EFFECT OF NOVEL SYNTHETIC BIOSURFACTANTS DERIVED FROM SURFACTIN CORE ON THE ACTIVITY OF BACILLUS SUBTILIS (ATCC6051) ALPHA-AMYLASE.

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Surfactin, a well known biosurfactant, is a cyclic heptapeptide (L-Asparagine, L-Leucine, L-Glycine, L-Leucine, L-Valine and two D-Leucines) bound to an acyl group which chain length can vary from 13 to 15 carbon atoms. We synthesized eight new molecules employing the FMOC method of solid-state synthesis. Four of these were non-acylated peptides and four were lipopeptides. All of them were synthesized based on a rational design in which some point modifications to the surfactin core were introduced, but some structural resemblance with the original surfactin was preserved. It is well known that surfactants can regulate the activity of amylases from different sources, thus our objective is to verify if these novel biosurfactants are able to regulate one alpha amylase from \textit{Bacillus subtilis} (ATCC 6051 strain) which is investigated by our laboratory as a thermophilic enzyme with potential industrial applications. Thus, we analyzed the dose-response curves of these peptides, rising from 2.5 to 50 µM, on the amylolytic activity. Activity was measured through the DNS spectrophotometric assay at 540 nm, in the presence of calcium and sodium-acetate buffer (pH 5.5) in artificial seawater, with soluble starch as substrate. Our results demonstrate that two of these peptides (#5 and #8) were efficient inhibitors of the alpha-amylase, with a maximal inhibition around 40-45%. Other two peptides (#3 and #7) were mild inhibitors, reducing the activity by only 20%. The remaining peptides (#1, #2, #4 and #6) were not capable to modulate the amilolytic activity. We conclude that at least two of our novel biosurfactants presented modulatory properties over the alpha-amylase from this \textit{Bacillus subtilis} strain. The properties of these potential biosurfactants summon to the other properties of these peptides which were described by our group, including: antibiotic drug delivery; antiviral activity; haemagglutinant activity and surface tension reductive properties, among others. Supported by FAPERJ, CNPq. Keywords: biosurfactants, solid-state synthesis, amylase.