Eastern Africa Bioeconomy Conference
BioInnovate Africa

Algal Resources Exploitation for Green Economy and Sustainable Development: a review

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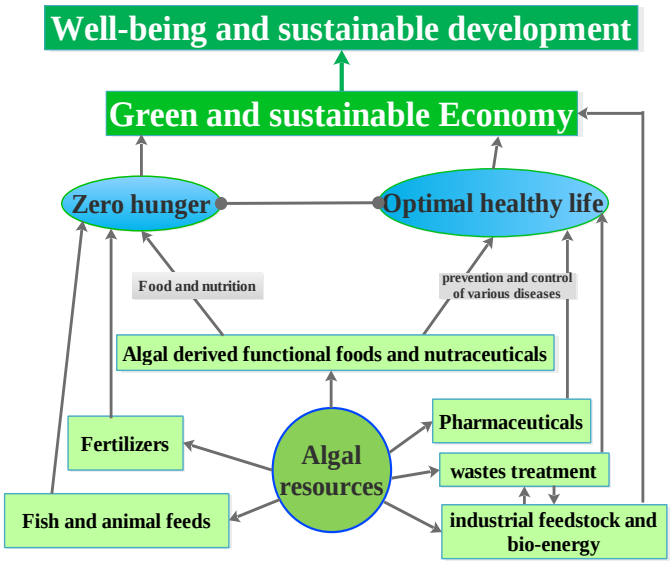
Introduction/Objectives/Aims/Problem/statement/Goal

Global challenges such as environmental degradation, hunger, malnutrition, poverty, antibiotic resistance, chronic diseases, depletion of fossil fuels, and other issues associated with their utilization, among others, are burdening the global population's quality of life. At the center of any country's green economy and sustainable development, are human beings and their entitlement to a harmonious, healthy, and productive life with nature. This review article aimed to elucidate the potentials of algal resources from the current scientific literature and to highlight their inputs in solving current pressing global challenges.

Methods: Algal resources are well-positioned, prominent, and sustainable resources for providing solutions to global challenges such as malnutrition, antibiotic resistance, and environmental degradation. Algal resources play a dual role, which is feedstock with a broad range of applications (including healthy foods, food supplements, feeds, and bio-energy) coupled with environmental phycoremediation. The approaches and strategies that can contribute to the achievement of sustainable development through the utilization of algal resources include stakeholders' collaborations: public–private partnerships; academia-industry partnerships that aim at deploying natural resources and technology, as well as human capital development. Algal resources are applied in the nutrients removal, in return the enriched biomass is produced. The algal derived biomass production requires just sunlight, nutrients, abiotic conditions such as pH and temperature.



(Manirafasha et al., 2019)

Results: The algal resources exploitation is contributing in the population well-being and countries' sustainable development through two main approaches: the first approach is linked to food security and nutrition where algal derived function food and nutraceuticals, bio-fertilizer, fish and animal feeds shall contribute to the zero hunger goal. The second approach is related to the environment protection and industrial feedstock production (e.g. through wastes management, pharmaceuticals, and industrial feedstock and bio-energy production), thus lining with optimal healthy life. As result, if the two approaches are sustainably implemented, this will build one of the key pillars of the Green economy and Sustainable development.

Conclusion: The algal derived resources synthesize a broad nutritional and bio-functional compounds with several applications in various industrial fields for sustainable development. Algal derived resources, as sustainable resources, should be optimally exploited for alleviating global challenges such as human pathogens and food security. The exploitation of algal resources for settling the global burdening health challenges need to urgently advance innovation and technology, as well as the educational strategies for more understanding the potentials of algal-derived products and eradication of negative connotation toward their utilization, especially in developing countries where most burdening challenges are still at high level.

References: Manirafasha, E., Vangh, A. V., Murwanashyaka, T., Rugabirwa, B., Ndikubwimana, T., Mukagatare, G., . . . Lu, Y. (2019). Algal Resources Exploitation for Green Economy and Sustainable Development: A Review. *Adv Biochem Biotechnol, 7*(1089), 1-14. doi: 10.29011/2574-7258.001089.

Acknowledgements: We are grateful to the Rebuplic of Rwanda for promotion Science, Technology, Engineering and Mathematics.

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