The Best Partner of Rice Ball

1. Introduction

Have you ever brought rice balls to the school? Many students may have brought them because I believe that it is rice balls that help our health. But do you know there are some problems behind rice balls? One of the bad effects is "food poisoning". As for it, oysters' and *sashimis*' images may be strong, but in fact, rice balls often cause food poisoning. Virtually, there are almost 30,000 patients on Japanese annual patients' list of food poisoning.

Then, we thought, "Can we make human life of rice balls better and safer by researching for food poisoning?" In this research, we focused our eyes on the staphylococcus bacteria – in Japanese, *oshoku budo-kyukin*. The bacteria is the main cause of food poisoning. If you get infected by it, bad symptoms such as stomach pain, vomiting, and diarrhea happens. And they conceal themselves in our body, in particular our hands.

2. Experiments

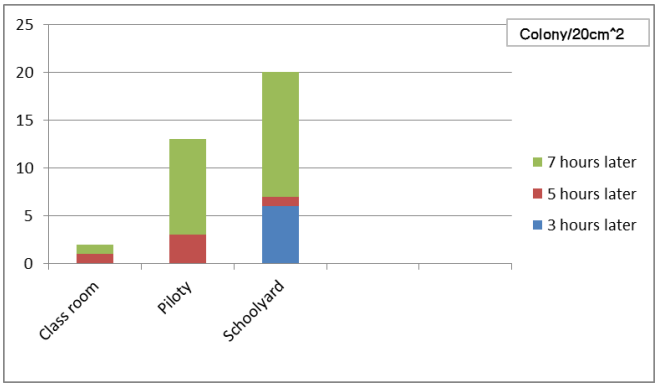
We did the following 5 experiments.

Experiment 1	What conditions do bacteria easily increase?
2	Which toppings can kill bacteria?
3	Research about *umeboshi* and garlic
4	Wrapping
5	Mixing

(i) Experiment 1

We experimented what conditions make the bacteria increase easily. At first, we mixed boiled rice by bare hands and a rice paddle to spread the staphylococcus equally. After wrapping these rice balls we preserved them under conditions that differ in times, places and temperature. After crushing rice balls and pouring water in beakers, we extracted water at the top and spread these water on the stamp culture medium. Then we marked the number of staphylococcus on the stamp culture medium.

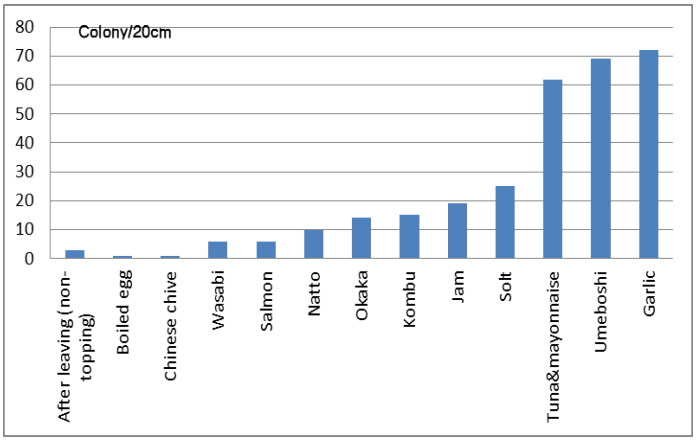
This following is the result understood by experiment 1. Rice-ball grasped by bare hands include staphylococcus. On the other hand, rice-ball grasped with a wrapper didn't have staphylococcus.



However, many unexpected dangers are hiding in our rice-ball life. For example, rice might be polluted in the process of making rice-ball. Moreover, some students take long hours before eating the rice-ball. I want to eat rice-ball more safely. By the way, there are various type of toppings for rice-ball. Some topping is said to have antibacterial effects. Maybe we can control staphylococcus by such topping. Our aim is to control increase of the bacteria in real rice-ball.

