A STUDY ON EFFECT OF RIVER PURIFICATION BY ABSORPTION ABILITY OF CHARCAOL

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1. OBJECT

Recently, on river environment, interest of a citizen is rising for healing or gracefulness and it is expected that river is imminent to human life in Japan. But, in actuality, a lot of rivers have various kinds of problems such as water pollution or security of drinking water. In this study, it is reported about river purification activity by the charcoal circulation that it is proposed and practiced till now.

2. THE CHARCTERITICS OF CHARCOAL

Charcoal that used in this study is made self carbonized of wood and combustion temperature is estimated at 600-800 ℃. Wood charcoal has many minerals such as Ca or Mg. In the water, charcoal is ability of adsorption of many chemical matters but charcoal is nature of self melting. It is shown a conception diagram of adsorption and melting of charcoal in fig.1. Charcoal is the ingredient content that is different by charcoal wood. And melting rate is different too. After one year observation, it is estimated quantity of melting and adsorption of charcoal from a view of ion balance in the water. As a result of calculation, with all charcoal, a quantity of absorption of a calcium ion is big, but On a sodium ion, as for the Hinoki syoress and Quercus acutissima charcoal, a quantity of melting is bigger than that of adsorption. It is indicated that there is each adsorption characteristics of charcoal. River purification can utilize this characteristic.

3. REMEDIATION BY THE CHARCOAL IN THE RIVER

Charcoal (a hinoki cypress and an evergreen oak) is set at Kamagawagawa River in central Utsunomiya.

An analysis items are pH, EC, ORP, BOD, COD, SS, a sodium ion, a chlorine ion, a sulfuric acid ion, a nitric acid ion, a magnesium ion, and a calcium ion. pH, EC, ORP and T (water temperature) are handy type measuring instruments. BOD, COD are by titration, SS is dried and filtration. Dissolved ions are analyzed by ion chromatography.

It is putted charcoal in a crop net, and setting method of charcoal depended on a method to fix with a rope in a right angle in a style lower course.

It is show the concentration of each ion in Fig.2. Just after charcoal setting, Cl ion concentration is much down and decreased by SO_4 ion, NO_2 ion, Na ion, K ion, order of Mg ion next, but there is not a change in Ca ion. At discharge is about $0.3m^3/s$ and setting charcoal is 200kg, absorption effect of charcoal is estimated that it is able to anticipate about 10% decrease in total ion concentration.

In addition, there are a little concentration of NO_2 ion and K ion and Mg ion too. It is thought that an absorption effect of ion concentration is not clear in such ions that much.

4. CONCLUSION

In this study, main obtained conclusions are as follows

1) Charcoal is superior in absorption of dissolved ions.
2) The continuance effect was confirmed for about around 3 months when charcoal is set in a river.

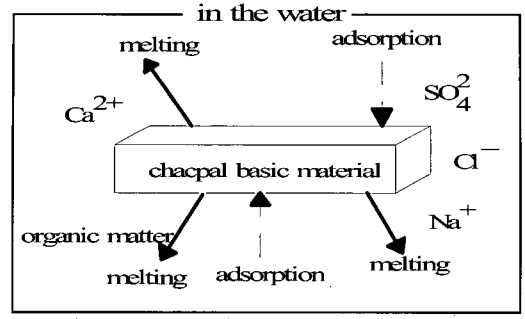

Fig.1 A model of melting and adsorption

Table 1. A list of adsorption quantity(estimation : 3liter undiluted-water)

	hinoki cyoress	evergreen oak	quercus acutissima	bamboo
Na	-9	2	-7	4
Ca	27	57	55	4
Mg	2	8	9	2

Unit : mg

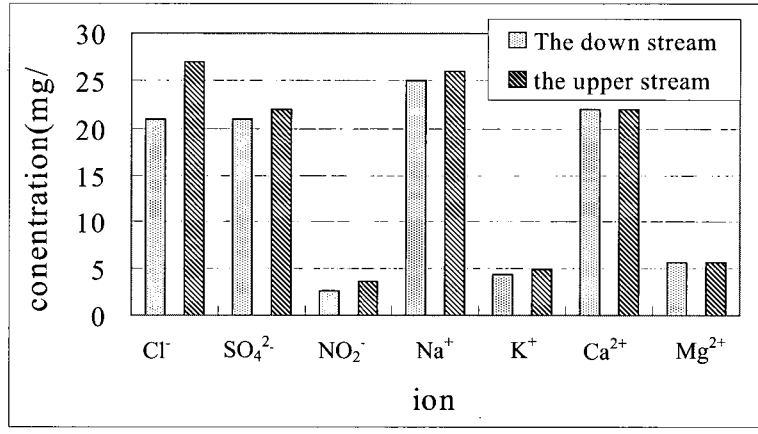

Fig.2 The concentration of each ion

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