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Mitigation Evaluation of Microplastic Contamination by Sustainable Landfill Liner
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EXECUTIVE SUMMARY

Because of the potential for its migration through an inadequate liner system, microplastic contamination has turned into a risk to management of landfills. The COVID-19 pandemic's occurrence worsens the situation. Personal protection equipment (PPE) and other single-use plastics (SUP) usage and consumption have dramatically increased in addition to the already significant growth in plastic trash. Notably, Malaysia is one of the leading destinations for illegal plastic garbage exports from other nations. They are often disposed of in landfills with mixed garbage and eventually decomposed into microplastics. The resultant creation of leachate pollutes the ground water. In the soil environment (for example, civil engineering vs. environmental sciences), awareness of microplastic contamination is currently only limited to environmental and chemical disciplines. So, by enhancing the quality of the liner, this research attempts to integrate the geotechnical engineering evaluation to better understand potential microplastic migration from landfill to the soil environment. This is crucial because the liner serves as a barrier to stop leaks. In certain circumstances, microplastic too might be able to partially obstruct the liner's pores, creating a layer that is more permeable. To design the liner system (ideally double-liner), geotechnical critical characteristics such as strength, permeability, and void ratio are taken into consideration when adding different concentrations of lime. Additionally, numerical modelling and the soil-water characteristic curve (SWCC) will be used to validate experimental data results through the commercial geotechnical software. The results of this research are anticipated to be compliant with the specifications for landfill design established by international organisations, and geotechnical engineering plays a role as a mitigating technique for lowering the microplastic pollution. This would essentially support the Sustainable Development Goals (SDG) as a global issue.