# SUMMARY OF Ph.D. DISSERTATION

| School | Student Identification Number | SURNAME, First name |
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| Fundamental Science and Technology | | SAIKAWA, Yoko |

Title

Chemical Studies on Natural Pigments and Toxins


Abstract

In nature, there are various organic compounds which would be important for natural phenomena. However, only a small number of such compounds have been elucidated. Natural toxins causing lethal poisoning for life and natural pigments having attractive colors are the targets of the present research and the following three subjects were investigated.

(1) toxic principles of a poisonous mushroom Podostroma cornu-damae

(2) structure determination and chemical characterization of xylindein and its analogs from Chlorociboria species

(3) isolation and structure determination of the pigments responsible for the color reaction of the sweat of Hippopotamus amphibious

(1) Podostroma cornu-damae is a lethal poisonous mushroom. Roridin E (1), verrucarin J (2), and satratoxin H (3) were found from the culture filtrate. On the other hand, satratoxin H (3), saratoxin H 12', 13'-diacetate (4), satratoxin H 12'-acetate (5), and satratoxin H 13'-acetate (6) were isolated from the fruit bodies. Compound 4, 5, and 6 are new natural products. All these macrocyclic trichothecenes had a lethal effect on mice by at least 0.5 mg per capita.

(2) The major blue pigment of the fungi, Chlorociboria species, is xylindein (7). The absolute configuration of 7 was determined by X-ray crystallographic analysis of its derivative. New analogs were also isolated from the methyleted extracts of Chlorociboria sp. and their structures were determined. Furthermore, it was found that dimethylxylindein (8) underwent auto-redox via disproportionation, giving dihydrodimethylxylindein (9) and dimethylxylindein dimer (10) as a reduction and an oxidation product, respectively.

(3) The colorless viscous sweat of Hippopotamus amphibius gradually turns red within a few minutes and turns brown in the end. The unstable red pigment 11 and orange pigment 12 were isolated by gel filtration and ion exchange chromatography. The red pigment 11 was converted to the stable derivative, X-ray crystallographic data of which unambiguously clarified its structure. On the basis of this result, spectroscopic analyses, and characteristics of the model compounds, the structures of 11 and 12 were determined to be the new fluorene quinone derivatives. Both the red pigment 11 and the orange pigment 12, respectively designated as hipposudoric acid and norhipposudoric acid, have UV-protection and antibacterial properties.