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Synthesis and growth-regulating activity of ammonium salts maleamic acids

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Abstract

The article describes the synthesis of ammonium salts of maleamic acids containing amino acid fragments. At the first stage, the interaction of maleic anhydride with aliphatic and aromatic amino acids yielded the corresponding maleamic acids. Glycine, α-alanine, ε-aminocaproic, *para*-aminosalicylic, *ortho*-, *meta*- and *para*-aminobenzoic acids were used as amino acids. In the case of aliphatic amino acids, the process was carried out in an aqueous or aqueous-acetone (2: 1) medium. For aromatic amino acids, acetone was used as a solvent. As weakly exothermic reactions progressed, colorless finely crystalline or light yellow friable precipitates of the corresponding maleamic acids precipitated. In the second stage, the suspension of synthesized maleamic acids in an aqueous medium was treated with a calculated amount of 25% aqueous ammonia solution. With further isothermal evaporation of aqueous solutions, ammonium salts crystallize in the form of hygroscopic colorless prisms or fine crystalline dense precipitates. The structure of the newly obtained compounds was confirmed by IR and ^{1}H NMR spectroscopy. In order to identify the biological activity of the synthesized salts, the effect of their aqueous solutions of various concentrations on the germination energy (GE) and laboratory germination (LG) of the seeds of spring barley cultivar «Elf», winter rye of the «Bezenchukskaya 87» variety and wheat was studied spring varieties «Moskovskaya 35». The determination of GE and LG drug in experimental and control samples showed that 0.01% - 0.001% aqueous solutions have a stimulating effect on seed germination compared to control. The best effect is achieved with pre-sowing seed treatment with 0.01% aqueous solutions of ammonium salts of maleic acids, which allows to increase germination by 9-26%.

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