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Comparison of the Environmental Impacts of Omnivore, Vegetarian, and Vegan Lasagnas Using Life Cycle Analysis: An Approach to Contrast Dietary Choices and their Ecological Footprint.

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Abstract

Recently, climate change and its repercussions have been a relevant topic of study worldwide. The effects of climate change can be noted in the escalation of temperatures, the retreat of glaciers, the scarcity of water, the loss of biodiversity, and other profound consequences. These indicators allow for the analysis, evaluation, and quantification of emissions generated by human activities and their impact on the environment. Among the main sustainability indicators under study are global warming potential (GWP) greenhouse gasses (GHG) and water footprint. Due to existing water scarcity and the inefficient use of this resource, future food security, specifically food production worldwide, is being threatened. According to the Inter-American Institute for Cooperation on Agriculture (IICA), the agricultural sector is responsible for 70% of freshwater consumption. As a result, the water footprint of this sector is excessively high and will continue to grow unless there is a reduction in the carbon footprint produced by human activities. Therefore, it is important to analyze and evaluate dietary choices, seeking to prioritize more sustainable foods, such as locally sourced products or plant-based options. This research aims to explore and contrast the environmental implications of different types of diets through a Life Cycle Analysis, focusing on the three most prominent diets globally: omnivore, vegetarian, and vegan. This study evaluates the impacts specifically associated with the preparation of a lasagna recipe, providing a comparative analysis of the: Global warming potential (GWP) and Water footprint. For the studied recipe, the system boundaries, production processes for each recipe, waste treatment and transportation, and wastewater treatment were defined. To enable a comparative analysis between the diets, 1 serving of food was chosen as the functional unit. The results reveal that the omnivore recipe produces 5 times more CO_2 eq emissions than the vegetarian recipe and 13 times more than the vegan recipe. Regarding water

footprint, the meat recipe generates an impact 7 times greater than the vegetarian recipe and 17 times greater than the vegan recipe. These results demonstrate the significant disparity in GWP and water use in the production and preparation of food among different dietary options. It is important to note that the analysis is limited to a specific recipe, and therefore, the comparison may vary depending on the recipe under study. This analysis provides valuable insights into the potential environmental benefits and trade-offs associated with different dietary choices and can inform individuals, policymakers, and the food industry about more sustainable options for lasagna preparation and consumption.

Keywords: life cycle assessment, dietary choices, homemade food, ecological footprint, Chile

References

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