(ii) Experiment 2

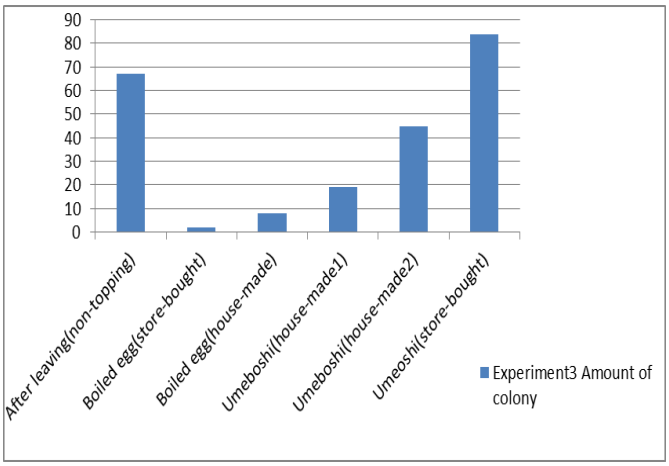
We examined these 12 toppings. First, to grasp their effects obviously, we use the bare hand grasped rice-ball which is used in former experiment. Second, leave these rice-ball in 30℃ of incubator and wait for 5 hours. To disease bacteria, all of instruments were heated.



The result is shown in graph. Based on this result, it is believe that Chinese chive has disinfection because it has less number of colonies than no toppings. Though a boiled egg changed color, it is believed that this experiment was incomplete in some points and some topping such as preservative influences this result because it was store-bought boiled egg. Preservative is a substance used to prevent food. Next, *umeboshi* and garlic show surprising result. They tend not to have disinfection. Number of colony of store-bought food such as wasabi, *natto* and jam is comparatively few. Therefore, home-made *umeboshi* has a large number of colonies. Moreover, it is found out that topping called alicin in Chinese chive and garlic has disinfection by research on the Internet. Alicin is an topping produced by cutting, and garlic wasn't cut in experiment 1. Therefore, alicin was hardly produced.

(iii) Experiment 3

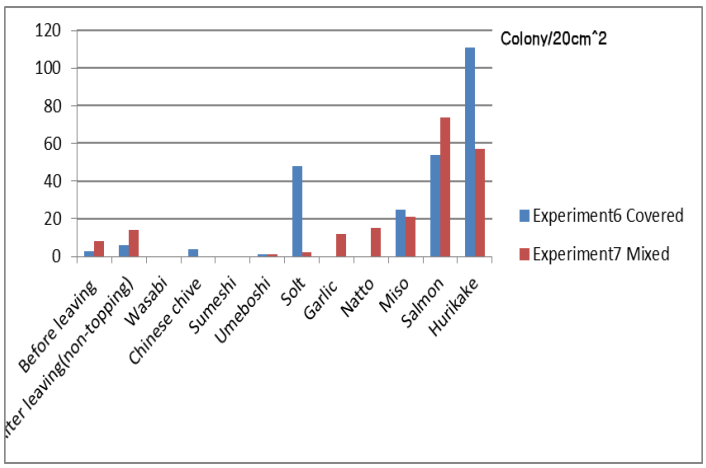
Next, two experiments were carried out under the similar conditions. The purposes of those experiments were to examine increase of bacteria in home-made and store-bought *umeboshi* and boiled egg and influence of alicin in Chinese chive and garlic. Chinese chive and garlic were heated, boiled, or uncooked one because alicin decrease by heating.



The result is shown in graph. First, boiled egg shows no change between home-made one and store-bought one. However, it is believed that other bacteria were broke out because boiled egg appeared to change color to pink and had smell of bad egg. Next, *umeboshi* wasn't involved in preservative, and effect of disinfection of alicin appeared on only Chinese chive. At two experiments, garlic and *umeboshi* didn't show clear disinfection. Therefore, though it is generally agreed today that they have disinfection, increase of staphylococcus aurous from our hands in stronger than disinfection of topping.

(iv) Experiment 4

Next experiment is to examine whether the material which we wrap rice balls with have disinfection properties. We did the experiment with *nori*, *shiso*, plastic wrap, a bamboo leaf, antibacterial sheet and normal rice ball. Until then, we wrapped all rice ball with aluminum foil. So we call rice ball wrapped with aluminum foil normal.

