. Six crews ate disaster foods during two weeks and spent all most time in MDRS. As for six crews, every meal performed tast evaluation. Taste examination evaluated the highest score as ten points.

### Result

Each taste examination for the 2-week disaster food menu got a high evaluation. Six crews thought that the meal quantity is small. They said that they want to eat it more. However, they spent two weeks without a problem about the quantity of the meal because they had little active mass in the closed colony space. The meal almost became 1800kcal~1600kcal rank. Six crew supplemented quantity of small meal by a snack.

### Conclusion

It is very important that the meal is not to supply merely nourishment and affects concentration to joy and work. Because this meal contents use disaster food, it is with limited menu contents, but wants to suggest the menu which the taste of crew took in in future. We think that it becomes a valuable study to play role that the disaster food is important to on the earth. In addition, we will consider about allergy that is necessary to make good space foods in future.

Keywords: Disaster food, Menu, MDRS