Fungi, though the earliest source of secondary metabolites, remain an under-exploited for novel compounds especially when considering their diversity. Through screening many different fungi over the years, it is apparent there are variations in secondary metabolite production between different isolates of the same species from different substrates and in different habitats. Hence to target novel fungal secondary metabolites, a comprehensive screening programme has to be designed. 

A total of 130 strains of fungi were isolated from soil samples, fruiting bodies or decaying wood substrates collected from various places and some obtained from persons and institutions stocking such micro-organisms in Kenya. The strains were cultivated in submerged cultures in 500ml scale and extracts were prepared from both the mycelium and the culture filtrate at the end of fermentation. The extracts were screened for any significant activity in antifungal, antibacterial, nematicidal and phytotoxicity bio-assays. Where strong activity was observed, further screening was carried out to optimise production of the responsible active compounds. Four strains, namely Aspergillus viridi-nutans, Stereum sp. 99123, Tyromces albidus and a basidiomycete, stain 99126, showed consistent results and were further processed for biologically active except A.viridi -nutans and only steruem sp. 99123 had nematicidal principles. In all four cases the culture filtrate extract was responsible for the observed activities.

These four were further cultivated on various scales ranging from 1-100 litres quantities and extracts were prepared from the filtrate either by direct solvent extraction or adsorption on a resin and subsequent elution. The solvents were removed under reduced pressure and the extract concentrated to dryness.

Bio-assay guided fractionation of the extracts was done using chromatographic methods. Six compounds namely was abidienone B1, was bienone B0, phomaligin A and variation as well as new analogues viriditin and 13- 0-methylviriditin were purified from A. viridi-nutans. Variation was responsible for the strong antifungal activity shown by extracts of A. viridi-nutans. Erinapyrone C, striatal D and six other new compounds were obtained from Stereum sp. 99123. Striatal D was found to be a strong antimicrobial and cytotoxic compound. Complicatic acid was purified from Tyromces albidus and a compound JO224K51 with interesting structural features from the basidiomycete, strain 99126. Both complicatic acid and JO224K51 had strong antibacterial activity.

Structures of these compounds were elucidated using spectroscopic techniques. Ultraviolet, infrared, mass spectra and nuclear magnetic resonance measurements were taken as principal complementary techniques in discerning the structures. Proton and carbon-13 NMR spectra were recorded as well as 2D NMR experiments performed for each of the compounds to decipher the structure. Novelty of the compounds was established by comparing the observed properties with those of known compounds in instrument in -built electronic libraries, in the literature and various current natural products and chemical databases.