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Phylogenetic reconstruction of some species of Indian termites based upon mitochondrial gene data

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Termites have colonized many habitats and are mainly abundant in the tropical ecosystems. Particularly, termites of the genus *Odontotermes* are widely distributed in the Indo-tropics and are the most important decomposers in the old World tropics. The species within this genus are difficult to differentiate morphologically due to the lack of up to date keys and also due to very little inter specific morphological variations. As a result, the taxonomy of *Odontotermes* has not been adequately worked out. In insects, the mitochondrial NADH dehydrogenase subunit 1 (*ND1*) gene region has proved to be a suitable marker especially for the identification of lower level taxonomic entities such as populations and sister species. So, to shed light on *Odontotermes* diversifications, we sequenced fragment of mitochondrial *ND1* gene to elucidate species boundaries within *Odontotermes* species/populations collected from Northern India and identified named taxa with which they may be associated. The nucleotide composition was found to be biased towards transitions with a significantly high A+T content ranging from 63.77% to 64.66%. Sequences of the out group taxa were retrieved from GenBank and the data were aligned using CLUSTAL omega software. Sequence analysis and phylogenetic reconstruction was carried out in MEGA 6.06. The results supported the monophyly of the genus *Odontotermes* and the unidentified sample occupied a position within the the *O. obesus* lineage indicating its possible origin.

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Protein functionalized nanostructured zirconia decorated reduced Graphene oxide based biosensor for food toxin detection

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This work describes the fabrication of nanostructured zirconia (~13 nm) decorated reduced graphene oxide (ZrO_2-RGO) based immunosensing platform for efficient and label-free detection of food toxin (aflatoxin B1, AFB1). Nanostructured zirconia has been uniformly decorated on reduced graphene oxide via one step, hydrothermal process and further functionalized using 3-amino propyl triethoxy silane (APTES). A thin film of APTES/ZrO_2-RGO was obtained through electrophoretic deposition (11 V; 90s) on to an indium tin oxide (ITO) coated glass electrode. Further, anti-AFB1 biomolecules were covalently immobilized on APTES/ZrO_2-RGO/ITO electrode through EDC-NHS chemistry. The structural, morphological and electrochemical studies of nanocomposite and the fabricated immunoelectrode were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier transform-infrared spectroscopy (FT-IR) and cyclic voltammetry techniques. Electrochemical response studies indicate that the immunosensor is capable of detecting AFB1 with a wide linear detection range (0.1-2.5 ng/ml), remarkable sensitivity (1.2 mA mL ng^{-1} cm^{-2}) and stability of upto 8 weeks.Thus, thisfabricated nanostructured zirconia decorated reduced graphene oxide (ZrO_2-RGO) based biosensing platform opens a new window for sensitive detection of food toxin marker.

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