Interaction of 5-aminosalicylic acid with nitrous acid: Formation of the diazonium derivative and nitric oxide release

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The reaction of 5-aminosalicylic acid (5-ASA) with nitrous acid has been studied at low pH under conditions that simulate a gastric environment. The course of the reaction was followed by UV-visible and fluorescence spectroscopy and the products were analyzed by high performance liquid chromatography (HPLC) with UV-visible and mass spectroscopic detectors. In addition, the formation of nitric oxide (NO) was estimated electrochemically. 5-ASA was readily consumed in a process catalyzed by chloride and thiocyanate, whose rate is first order in 5-ASA and second order in nitrous acid. 2-Hydroxy-5-diazonium benzoic acid (diazonium derivative) and NO were detected as products of the reaction. From the NO formation profiles, it is concluded that NO is produced as a minor product in a process parallel to the path that leads to generation of the diazonium derivative. While the formation of NO could be beneficial for the protection of the stomach, the generation of the diazonium derivative could