

# Green Synthesis of 2-Carbamidinopyrazine

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Aryl amidines in general are synthesized via a two-step synthesis, with the first step involving the synthesis of an imidate, and the second step being the incorporation of nitrogen (Figure 1). The current strategy is not efficient or student-friendly as the first step involves the use of a strong base, and the second step requires the use of a large amount of solvent and a large excess of ammonium chloride. To overcome these problems and to make a more efficient synthesis, we successfully synthesized 2-carbamidinopyrazine by using a weak base with methanol and ammonia, and by targeting the ideal anion to precipitate 2-carbamidinopyrazine. All the products and intermediates were characterized by single-crystal X-ray diffraction to confirm the obtention of the final product, as these compounds have N-H hydrogens frequently difficult to locate by <sup>1</sup>H NMR. Two final product salts with pyrazine-2-carboximidamide as cation and chlorine or bicarbonate as anions were obtained, with different hydrogen bond motifs and solubilities. In the future, we plan to extend the synthesis to other aryl amidines.