STUDY IN THE REACTION OF CYANAMIDE WITH 1,3-DIAMINOPROPANE: FORMATION OF MELAMINE AND TETRAHYDRO-2-PYRIMIDINONE

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Abstract: Endogenous agmatine, which is neuroprotective and a neurotransmitter, binds to α₂-adrenergic receptor and imidazoline binding sites, and blocks NMDA receptors and other cation ligand-gated channels. Agmatine inhibits nitric oxide synthase (NOS), and induces the release of some peptide hormones. The enzyme, agmatinase, degrades it into polyamine. We are interested in controlling the level of agmatine by inhibiting agmatinase and have designed several derivatives. A previous experiment shows that 3-aminopropyl guanidine (APG) shows the inhibition activity on the enzyme. Initially, APG was prepared from the coupling reaction between cyanamide and 1,3-diamino propane. However the reaction produces APG as a minor product with two byproducts, melamine and tetrahydro-2-pyrimidinone. Two byproducts were analyzed by NMR, MASS and X-Ray Single Crystallography. The reaction mechanism has been proposed and will be discussed.

Keywords: Agmatine, Agmatinase, Agmatinase inhibitor, 3-aminopropylguanidine, melamine, tetrahydro2-pyrimidinone, NMR, MASS, and X-Ray Single Crystallography

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