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EFFECT OF A BIOTECHNOLOGY FROM A PURPLE NON-SULPHUR BACTERIA ON THE MICROBIAL COMMUNITY OF WATER BEFORE AND AFTER TREATMENT

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RESUMO

The analysis of key-microorganisms components in wastewater is crucial for assessing its quality and potential health risks, ensuring public health and environmental safety. Purple non-sulfur bacteria (PNSB) such as *Rhodopseudomonas palustris* are target-microorganisms of many sustainable studies due to its biotechnologies that achieve resource recovery from wastewater. This study aimed to determine the potential of *R. palustris* biotechnology to recover the wastewater based on the quantity of key-microorganisms in the water before and after treatment. Water samples were collected at two times: before treatment (at day 0, corresponding to the raw wastewater from a fishery slaughterhouse), and after treatment (at day 7, corresponding to the period of *R. palustris* incubation with wastewater in bioreactors). At day 0, the wastewater was homogenized in pasteurizer and sampled (triplicate) for microbiological analysis (triplicate). Then, the wastewater was pasteurized (76.8°C/30minutes). After ranging 35°C-40°C, the wastewater was pumped to 6 bioreactors (25L/each), and inoculated with 250mL of *R. palustris* (MFRP01, pre-reactivated in Pfennig broth) for incubation during 7 days. At day 7, the wastewater of each bioreactor was centrifuged (7000rpm/4°C/4 min) and sampled (triplicate) for microbiological analysis (triplicate). For mesophyllic aerobes, samples were diluted and spread in yeast extract agar (YEA, 35°C/44h and 24°C/68h). For molds and yeasts, dilutions were spread on potato agar containing 2% acidified glucose (24°C/5days). The presumptive colonies of total coliforms were counted in chromogenic coliform agar (35°C/24h, positive:red-pink colonies) and the confirmatory test was performed through oxidase (positive:purple colonies). The *Salmonella* was determined through the most probable number method in Hektoen Enteric agar (37°C/18h, positive:black-green colonies). Before treatment, total mesophyllic aerobic counts, indicated an average initial bacterial load of $2.3x10^7$±0.41 (35°C) and $2.3x10^7$±0.23 (24°C) CFU/mL. After treatment, the bacterial load reduced 14.7% and 21.42%, respectively. Mold and yeast initial counting was $8.3x10^4$±3.7 and after treatment was 0, revealing a reduction of 100%. Total coliforms initial counting was 4 CFU/100mL±2.31 and after treatment was 1 CFU/100mL±0.58, with a reduction of 75% in bacterial load. *Salmonella* was $5.5x10^9$±2.97 CFU/mL and after treatment was $3.0x10^9$±1.69, showing a reduction of 55.15%. These results highlight the potential to reduce 100% of mold and yeast and 75% of total coliforms from wastewater through microbial technology of a PNSB, providing a new sustainable method that contributes to environmental safety. Funding

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