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Implementation of the Self-organizing Mapping for Detecting Changes in Movement Behavior of Aquatic Macro-invertebrates after the Treatments of Insecticides at Low Concentrations

Kyung-Hee Choi^P, Sang-Hee Lee², Chang-Woo Ji¹, Joo-Baek Leem³, Sung-Kyu Lee³, Tae-Soo Chon^C

^{PC1}Division of Biological Sciences, Pusan National University, Pusan 609-735; ²Department of Physics, Pusan National University, Pusan 609-735; ³Korea Institute of Toxicology, Korea Research Institute of Chemical Technology, Taejeon 305-600

Computational methods were implemented to quantitatively characterize the movement tracks of chironomids and daphnia after treated diazinon and copper at low concentrations. Activity was generally decreased after the treatment of insecticides. The movement tracks were continuously recorded in segments in (time segment; 1 hour) before and after the treatments, and subsequently the movement segments were classified by training with an artificial neural network, the Self-Organizing Mapping (SOM). The parameters characterizing the movement tracks such as speed, meander and angle increment were extracted from the movement segments, and were provided as input to the SOM. The groupings obtained after the training with the SOM correspondingly revealed the impacts of the treatments and individual differences.

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구리 내성 식물종 선정에 대한 연구

김성현^P, 이인숙^C

이화여자대학교 생명과학과, 서울 120-750

본 연구는 구리로 오염된 토양을 phytoremediation을 이용하여 복원하기 위한 Cu 내성종 선별을 위해 수행되었다. 식용피, 알팔파, 닭의 장풀, 해바라기, 옥수수, 어저귀, 소리쟁이의 토양 내 구리 농도 변화에 대한 발아율, 유식물의 생장을 및 생체량, Cu 축적 및 제거력 등을 수행하였다. 알팔파의 구리 축적 능력은 100 ppm에서 90 mgCu/g 이상 나타났으며 200 ppm, 300 ppm에서는 70 mgCu/g 이상 보였다. 그러나 토양 제거율은 매우 낮게 나타났다. 반면 닭의 장풀은 100 ppm에서 78 mgCu/g로 중금속을 축적했다. 닭의 장풀을 심은 토양의 경우 100 ppm에서 90% 이상 제거했고, 200 ppm에서 70%, 300 ppm에서 50% 이상 제거효율을 보였다. 이미 Pb, Cd 등 중금속 제거 효과에 효율적이라고 보고되었던 해바라기와 옥수수는 구리에서도 뚜렷한 효과를 보였다. 실험에 사용된 모든 식물종은 100 ppm 이상에서 생체량과 발아율에 저해를 받는 것으로 나타났다. 이처럼 구리가 식물체에 미치는 독성효과는 농도와 식물종에 따라 다르게 나타났다. 특히 닭의 장풀이 중금속 제거 효율 70% 이상을 보여 phytoremediation에 효율적으로 사용될 수 있을 것으로 보인다. 앞으로 구리 내성 기작에 대한 연구로 Cu-binding protein을 분석할 예정이다.

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Effect of Soil Copper Content on Copper Uptake of Selected Plants and the Physicochemical Environment of Rhizosphere

Kyung-Hwa Baek^P, In-Sook Lee^C, Sung-Hyun Kim¹, Ha Yoon Jung¹

Department of Life Science, Ewha Womans University, Seoul 120-750

We investigated the effect of effect of soil copper content on copper uptake of plants and the physicochemical environment of rhizosphere. Four species, *Abutilon avicennae*, *Commelina communis*, *Echinochola frumentacea*, *Medicago sativa* screened previously were tested and cultivated in soil pots with different copper concentrations. The growth of plants tested was significantly inhibited over 100 mg Cu/kg of soil. Although significant difference were shown in Cu accumulation among the four species, but Cu uptake was decreased with increasing concentration of applied Cu. Accumulation of Cu in roots was 3-10 times more than in the shoot. The change of soil physicochemical factor, such as pH, organic matter, moisture contents, cation exchange capacity, soil dehydrogenase activity was depend not only on soil copper concentration but also on plant species.

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Assessment of Surface Water Quality on Two Golf Courses in Kyunggi-do

Yoon-Jung Chang^P, Ok Kyung Kim¹, In-Sook Lee^C

^{PC}Department of Life Sciences, Ewha Womans University, Seoul 120-750; ¹Department of Environmental Engineering, Anyang University, Anyang 430-714

This study was performed to produce data on the quality of surface water bodies on two golf courses located in southern (P country club) and eastern (B country club) areas of Kyunggi-do by monthly direct measurement of several physical parameters and four heavy metal concentrations over the course of a single year, to determine the impact of these courses on their surrounding environment, and moreover to investigate whether the efficiency of water quality remediation by aquatic plants (i.e., water hyacinth, floating salvinia, lotus and sword leaved iris) in preventing movements of compounds into surrounding area. Only these results of April and May were involved in these Abstract. The parameters determined were pH, DO, COD, Cl⁻, alkalinity, hardness and nitrogen compounds(NH3-N, NO2-N, NO3-N). Water pH and DO concentrations are within the alkaline ranges of 7.8 to 9.8, with in the relatively low ranges of 2.4 to 5.9 ppm. COD had ranged 0.2 to 0.5 ppm, except with 3.5 ppm in B country club. The range of alkalinity and hardness were 18 to 76 ppm and 20.5 to 88.2 ppm, respectively. Nitrogens as ammomium (NH3-N) were detected in all samples. NO2-N and No3-N were detected in slightly low concentrations. In the case of heavy metal concentration in water, the highest observed Cd were 22.4 ppm in B country club remarkably. And other metal concentrations were represented in weak to intermediates level, comparing with Quebec guidelines levels. Further study is necessary completely to determine the impact of aquatic plants on water quality during the process of growing season.