Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

MSD39-01 Room:106 Time:May 24 17:15-17:30

Staying 2 weeks in MDRS as Mars emigration (MDRS Crew 137 Team JAPAN)

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Purpose
Crew 137 Team NIPPON stayed in MDRS during two weeks.Crew 137 Team NIPPON is a team only for the first Japanese.We recorded a physiologic change in the closed colony.
Method
We recorded the weight, body composition, blood pressure, stool frequency, the urination number of times during two weeks.
Result
The commander and the scientist were in state that their blood pressure were always high.We ate three meals a day.We ate the snacks also.One week later, the weight of all six people rose 1-2 kg.We changed dinner for breakfast.In this, the weight of all six people was recovered one week later as the beginning of this examination. Our weight was restored, but muscles decreased, and fat increased.
Conclusion
The muscles decrease even if we can maintain the weight, and fat increases only by meal management.We understand that we must exercise.More studies must be conducted about appropriate exercise.We want to study both meal and exercise on the next time.

Keywords: Mars emigration, Closed Colony, MDRS

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Decade from Space Agriculture Concept - Some approaches within the next decade from a perspective of outreach

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It's been a decade since the concept of space agriculture began. Now we are looking ahead at the prospect of future Space Agriculture for the next decade. 2015 marks the 10th anniversary of the Space Agriculture task force that projects have been researching; now the established focus is a research goal for space agriculture to establish a system which would sustain 100 people living on the Moon or Mars for 20 years.

Research is proceeding on a variety of topics by space agriculture members, which will lead to new approaches and measures to be taken in the future.

For example, reviewing sustainable human life on earth, reviewing eating habits, change of age-related bodies and taste alteration. There will be discoveries about living organisms' ability to adapt to an extreme environment; etc.

Furthermore, agriculture is a comprehensive field including physics, chemistry, biology and geology in middle school and high school. Thus, instead of focusing only on individual segments of life sciences, the field of space agriculture offers multiple approaches and topics. Targets should be set for achieving goals.

Then, when we consider the next decade of space agriculture research, we believe that is necessary to continue outreach activities and strengthen our space agriculture research more than ever.

At first, I would like to propose the following five points for the expansion of the science community and planning.

1. To delineate and encourage a relationship between space agriculture research and integrated studies with environmental education, our everyday life, in school curricula.

To show middle school and high school students the importance and attractiveness of their research, and to create an opportunity for them to get interested in space agriculture research. Let them know that young people's participation in this study is important.

2. To create an overview of space agriculture research.
3. To create a list of available research laboratories and universities, and post them on a website.
4. To show the goal of space agriculture research clearly, and create a community sense of unity.
5. To organize an outreach team.

Keywords: Space Agriculture, Mars, Outreach, Integrated study

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MSD39-P01 Room:Convention Hall Time:May 24 18:15-19:30

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

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MSD39-P02 Room:Convention Hall Time:May 24 18:15-19:30

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

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MSD39-P03 Room:Convention Hall Time:May 24 18:15-19:30

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 to 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” ”seat seat 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

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MSD39-P04 Room:Convention Hall Time:May 24 18:15-19:30

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