

Metal self-assembly mimosine peptides with enhanced antimicrobial activity: towards a new generation of multitasking chelating agents.

Autorzy

Joanna Izabela Lachowicz

Gabriele Dalla Torre

Rosita Cappai

Enrico Randaccio

Valeria Marina Nurchi

Remigiusz Bąchor

Zbigniew Szewczuk

Łukasz Jaremko

Mariusz Jaremko

Maria Barbara Pisano

Sofia Cosentino

Germano Orrù

Antonella Ibba

Joni Mujika

Xabier Lopez

Rok wydania

2020

Czasopismo

Dalton Transactions

Numer woluminu

49

Strony

2862-2879

DOI

Streszczenie

Mimosine is a non-protein amino acid with various properties, such as antibacterial, anti-inflammatory, anti-cancer and anti-virus among others. Due to its structural similarity with deferiprone (**DFP**), mimosine is a potential excellent metal chelator. In the present work, we combine experimental and theoretical (DFT) approaches in order to investigate the properties of mimosine peptides. Six different peptides were synthesized and their complex stoichiometry and stability were characterized by means of UV-Vis spectrophotometry. Then, the binding mode and self-assembly features of the peptides were evaluated using a DFT approach, taking into account different number of mimosine amino acids and varying the length of the spacer between the mimosine residues, and there was good agreement between experimental data and computational calculations. Further elucidations of the structural properties of these peptides allowed us to propose improvements in the structure of the mimosine moiety which can lead to enhanced affinity for high-valent metals. Moreover, we demonstrate that these peptides show an anti-microbial activity against Gram positive bacteria that is enhanced by the formation of a complex with iron(III) ions. The mimosine peptides could be an alternative to antimicrobial peptides (AMPs), which are expensive and susceptible to proteolytic degradation. In summary, in the present work, we propose a new generation of multipurpose mimosine-based peptides as new metal self-assembly chelators which could be a turning point in biomedical and nanotechnological applications.

Adres publiczny

<http://dx.doi.org/10.1039/c9dt04545g>

Strona internetowa wydawcy

<https://www.rsc.org/>

10.1039/c9dt04545g

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Plik został wygenerowany dnia 2026-10-06 21:45:53

Adres w repozytorium <https://old.chem.uni.wroc.pl/pl/repozytorium/ds-bjPT>.