Synthesis of compatible solutes with protein thermostabilisation properties.

Halotolerant and moderately halophilic microorganisms accumulate compatible solutes to face fluctuations in the water activity of their environment. Hyperthermophiles (thriving optimally above 80^{o}C) isolated from marine sources also use the same general strategy. Protein stability, often viewed as a direct consequence of its three dimensional fold, is highly influenced by its the dynamic behaviour, i.e. its internal motions in relation to its structure, which ultimately decide in what conditions the structure collapses or unfolds. With this in mind, to understand the stabilisation phenomenon, one should also study the changes in the dynamical behaviour of a protein upon solute addition.

The aim of this project is to synthesise new solutes, with minor but significative structural modifications when compared with alpha-glucosyl-D-glycerate and alpha-mannosyl-D-glycerate, the last one a well known and studied natural solute.

The natural solutes are 1,2-*cis* glucosides, and for the construction of an alpha-glucosidic bond there is not a general method and studies for improving the anomeric selectivity of this challenging glycosylation reaction will be performed.

Task 1. Synthesis of the glycosidic donor.

Task 2. Synthesis of the glycosidic acceptor when needed.

Task 3. Glycosylation reaction – study of several conditions.

Task 4. Selective cleavage of the protecting groups.

Task 5. Structural analysis and characterisation of the products obtained throughout the synthesis.

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