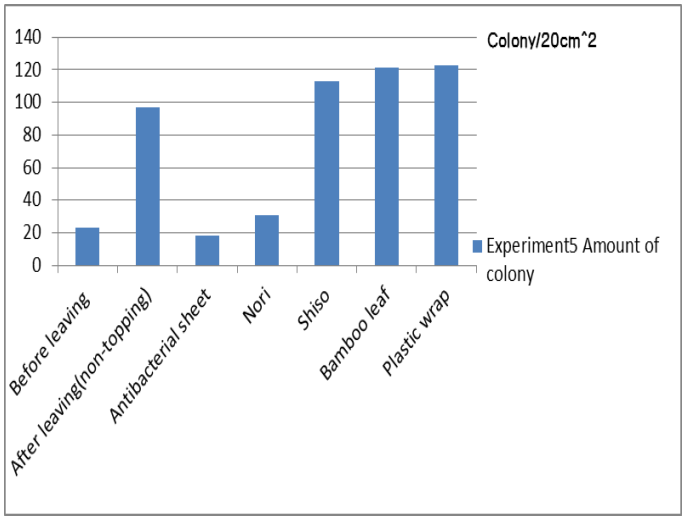


This graph shows this experiment's result. *Nori* and antibacterial sheet have less staphylococcus than normal one. But plastic wrap have more staphylococcus.

The reason is that plastic wrap doesn't breathe well and staphylococcus increase well. On the other hand, *nori* breathes well and it is sanitary. So *nori* prevents staphylococcus from increasing.

(v) Experiment 5

Next, we apply the foods on rice ball and mix them. Mixing them, we did all of them in 30 seconds. In addition, we pressed them and averaged their volume. The foods we used this experiment are the foods used at first and second experiment and *sumeshi* (rice with vinegar).



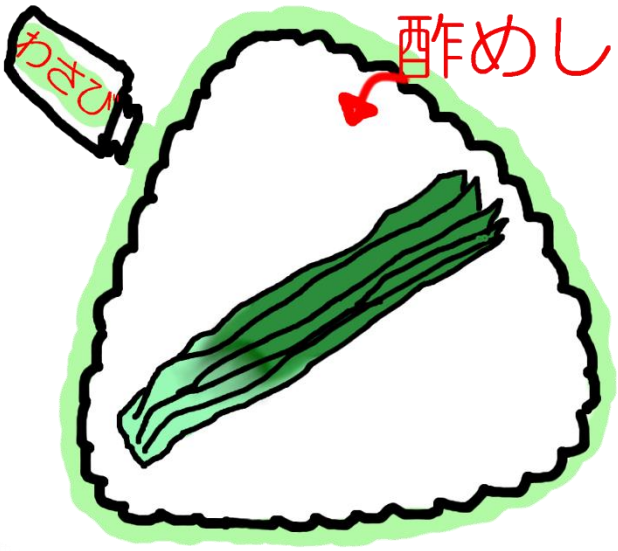
Look at this picture. This shows that mixed rice ball has more staphylococcus than without mixing one. Besides, wasabi, *sumeshi* and *umeboshi* have disinfection. Therefore, some foods seem to have disinfection by increasing amount of topping or surface area which had contact with rice.

3. Conclusion

These results show us 3 conclusions.

- Making a rice ball with your hand is not safe even if you use any topping.
- Using topping only inside, most of them cannot kill bacteria.
- If we use them outside or mix them and rice, some toppings show us good result of killing bad bacteria.

Finally, we thought "THE STRONGEST RICE BALL!"



Put Chinese chive in rice with vinegar, and cover this with *wasabi.*

They are best partner of rice ball.

We looked back these all experience, and we found 3 reflection points.

- We could use only 2 stamps per one topping. So result of our experience may have become inaccurate.
- We have to treat instruments more carefully.
- As you know, we didn't consider about taste of riceball.

Through our researches, we got scientific data of each toppings. In next time, we want to research safe and delicious riceball.

Thank you for reading.