

## How can Microbiology improve lives and livelihoods in Nigeria?

“They can never be seen with unaided eyes, more germane to be discarded and so wide in scope to fully be studied.” This form of description appreciably fits what the groups of microorganisms are, and the science of studying them is named Microbiology. The efficacy of Microbiology towards life improvement in Nigeria is convincingly and concisely discussed accordingly.

Agriculturally, the concise ken of Microbiology can help heighten the high yield of the major farm produces in Nigeria e.g. Rice, Beans etc. Rice, being commonly consumed, can be improved through the use of mixed cultures of specific microbial strains during the processes of cultivation. Notably, *Proteobacteria* can contribute to the growth development of rice plants due to the presence of growth-impelling bacteria which can induce callus in rice and produce phytohormones. The organism is noted for nutrients recycling and drought resistance.

Medically, the knowledge of microbiology can help in the better diagnosis of novel infectious agents including emerging and re-emerging diseases. This can alleviate the rate of poverty through empowerment of people as epidemiologists, virologists and public health officials and research enthusiasts in standard research laboratories. This is well described in the current pandemic outbreak of Corona virus (Covid-19). This can create proper sensitization for people. Moreover, explicit ken of microorganisms can help in the process of waste management including solid waste and waste water treatment with the use of strategic principles. In most of Nigeria states, lots of active medicinal and green herbs can well be gotten cheaply while the extracts can be used pharmaceutically in the production of effective antimicrobial agents in combating any illness that may be encountered. This can immensely eradicate the war of antimicrobial resistance being faced by most pharmaceutical industries at large.

Industrially, the knowledge gained can rightly be used in producing essential nutrients and synthetic fibres e.g. the microbially produced ethanol (by *Z. mobilis*) can widely be used as solvent and anti-freeze. Moreover, creation of standardised fermentation systems in major cities in Nigeria (e.g. Lagos) can improve the state of food consumptions. This can be focused mostly on the commonly consumed staple foods in Nigeria with fermented dairy foods, through the use of specific microbial strains e.g. Ògì by *Lactobacillus rhamnosus*, Garri; (south western states) etc.

In petrochemistry, the consistent generation of petroleum based products as the major source of energy for industries and daily lives has seriously led to the contamination of soils with accumulated recalcitrant compounds which can damage plant and animal tissues, majorly in the Niger Delta. However, hydrocarbonoclastic organisms which are capable of digesting the toxic substances can dearly be utilized. Also, other pollutants from oil spillage can also be cleaned through the process of bioremediation with the right group of microorganisms e.g. *Arthrobacter* and *Rhodococcus*. Fascinatingly, the abundant volume of untapped crude oil from deep surfaces and underground crevices (e.g. Owowo Oil Field) can innovatively be regenerated through the process of microbial enhanced oil recovery (MEOR) while using biostimulation and bioaugmentation as potent strategies with the use of right strains of microorganisms.

In conclusion, the upgrade of systems of teaching Microbiology as a professional course, with the implementation of virtual classrooms and other online tools in all Nigeria's institutions, will make studying alluring innovatively, while the creation of seasonal seminars for Microbiology students at large will create an avenue through which able students can intelligently share creative and innovative ideas. The right application of these measures and strategies will elevate the nation's prowess to the internationally accepted standard and exemplar.