An actinomycete strain, ID05-A0528T, was isolated using the SDS-yeast extract pre-treatment method from soil under mahogany \((Swietenia mahogani)\) trees in West Timor, Indonesia, and was examined by using a polyphasic taxonomic approach. Chemotaxonomic and phylogenetic characterizations demonstrated that the novel strain belongs to the genus *Dietzia*. 16S rRNA gene sequencing studies showed that the strain was related to *Dietzia cinnamea* (97.2%). Results of phenotypic and phylogenetic analyses determined that strain ID05-A0528T is different from the known species of the genus *Dietzia*. It is proposed that the isolate should be classified as a representative of a novel species of the genus *Dietzia*, with the name *Dietzia timorensis* sp. nov. The type strain is ID05-A0528T (=BTCC B-560T =NBRC 104184T).