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A Cost Effective Laboratory Scale Seeding Culture for BOD Testing in Wastewater Analysis

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Biological Oxygen Demand (BOD) is an important water quality parameter, widely used to determine the pollution level and as measure to test treatment effectiveness of wastewater. The BOD test is a bio assay, involved in the measurement of oxygen consumed by living organisms while utilizing the organic matter present in a wastewater sample. The microbes present in the test sample should be capable of decomposing all organic matter present in the sample during the incubation period. However, for highly polluted water samples, the naturally occurring microbes are not sufficient to provide reliable BOD value and hence, microorganisms have to be added to the test samples as seeding material.

Even though commercially available BOD seed inoculum capsules can be used as seeding material in BOD testing, their usage in regular water quality analysis by local authorities is limited due to high cost. Many local institutions tend to use various locally available seeding materials in BOD testing; the effectiveness of these seeding materials is questionable. Therefore, the present study aimed at developing cost effective and reliable seeding material for BOD testing and also determining the suitable storing condition and viable time period for each seeding material.

Four types of commonly used seeding materials, sewage sample, domestic wastewater, soil suspension and activated sludge were subjected to BOD₅ test while changing their storing conditions. Glucose glutamic acid (GGA) standard solution with the BOD value of 198 ± 10 mg/l was used as the reference to detect seed effectiveness. Effectiveness of seeding materials was estimated by comparing BOD values received for standard GGA solution after inoculating the samples with each seeding material. The seeding material which gave the closest value of BOD to the reference value (198 ± 10 mg/l) was selected as the most effective seeding material. Standard colony counts were conducted to monitor viable time period of microbes in each seeding material.

The soil suspension which gave BOD₅ of 190 mg/l for standard GGA solution was found to have a higher seed effectiveness than the other three seeding materials and a three week viable time period recorded under open dark conditions was found to be the best storing condition. Domestic wastewater and activated sludge were less effective as seeding for BOD testing possibly due to their compositional variations. The findings of this study suggest that the soil suspension can be used as an effective seeding material for BOD testing locally.

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