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Estimation for Purification Ability of Stream Water Quality with Applying Porous and Planting Concrete

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This study was performed to improve water quality of stream by applying environmental materials (porous concrete and planting concrete). To estimate availability of media developed for improvement of water quality, physical and chemical characteristics of porous concrete were investigated and water purification ability by porous and planting concrete was also estimated through batch test and continuous flowing system test. In the results of investigation for physical and chemical characteristics of porous concrete, initial pH of porous concrete manufactured was in the range of 12.3 ~ 12.6, but, after placing into tap water flowing during regularity time (28 hour), the pH was decreased in the range of 7 ~ 7.5. This pH range is appropriable to growth of plants and microorganisms. Compressive strengths of porous concretes were in the range of 194 kgf/㎠ ~ 218 kgf/㎠ (average 205 kgf/㎠). This fact showed that porous concrete is available as a water purification material (above 180 kgf/㎠ that is minimum compressive strength of general concrete can be used at construction). The result of purification efficiency by planting concrete through batch test showed 75% for DOC removal efficiency. This value was similar to that by porous concrete (72%). In the PO_4-P concentration, removal efficiency by planting concrete was 4% higher than that by porous concrete, and removal efficiency by planting concrete for NH_4-N was 22% higher than that by porous concrete. In case of the NO_3-N concentration, removal efficiency by porous concrete was 7% higher than that by planting concrete. we manufactured the reactor for the test in the continuous flowing system and porous and planting concrete were applied at the first and the second shore protection part. And reservoir tank was located in the high water-level land in the reactor. From this results, water purification efficiencies by planting concrete were higher by 4.3% for SS, by 1% for BOD, by 6% for COD, by 18% for T-N, and by 11% for T-P than porous concrete. Therefore it is judged that planting concrete is more available contact media for the purification of water quality than porous concrete.