

Hong Kong Student Science Project Competition 2022

Template of Extended Abstract (Investigation)

(Word Limit: 1,000 words, Pages: 2 pages only)

Team Number: SBBC 193

Project Title: Luscious Microbial Killer

Project Type: Investigation

To our best knowledge and after thorough literature research, as at 30/06/2022, there are no* similar works. If there are, the reference links are as below:

--

The enhancement our project has made for the existing related products or research is summarized as below:

--

***Please delete if not applicable. HKSSPC values the originality of works. Students must conduct literature research thoroughly to ensure that their works are unique, and to list relevant reference materials to complement the research or invention.**

I. Background

Mold easily grows on food under the right conditions and pose harm to human. We would like to seek organic ways that can help preserve food better and for a longer period of time using the strongly smelled cooking sauces or vegetation, such as garlic which has sulphur-containing compounds proven to inhibit the growth of fungi and bacteria.

II. Objectives

The relationship between the different types of edible materials that give a strong smell and the speed of the growth of mold on bread was investigated.

III. Hypothesis

It is hypothesised that if strong-smelling ingredients are put together with the bread, the amount of grown mold will be less than the control set-up that is without strong-smelling ingredients. Since garlic is a strong-smelling food and contains anti-microbial chemicals, it inspired the idea that other ingredients with strong-smelling may also work in the same way on mold. It can be tested by setting up a small confined area with only bread and the ingredients so as to let the strong-smell vapour originated from ingredients diffuse. If the growth of mold is prevented in this experiment, the hypothesis proposed is true.

IV. Methodology

Materials:

White bread, cling film, paper boxes, plastic containers and strong-smelling food substances, including garlic, soy sauce, wasabi, onion, chilli, ginger, lemon, curry

Experimental protocol:

Under air tight condition, strong-smelling food substances and a small slice of bread are placed together in a container. The mold grown on the different slices of bread is examined and compared after two weeks. A control set up containing no strong-smelling food substance is prepared.

V. Results

Food	Mold colour	Mold area	Amount of mould (scale of 1-10)	Texture
Onion	Large surface of white mold A black spot	1cm ² : black Remaining: white	10	Soft
Chilli	Different layers of yellow Some black spots Little pink (silky)	29.4 cm ²	6	Soft
Ginger	Brown & dark green (silky)	Whole bread	10	Soft (normal texture of bread)
Lemon	Grey & pink Little white	16 cm ²	4	Harder than normal
Garlic	Black dot	0.01 cm ²	1	Harder than normal
Curry	/	/	/	A little hard
Soy sauce	/	/	/	Hard
Wasabi	/	/	/	Hard
Control	/	/	/	Hard

From the table above, it is shown that in the presence of curry, soy sauce and wasabi, mold did not grow on the bread. The breads that were tested with onion, chilli, ginger, lemon and garlic have mold on them. Among them, onion has the largest amount of mold on the bread, with a large surface area of black and white mold, while garlic has the least amount of mold on the bread, with only 0.01 cm² mold on it. For easy reference, a scale of 1 to 10 has been devised and directly related to the growth of the mold. The results are only partially reliable because repeated trials were not carried out. The results are also preliminary as there are different kinds of unidentified particles or chemicals which could have different potency in deterring the growth of mold. There are molds of different colours showing their variety. This can contribute difficulties in analysing the results as different types of mold could have different reactions to the strong-smelling particles. It was found in this experiment the texture of the bread can be either soft or hard. The softness in some sample of bread could be due to the presence of mold and the hardness in other sample could be due the absence of mold or simply there is airflow inside the box resulting from the incomplete covering with the cling film.

VI. Conclusion

In accordance with the results, it could be concluded that curry, soy sauce and wasabi could be applied in daily life to prevent the growth of mold. On the other hand, it was shown that the onion, chilli, ginger, lemon and garlic, which could not stop the growth of mold, shouldn't be used as agents to preserve food. Apart from that, a more diverse type of food could be tested to search for more substances to potentially inhibit growth of harmful microbial. It is believed that more distinctive data, such as the specific chemicals from the anti-microbial strong-smelling food, could be obtained so that it could be massively used in bringing up the level of the food safety.

Our project is developed based on our school's previous project and the enhancement is as below:

--