Indicate the intensity of ultraviolet rays using the degree of fading of cotton yarn dyed with reactive dye

*Natsuki Yamamoto[1], *Ayaka Akase[1], *Kento Takase[1], *Reiji Iwamoto[1], *Keisi Okumi[1], *Mayu Naito[1], *Hiromu Fujimoto[1], *Yamato Yasuhara[1], *Nanami Kishimoto[2], *Sayuki Fujii[2], *Nagisa Yokoyama[2], *Soya Obata[2], *Hinako Kobayashi[2], *Haruki Murakami[2], *Reo Yamada[2], *Syo Yoshida[2]

1. Hyogo Prefectural Himeji Higashi Senior High School Science Club (Ultraviolet rays team), 2. Hyogo Prefectural Nishiwaki Senior High School Earth Science Club

Ultraviolet rays fade the color of clothing. We thought that the intensity of ultraviolet rays could be indicated using the degree of fading of cotton yarn dyed with a reactive dye. The following three points became clear as a result of irradiating the cotton yarn of three colors of blue, yellow and red with ultraviolet rays. (1) Ultraviolet rays damage fibers, and the strength of fibers becomes extremely low after the sixth day of irradiation. (2) The ratio of magenta to cyan decreases until the sixth day of irradiation, and the blue and red yarns fade. This indicates that magenta has been destroyed by ultraviolet rays. (3) This tendency is not seen in the yellow yarn. The yellow yarn is less likely to fade than the blue and the red yarn. The intensity of ultraviolet rays can be indexed by the ratio of magenta dye to cyan.

Keywords: reactive dye, intensity of ultraviolet rays, fading