Investigation of the inhibitory effect of two new phenol-ninhydrin derivatives on humansalivary α-amylase enzyme

Narges Alipour Saqa - Department of Biology, Yadegar-e-Imam Khomeini (RAH) Shahre Rey Branch, Islamic Azad University, Tehran, Iran

Shiva Khalil- Moghaddam - Young Researchers and Elite Club, Yadegar- e- Imam Khomeini (RAH) shahr-e-Rey Branch, Islamic Azad University, Tehran, Iran

Ashraf Shahvelayati - Young Researchers and Elite Club, Yadegar- e- Imam Khomeini (RAH) shahr-e-Rey Branch, Islamic Azad University, Tehran, Iran

Inhibition of α-amylase, an enzyme that plays a role in the digestion of starch and glycogen, is considered as a strategy for the treatment of disorders in carbohydrate uptakes, such as diabetes and obesity. Inhibitors of carbohydrate-digesting enzymes, such as alpha-amylase and alphaglucosidase, are now actively searched for since they could ultimately make useful medicines against diabetes and obesity. In the present study, by considering the structural requirements, two new phenol-ninhydrin derivatives as α-amylase inhibitor were synthesized. Inhere, pyrogallol has been used as a polyphenol compound. Ninhydrin-Pyrogallol monoadduct and Ninhydrin-Pyrogallol bisadduct derivatives characterized by spectral analysis and finally evaluated for the inhibition of human salivary α-amylase activity by the method of Bernfeld. Mono and bis adduct derivatives exhibited their best α-amylase inhibitory activity at a 1 millimolar concentration (23 and 69.4 Percentage of inhibition). Results showed that bis adduct derivative can be explored as a strong anti-hyperglycemic agent. Putative binding mode of two derivatives with the target enzyme was also explored by the docking studies.

Keywords:
Diabetes, Human salivary alpha-amylase, Ninhydrin pyrogallol derivatives

https://civilica.com/doc/850233