E1-18: ^{252}Cf plasma desorption mass spectra of penicillins and the stabilization of molecular ions by cationization

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The ejection of material (desorption) from the solid surfaces by the impact of high energy particles such as fission fragments from a ^{252}Cf source has been utilised as the ion source of a ^{252}Cf plasma desorption mass spectrometer. Such a mass spectrometer equipped with a time-of-flight mass analyser has been constructed at the Dept. of Physics, Univ. of Colombo. Present investigation was carried out to study the molecular spectra of antibiotics in the penicillin group which are commonly available in Sri Lanka. Three compounds ampicillin, amoxycillin and cloxacillin, which have the same basic structure were analysed to compare the mass spectra with respect to the molecular ion yield and the fragmentation pattern. The molecular ions gave less intense peaks than the fragment ion peaks in all 3 cases indicating the instability of intact molecules of such compounds in the desorption/ionization process. Cationization (e.g replacement of a hydrogen atom by a cation) was tried with all 3 compounds using potassium as cation and then the cationized compounds analysed in the mass spectrometer. One compound, namely ampicillin, registered an intense peak corresponding to a 8 fold increase in the absolute yield compared to the molecular ion peak of ampicillin itself. This has been found to be another example of the possibility of stabilising the intact molecular ions in the desorption/ionization process by cationization.

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