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Solvent-free mechanochemical obtention of phenol-N-aminal aggregates

John Sadat-Bernal[1], **Augusto Rivera**[2], **Jaime Ríos-Motta**[2], **Jicli José Rojas**[2] and **Michael Bolte**[3]
[1]Universidad Militar Nueva Granada, Colombia
[2]Universidad Nacional de Colombia, Bogotá, Colombia
[3]Institut für Anorganische Chemie, Frankfurt Am Main, Germany

Phenols and cyclic aminals are known to form a variety of supramolecular aggregates via O—H···N hydrogen bonds, and complexes of phenols with various nitrogen bases are model systems often applied in the study of the nature of the hydrogen bond. Previously, hydrogen bonding between the hydroxyl group of acidic groups such as phenols and heterocyclic nitrogen atoms has proved to be a useful and powerful organizing force for the formation of supramolecules. The phenol–N complex has also served as a good model for the investigation of proton and electron-transfer processes occurring in living matter, it being generally assumed that this interaction consists solely of the attraction between the lone pair of the amine N atom and the phenolic hydroxy proton. In addition to the typical features of intermolecular hydrogen bonding, these systems have an extra advantage over many other complexes because they play an important role in probing the anomeric effect in N—C—N (aminal) systems even though the anomeric effect is well recognized as an important factor in defining the predominant conformational state of many cyclic heteroatom containing compounds. Noteworthy, usually cyclic aminals react with phenols when the reaction is attempted under standard conditions in various organic solvents affording symmetrical imidazolidines in good yields. We discovered that, under mechanochemical conditions, grinding the reagents in a mortar and pestle, the reaction of some cage type aminals with phenols affords phenol–aminal aggregates in excellent yields. Furthermore, no side products form in the reaction mixture. Usually, washing the homogeneous mixture with an appropriate solvent and filtration of the solid gives the pure adduct. This mechanochemical process provides a convenient and efficient method to produce these adducts, and is also environmentally friendly.

Biography

John Sadat-Bernal studied Chemistry at the Universidad Nacional de Colombia. He received his PhD degree in Chemistry from Universidad Nacional de Colombia where he worked on his thesis entitled, 'synthesis of N-containing heterocyclic compounds'. He joined the Universidad Militar Nueva Granada (UMNG) as a Professor and Researcher 3 years ago and his research interest focuses mainly on heterocyclic synthesis and analytical methods.

john.bernal@unimilitar.edu.co

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