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MALATTIE APPARATO RESPIRATORIO
MALATTIE METABOLICHE
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LIBRO degli ABSTRACT

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work, the presence of endophytic bacteria in the seeds of *Anadenanthera colubrina* var. *cebil* (Vell.) Brenan, a Fabaceae tree of South America, has been demonstrated using culture-dependent, culture-independent approaches and FISH analysis. Culture-dependent approach, based on the isolation of cultivable bacteria and subsequent identification by analysis of their 16S rDNA sequences, allowed the identification of species closely related to *Staphylococcus* and *Methylobacter*. The culture-independent approach, based on the high-throughput sequencing 16S rDNA amplified from seed metagenomic DNA, confirmed the results of the culture dependent approach. This analysis also identified *Actinomyces*, *Pseudomonas* and *Clostridium* genera. Fluorescence in situ Hybridization coupled with Confocal Laser Scanning Microscopy (FISH-CLSM) confirmed the presence of bacteria belonging to both Alphaproteobacteria and Firmicutes Phyla in seed cryosections. The bacteria were arranged as single cells or small colonies with up to ten cells and colonized the outer seed coat as well as the internal tissues. All these results demonstrate for the first time that typical Phyla of the root- and leaf-microbiota, such as α Proteobacteria, Firmicutes and Actinobacteria, are present in the seeds of *Anadenanthera colubrina*.

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Dicationic imidazolium salts: tunable antimicrobial and antitumoral chemotherapeutic leads

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The chemical synthesis of novel chemotherapeutical leads is evolving thanks to possibility to design molecules with desired physical-chemical and, thus, biological properties. The imidazolium salts, recently proven effective to inhibit bacterial and/or cancer cell growth, possess an amphiphilic nature that is conferred by the imidazolium cation having a polar head generally coupled with aliphatic side chains. Thus, biological properties of imidazolium salts can be tuned through modifications involving the cation structure and/or the anion nature. By covalently linking two imidazolium rings, diimidazolium salts were obtained differing in: i) kind of anions; ii) isomeric cations or anions; iii) length of the imidazolium alkyl side chains. Initially, eleven diimidazolium salts, differing for their anionic counterparts, were assayed for: i) antibacterial property, quantified as the minimal concentration inhibiting at least the 90% of bacterial growth (MIC90) using Escherichia coli and Kocuria rhizophila as Gram-negative and Gram-positive tester strains respectively; ii) antitumoral activity measured as the concentration inhibiting the 50% of cell growth (IC50) using SKBR-3 breast cancer cell line. All the assayed diimidazolium salts possess biological activity showing i) 0.1-0.5 and 25-50 μg/ml as MIC90 values against of K. rhizophila, and E. coli; respectively, and ii) 30-55 μg/ml as IC50 values. Among the tested diimidazolium salts, three were chosen to further investigate the relationship between biological efficacy and either length of alkyl side chains or isomeric substitution on the cation. Isomeric substitution revealed few or no effect while a positive correlation between alkyl chain length and cell-growth inhibitory efficacy was shown. Although further studies have to be performed to elucidate the molecular mechanisms leading to cell growth arrest, this study provides insights on the attractive possibility of dicationic imidazolium salt exploitation as chemotherapeutic compounds whose activity can be tuned by modifying structural characteristics.