Mount Gay Distilleries, the world's oldest rum distillery produces 50 million litres of vinasse a year, as a waste product of the rum distillation process. Vinasse is a pungent brown liquid containing various organic matter content, making it a promising alternative to conventional fertilizers in Barbados. Currently, the vinasse produced at Mount Gay is being injected into the ground causing a chemical reaction in which smoke can be seen between the coral limestone foundation of the land (which is alkaline) and the acidic vinasse. Additionally in 2023, Barbados' Water Authority passed stricter legislation surrounding water management and water protection meaning that Mount Gay's current vinasse disposal practices may be soon deemed illegal because of concerns surrounding vinasse contaminating the local water supply. Therefore, it is crucial to investigate alternative uses for the vinasse produced at Mount Gay.

This study investigates the potential of vinasse, a byproduct of the rum industry, as a sustainable alternative to commercial fertilizers due to its high organic content, focusing on its efficacy at varying concentrations (0%, 5%, 10%, 15%, 20%, 50%, and 100%). This experiment utilized vinasse as a fertilizer to observe its effect on the development of corn and bean plants in a shade house at Mount Gay Distilleries. Each concentration had triplicates for both beans and corn (21 bean plants and 21 corn plants). The hydroponic portion of the experiment was conducted to evaluate the growth of bean and corn in a solution of vinasse and chicken manure and compare it to a control solution with only chicken manure. We hypothesized that low concentrations (5-15%) of vinasse would significantly enhance crop growth and yield, while the 100% concentration will be toxic, leading to plant death. Results indicate that medium vinasse concentrations (10, 15 and 50%) enhance plant growth, while 0% and 100% showed reduced growth. However, more studies should be conducted with a more controlled environment, more replicates, and a singular application of vinasse at the beginning of plant growth as opposed to a weekly application. These will help offer a more robust understanding to properly investigate vinasse's role as a fertilizer. This study concludes that vinasse, when used at appropriate concentrations, has the possibility to enhance plant growth, presenting it as a possible sustainable fertilizer option in Barbados. Vinasse should also be tested on crops commonly grown in Barbados such as sweet potato, cassava, and okra to make it more relevant to the Bajan context. Our findings could reduce the environmental impact of vinasse disposal and improve sustainability practices at Mount Gay Distilleries and reduce Barbados' reliance on imported sources of conventional fertilizers.

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