The diversity of Bacillus species isolated from the fermented soup condiment okpehe in Nigeria was studied using a combination of phenotypic and genotypic methods. Fifty strains presumptively characterized as Bacillus spp. using the API 50 CHB test were further identified by PCR of randomly amplified polymorphic DNA (RAPD) and by amplified ribosomal DNA restriction analysis (ARDRA) genotyping methods. ARDRA fingerprinting with HhaI, HinfI and Sau3AI restriction enzymes did not allow successful differentiation between the Bacillus species, except for distinguishing B. cereus from other Bacillus species. This problem was overcome with the combination of RAPD PCR and ARDRA genotypic fingerprinting techniques. Sequencing of 16S rRNA genes of selected strains representative of the major clusters revealed that the Bacillus strains associated with this fermentation were B. subtilis, B. amyloliquefaciens, B. cereus and B. licheniformis (in decreasing order of incidence). The presence of enterotoxin genes in all B. cereus strains was demonstrated by multiplex PCR. The high incidence of detection (20%) of possibly pathogenic B. cereus strain that contained enterotoxin genes indicated that these fermented foods may constitute a potential health risk.