

## 学 位 論 文 要 旨

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題目: **Effect of Applied Fertilizer Method on Loss of Nutrients and Benefit of Bamboo coal and Shaving on Clarification of Turbid Water**

(施肥方法による養分流出および竹炭やオガクズを用いた濁水の浄化に関する研究)

This research was done to study the relationship of the effect of method fertilization and rainfall intensity to the losses of soil, nutrients in surface runoff by simulated rainfall and methods to limiting of turbidity in runoff by used bamboo coal for filtration of turbidity in runoff from field.

The results of experiment research the effect of method fertilization and rainfall intensity to the losses of soil, nutrients in surface runoff by simulated rainfall showed that, nutrients concentration in runoff of the parameters analyses that were significantly higher than that of original water. Under same rainfall condition, ratios of contents of the most nutrients (T-N, NH<sub>4</sub>-N, NO<sub>3</sub>-N, T-P, PO<sub>4</sub>-P) in runoff from on surface (Case1) per subsurface of 1cm depth (Case2) fertilizer application are more than 1.0. Leaching of nutrients content was high when rainfall high, fertilization can rapidly increase the nutrient concentration in runoff, which varies with the methods of fertilization and forms and elements of the nutrients. Data collected in this study may be useful as estimates of maximum losses from runoff under similar farming practices. Such determine the loss potential of fertilizers under high rainfall conditions.

The results of experiment research to limiting of turbidity concentration in runoff by used bamboo coal showed that, the turbidity of outflow water had relation with discharge volume of water. If the same bamboo coal diameter, with the water volume of 2L/min, the turbidity was the most decreased; the followings were 6 L/min and 10L/min. The least decrease fell on the highest velocity of 14L/min. The diameter of bamboo pieces in filters also affected on the turbidity of water. Among three types of bamboo pieces used in experiment, the smallest sizes gave the most decrease of turbidity values; the next was the medium-sized ones. The least decrease of turbidity values happened to the big-sized ones. The increase of the height of outflow was good for speeding down the outflow, thus the turbidity of water also got decreased. At the time the depth of water volume of 31.5 cm (N1) resulted in the most decrease of turbidity values; the next were at 21.5 cm (N2) and 11.5cm (N3). The least decrease was determined at 0 cm (N4).

The results of experiment on the real flow from the field presented that the turbidity in outflow had strong relationship with that in inflow. High turbidity in inflow resulted in high turbidity in outflow. Mean results of turbidity in outflow measured in 60 minutes indicated the If look at the decreasing of percentage ratio of turbidity comparing to in inflow, it is clearly that when the inflow concentration bigger than 100 mg/L, the purification ability of charcoal obtained from 30-60% and achieved 60-90% of effect in the case of the inflow concentration smaller than 100 mg/L. The study also recommended a new method in which bamboo can be employed for decreasing the turbidity in runoff from the field with increasing the depth and slowing down the speed of runoff.

The results of experiment research to limiting of turbidity concentration in runoff by used wood-shaving showed that, shaving can clarification of turbidity in runoff water. And volumetric filter had relation with turbidity concentration in outflow volume of experiment 2. Experiment 1 shows that, concentration of turbidity in outflow of wood-shaving filter lower than from bamboo coal filter with  $C_s/C_b < 1$ .

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