A study on defense of red tide by ultraviolet rays

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Summary

[Purpose] Kagoshima bay's biota exhibited corresponding drastic changes. "Akasio", red tide caused by the bloom of a flagellate alga, *Hornelia marina* (Raphidophyceae) first appeared in 1977. This phenomenon has recurred several years since their appearance. In 1995, the red tide of *Heterosigma akashiwo* (Raphidophyceae) brought about 1 billion-yen damage for aquaculture in this bay. The purpose of this study is to develop a method to defense the red tide by ultraviolet rays as emergent tackling treatment in red tide outbreak.

[Method] *H. akashiwo* was cultured using M-ASP7 nutrient medium during one month. Ultraviolet rays was irradiated directly to the sterilized petri dish, in which 2 ml *H. akashiwo* culture was added to 30 ml of M-ASP7 nutrients medium. Ultraviolet rays were irradiated during the time about 30s, 60s, 120s, 300s and 900s. Ultraviolet rays strength were changed by 80 μ W, 400 μ W, 700 μ W and 1500 μ W. In the count of *H. akashiwo,* the cell was distinguished by motility.

[Results] In compared with irradiation strength of ultraviolet rays, the cell was restrained in a condition of 80 μ W / cm² for 900 seconds, but effect of ultraviolet rays on cell growth was not recognized below the irradiation in case of 900 seconds or less. In compared with irradiation time of ultraviolet rays, the cell was restrained in case of 30 seconds with a condition of 1500 μ W / cm², but red tide cell was not recognized in a condition less than 700 μ W / cm². In irradiation time of 900 seconds when in case more than 400 μ W / cm², red tide cell cannot multiply after handling, and, with a condition of 80 μ W / cm², most cells became extinct for less than 6 days. A result mentioned above, the relation between irradiation strengt and time was able to express as an expression of $y = -202.0\mathrm{Ln}(x) + 1380.6$. Irradiation strength of ultraviolet rays might influence for survival rate rather than irradiation time, and its effect began to appear more than 400 μ W.