

# Study of luminescent bacteria

~about the source of nutrition which luminescent bacteria like~

Kobe High School Shin Taguchi, Naoki Obiya, Miho Kanda, Mami Takagi, Tomoyuki Fujita, Haruka Mori

## Purpose

When we were researching about environmental problem, we found "luminescence bacteria". Now, it is studied how to measure the degree of environmental pollution. We studied luminescent bacteria for foundation of research about it. This time, we researched what ingredient increased the amount of bacteria by culturing.

## Conclusion

Amount of bacteria must depend on "erythritol".

## Experiment Methods

- Put a raw squid in artificial sea water, and leave it in the fridge for two days.
- Take luminous part of the squid, and put it in Erlenmeyer flask in squid stock. Culture it with shaking incubator for a day (We call this ①). <Experiment1>

↓ Figure1



- Put mixture of artificial sea water and desalted water into each six test tubes. We changed each of the concentrations of them. Make these ones again. So, we prepare 12 tubes.
- Put 100 μl of ① into each 6 test tubes, then cultivate it with shaking incubator for a day.
- Measure the transmittance of ② by using other 6 test tubes without bacteria as a standard. <Experiment2>

↓ Figure2



- Cook white meat of chicken and horse mackerel in stock, and take each stock out.
- Prepare the stock of squid, horse mackerel, white meat and desalted water like Figure3. Put powder of artificial seawater into each of them. Then put 100 μl of ① into them.

↓ Figure3

concentration(%)	20	80
stock(ml)	1	4
desalted water(ml)	4	1

- Make ② again. But this time we didn't put ①.
- Shake culture for a day.
- Fix standard test tubes without bacteria.

↓ Figure4



## Result and Consideration

- As the concentration of the stock becomes higher, we can see the stronger light of bacteria. However, we could not measure the intensity of light because it is too weak to measure, so we used a spectrometer.
- As the concentration of the stock becomes higher, the transmittance of light is decreasing. Therefore, we can think luminescent bacteria depend on the nutrition which contains in a squid. But measured value of 80% broth is away from the others. So we think there are some faults with our way of measuring.

↓ Figure5 The change of average transmittance

concentration(%)	0	20	40	60	80	100
transmittance(%)	88	56.3	51.4	45.8	51	38

- For horse mackerel and squid, the transmittance of broth which has higher concentrations is lower, and bacteria increased more.
- In case of white meat, there is only small difference of transmittance between 20% and 80% stock.
- We can think of it as the difference among the amounts of "erythritol" which squid and horse mackerel and white meat contains.

↓ Figure6 The change of average transmittance

	squid		horse mackerel		white meat	
concentration(%)	20	80	20	80	20	80
transmittance(%)	91.2	68.55	93.7	86.95	88.6	88.75

## Prospects from now on

- We want to check whether luminescent bacteria multiplies in broth of white meat which include erythritol to be sure that erythritol is the nutrition which squid like.
- Luminescent bacteria are marine, so we want to ascertain whether it would be possible to culture using broth of other marine organisms.

## References

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