Introduction Pharmaceuticals and personal care products (PPCPs) are the subject of increasing concern and scientific interest (1, 2).The bimolecular rate constants (reaction with o OH and 1 O2) and apparent quantum yields of the indirect photodegradation for amine drugs were determined to predict the photochemical fate of amine drugs in the natural waters.In this work, a class of amine drugs including primary, secondary, and tertiary amines was selected for study based on the likelihood that they would undergo photodegradation due to their structural moieties in the presence of HS. The photodegradation mechanism was elucidated in detail.Although they were generally detected in the ng–ug/L range, the continual infusion into the aquatic environment leads to the chronic exposure of nontarget organisms in the waters with largely unknown consequences (3, 4).The numerous studies have identified humic substances (HS) and NO3 – as significant participants in the indirect photodegradation of pollutants (17, 18).To date, most of the concerns were the phenolic compounds for the enhanced degradationmediated by HS (17, 26–28), and some phenols have been demonstrated to be degraded via electron transfer mechanism (28).The relationship between structure and activity for the reaction of amine drugs with HS was preliminarily examined in order to predict the propensity of various amines toward photooxidation in the sunlit surface waters.Both of them can photogenerate the highly reactive, nonselective o OH thereby limiting the persistence of many pollutants that degrade relatively slowly by direct photolysis (19, 20).Additionally, photolysis of HS leads to the formation of other reactive species, including 1 O2 (21), O2 o–/HO2 o (22), H2O2 (23), eaq– (24), and the reactive HS triplet states (3 HS*), of which O2 o–/HO2 o , H2O2, and eaq– may play a minor role in the sunlit surface waters (25).Although there have been many studies proving the enhancement effects of HS on photolysis of the substrates (26), the photochemical mechanism underlying the degradation is still not well understood.There are numerous reports concerning the occurrence of PPCPs in the wastewater treatment plants (WWTP), surface water, groundwater, and drinking water every year.As one subset of the PPCPs pollutant class, the amine drugs have been widely used and repeatedly found at concentration ranging from 0 to 2.5 ug/L (5–12).Major degradation products were identified by GC–MS analysis.