Abstract No.23

Neohesperidin Dihydrochalcon Activator of Alpha- amylase: a Mechanistic Study

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Alpha Amylase digest starch in a wide variety of organisms. Because of its important role in controlling blood sugar its inhibitors and activators are of interest. Previously, we found that neohesperidin dihydrochalcone (NDC) is an activator of porcine pancreatic alpha amylase (PPA) . This study was aimed to determine the kinetic parameters of this activator. We applied Bernfeld method to assay the enzyme, using different concentrations of substrate against NDC. NDC behavior was also assessed in the presence of acarbose (strong enzyme inhibitor). Linweaver–Burk plots were drawn to obtain kinetic parametrs of NDC. To get an insight on the putative NDC activation site, we docked NDC on PPA with the use of Autodock Vina. Linweaver-Burk plot and replots were drawn to obtain α, β and Ka values. Two intercepts were obtained, affinity to substrate (α) and kcat (β) in both intercepts followed a β>1 and α<1 pattern. While under 1400 (µmole/lit) of NDC, intercept is above X-axis and above 1400 (µmole.lit -1) intercept is under X-axis, it's assumed that NDC follows both increasing cooperativity (between activator and substrate) and increasing catalytic constant pattern to raise enzyme activity. Some competition is also observed between acarbose and NDC. NDC is proposed to interact with PPA in a pocket near Asp402 and Arg 252 which was previously suggested to become occupied by caffeine and theobromine (other weaker activators of PPA that we have reported) . NDC may bind in this pocket via hydrogen bonds which are not observed in the weaker activators, a fact that could be related to the higher effectiveness of NDC. In conclusion, NDC is a highly activator of PPA which may play its role through boosting intramolecular hydrogen bonding in a putative activating site.

Keywords: Neohesperidin Dihydrochalcon, Alpha-Amylase, Kinetic Parameters, Activator.

Abstract No.24

Novel Hydrogen Peroxide Biosensor Using Functionalized-carbon Nanotubes and Nanoclay

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Phenolic compounds are important starting materials in a broad range of chemical manufacturing materials. Due to drastic environmental legislation, analytical determination in the subnanomolar range is one of the challenges of all analytical devices. Among these different analytical devices, biosensors play an important role due to some generally claimed advantages: intrinsic specificity, low costs and fast analyses. In this study, we demonstrate the synthesis of carbon nanotubes (CNTs) on clay minerals, and the development of biosensors based on COOH–MWCNT/Clay–HRP and composite films for the detection of hydrogen peroxide (H_2O_2). The mixed hybrid film of CNT/Clay, HRP is coated on the glassy carbon (GC) electrode to detect H_2O_2. This film exhibits a detection limit of 5.0×10^{-5} M for H_2O_2 with a sensitivity of 280 µA mM^{-1}. A higher sensitivity and more stability of enzyme are observed with increasing H_2O_2 content in the composite matrix film. Consequently, the CNT/Clay medium can probably be a useful electrode for the development of sensors due to its high sensitivity and applicability

Keywords: Clay, Biosensor, Carbon Nanotube, HRP.

Abstract No.25

Spectroscopic Investigation of Gold Nanorice – Enzyme Nanobioconjugates for Drug Delivery Applications

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The remarkable feature of plasmonic-anisotropic nanoparticles arises from their structural, electronic, magnetic and catalytic properties. Tunability of the size, morphology and surface of nanoparticles in controlled synthesis strategies has raised great interest of nanobiotechnologists. A combination of optical-thermal properties of plasmonic nanoparticles and biomolecules could be utilized for development of non-destructive therapeutic and diagnostic agents. Although applicabilities are undeniable, a number of undesirable