24-28 June 2024, Rome (IT)

Second Symposium for Young Chemists

BOOK OF ABSTRACTS

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Seleno-glycoconjugates for the prevention of oxidative stress

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Since the evaluation of Ebselen as glutathione peroxidase (GPx) mimetic,[1] organoselenium compounds are gaining interest in the medicinal chemistry community due to their promising biological activities for a wide range of clinical applications.[2] Several Se-bearing molecules were indeed reported as anticancer, anti-inflammatory, antidepressant and antibacterial.[3] Even if organoselenium compounds do showcase important biological properties, their actual clinical exploitability could be hampered by the low aqueous solubility which precludes them from reaching therapeutically relevant doses in blood.[3] A possible strategy to overcome this barrier is to combine the important pharmacological properties of selenium with the physicochemical properties of sugars, leading to the class of selenosugars and their derivatives.[3]
Moreover, polyphenols are molecules with antioxidant[4] capacity due to their structure: they have a broad conjugate system and hydroxyl function capable of deactivating or inhibiting radical precursors or free radicals. In this contest, the design of new molecules that consider synergistic interactions among the different antioxidants, could be useful to develop possible therapeutic agents.
This work is part of a project aimed to the preparation of glycoderivates with antioxidant functions useful for the prevention of oxidative stress: namely, seleno-glycoconjugates. They can express, by combining the antioxidant properties of Se with the chelating and antioxidant properties of a polyphenolic unit, a synergistic antioxidant activity greater than the individual components.[5] Based on remarkable results[6] obtained with previous generation of compounds, using D-ribose, in this work we started from the commercially available D-mannose, which was then used as donor for the preparation of glycoconjugates using different polyphenols.

References

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