Evaluation and Biophysical Characterization of Novel Antimicrobial Peptides: A Water Purification Approach

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Potable water is a fundamental substance for the existence of living organisms. It is extremely vital as a clean source since without it any organism will not be able to survive. According to the World Health Organization over half million of people from all parts of the world die every year due to poor or non-existent water purification procedures. By cause of these poor procedures, many bacteria such as *Pseudomonas aeruginosa* and *Escherichia coli* can cause a diversity of diseases. It seems that providing access to safe drinking water has been one of the grandest challenges that we face in the 21st century. Searching for a solution to this problem, we are making use of antimicrobial peptides (AMPs). It is well established that AMPs are produced by a diverse range of organisms and form a crucial component of their immune system because they possess potent activity against a wide spectrum of bacteria, viruses, fungi and parasites. With the purpose of being successful, the objective of this project is to characterize and evaluate AMPs capable of purifying water in order to give more people access to potable water. For this project, we used Maximin H5 (MH5) and Tet-20 AMPs. The primary structure of MH5 is ILGPVLGLVSDTLDDVLGIL-NH2 and of Tet-20 is KRWRIRVRVIRKC-NH2. MH5 is constituted by anionic and hydrophobic properties and also contains three aspartate residues and no basic amino acid residues. On the other hand, Tet-20 is composed by cationic and hydrophilic properties. We have performed a series of experiments such as Scanning Electron Microscopy (SEM), Minimal Inhibitory Concentration (MIC), Disk Diffusion, Growth Curves, Dynamic Light Scattering (DLS), and Zeta Potential. These experiments allowed to assess the biophysical and antimicrobial properties of the peptides with the end of successfully purify water.