Erosion rate of yellow soil on pine hill in the Three Gorges reservior region using ^{137}Cs Technique

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Soil erosion and degradation, as one of the major environmental problems man is confronted with, is becoming a hot spot in the study of soil and environmental Science. In recent years, radio-isotope tracer in soil erosion studies has become one of the hottest research topics in the field of soil Science. This research presents the ^{137}Cs tracer in the soil erosion rates in the Three Gorge Reservoir Region in Chongqing.

Two yellow soil profile samples which formed by the weathering of quartz sandstone of the Upper Triassic Xujiahe Fm were collected from the pine hill. Simplified mass balance model established by Zhang *et al* [1] is applied to overestimate the soil erosion rates.^{137}Cs of Section A (sits on upper section of the hill, with an incline of about 15 degrees) is mainly gathered in middle section (4-10cm). The ^{137}Cs inventories of the section is estimated to be 1099.8 Bq/m^2. The soil erosion rate on this section is 1009.92 t/km^2.a, in concordance with the result of Dong *et al* (2006)[2].

As to section B (sits on middle to lower section of the hill, with an incline of about 15 degrees), ^{137}Cs is mainly gathered in surface soil (2-6cm). The ^{137}Cs inventories and soil erosion rate values are 2139.8 Bq/m^2 and -190.937 t/km^2.a respectively, indicating slight accumulation happened before.

Combined with some previous results[2], it may be deduced that the soil erosion rates of this area might have little relationship to the soil type and soil forming rocks, but were greatly affected by topography, soil utilization way and vegetation.

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[1] Zhang *et al*. (1990) *Hydro. Sci*. **35**, 243-252. [2] Dong *et al*. (2006) *J. Soil and Water Conserv*. **20**, 1-5.

Alteration of biochemical pools assemblage induced in *A. variabilis* by TiO_2 nanomaterials exposure

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In this study Fourier Transformed Infrared spectroscopy and Transmission Electron Microscopy were used to evaluate the ecotoxic impact of TiO_2 nanomaterials to the cellular reorganization of macromolecules in the nitrogen-fixing cyanobacteria *A. variabilis*. The increase in occurrence and intracellular levels of cyanophycin grana proteins (CGPs, Figure 1) reveal changes in the dynamics of cellular nitrogen storage and metabolism. The results also showed characteristic temporal re-allocation patterns after short and long-term exposure of the predominant chemical markers (lipids, nucleic acids, carbohydrates and proteins) with nTiO_2 dose-dependent trends.

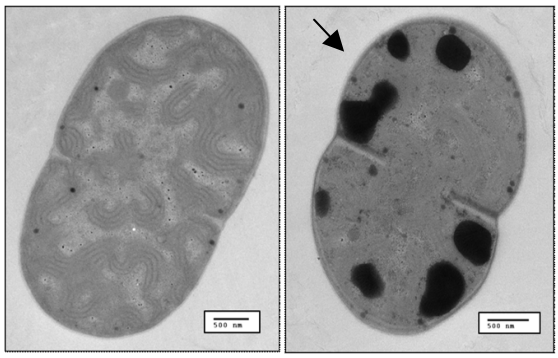

Figure 1: CGPs formation after cell exposure to nTiO_2 (right) compared to control (left).

In conclusion, this study reveals important insights into the metabolic strategies implemented by cyanobacteria under nTiO_2 exposure and anticipates at larger scale the impact on important biogeochemical processes, such as nitrogen cycle, and ecological food web dynamics.