Monitoring and Evaluation of the Water Pollution Caused by Environmental Phytoestrogens Based on Analytical and Bioassay Methods

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1. INTRODUCTION

The contaminants from effluent of wastewater treatment plant released into water environment have the potentiality of disturbing wildlife and human's endocrine systems. The pyhtoestrogens have been detected in the river (Kawanishi et al, 2003), as well as effluents from wood industries, pulp paper mill industries (Pollack and Kritchevsky, 1981; Richad et al., 2001) and sewage treatment effluent (Matsui et al., 2002; Kiparissis et al., 2003). In this study, I analyzed the channel water in Setsu City in Osaka and wastewater treatment from the soybean industries in Indonesia to detect the presence of 3 selected phytoestrogens (genistin, daidzein and genistein). A combination of analytical HPLC and bioassay methods approaches were applied.

2. SAMPLING POINTS AND METHODS

(1). SAMPLING POINTS

Channel water in Setsu City: 5 different sampling locations were chosen. The wastewater treatment plant in Indonesia: 6 different sampling locations were chosen, there were washing process, cooking process, influent, conditioning tank, aeration tank and effluent.

(2). METHODS

Samples were filtered by glass fiber filter, and filtrate was extracted by Sep-Pak C18 (environmental-plus) cartridges, and then eluted by DMSO, followed by the evaporation to dryness by centrifugal concentrator. The residue was dissolved in to small volume of DMSO and then injected to the HPLC. The absorbance was measured at 254 nm.

3. RESULTS

(1). Samples from Channel water in Setsu City

At only one from five point samples the contaminants have been detected.

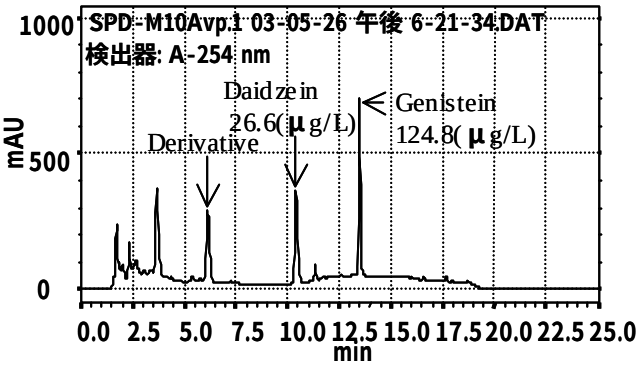

Figure 1. HPLC performance of sample from channel water Setsu city

(2). Samples from wastewater treatment plant in Indonesia

The concentration of genistin, daidzein and genistein in the treatment plant seems to be reduced by the biological treatment process.

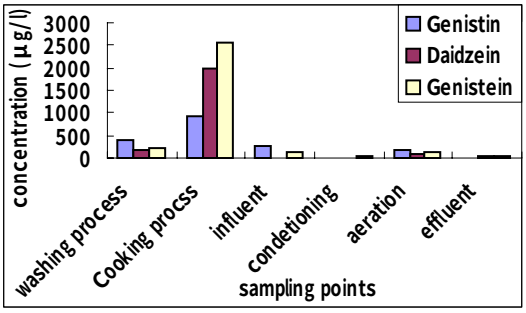

Figure 2. Occurrence and behaviors of genistin, daidzein and genistein during biological treatment process

4. CONCLUSIONS

- I have identification and measurement of genistein and daidzein in the channel water Sets city Osaka. I assume those contaminants came from pulp and paper industry located near the sampling a point.
- I have also detected genistin, daidzein and genistein from the wastewater treatment plant in industries those are used soybeans as raw materials.
- The biological treatment process reduced concentration of genistin, daidzein and genistein.