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Prevalence of fungi and mycotoxins in cocoa beans from cocoa producing

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Prevalence of fungi and mycotoxins in cocoa beans from cocoa producing areas of ogun state, Nigeria: Dried cocoa beans are susceptible to spoilage by filamentous fungi, with consequent mycotoxins production which has significant effects on public health and hence food safety. In this study, the prevalence of fungi and mycotoxins in dried cocoa beans in Ogun State Nigeria as basis for quality and safety assessment for international trade was evaluated. Cocoa samples were randomly collected from (75 registered cocoa stores) the cocoa producing areas (Yewa, Ijebu and Egba) in the state and the storage conditions were noted. Fungi were isolated, counted and pure isolates were obtained which were characterized and identified using molecular methods. Also, Aflatoxin and Ochratoxin were extracted from the cocoa samples with suitable solvents and quantified using Enzyme-Linked Immunosorbent Assay. The results showed that the fungi count of the cocoa beans samples from all sampling areas were significantly different ($P < 0.05$). The highest count of 2.0×10^6 cfu/g, and the least count of 0.2×10^6 cfu/g were found in cocoa samples from (Yewa area and Egba area respectively). The dominant species of fungi isolated and identified from the cocoa samples were *A. fumigatus*, *Penicillium notatum*, *A. niger*, *Fusarium verticilloides*, and *A. flavus* with *Aspergillus* species as the most prevalent specie. *A. oryzae* and *A. nidulans* were also identified from some of the samples while the phylogenetic analysis of the fungi sequences and their evolutionary traits revealed the genetic diversity of DNA composition among the *Aspergillus* strains that were isolated. The total aflatoxin concentration found in the cocoa samples ranges between 17.5 and 20.5 ppb while the total ochratoxin concentrations were between 15.0 and 11.9 ppb. The study established the presence of toxigenic fungi as well as their toxins (Aflatoxin and Ochratoxin) in cocoa beans from cocoa producing areas in Ogun State Nigeria.

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