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DETERMINATION OF OPTIMAL PARAMETERS OF NEUTRALIZATION OF MONOETHANOLAMINE WITH SULFURIC ACID

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It is important to remove the cotton foliage before harvesting to improve the quality of the cotton fiber with less debris during harvesting by machines [1]. Thus, harvesting aids, such as chemical defoliants or desiccants, are now considered important components of modern cotton production [2]. Hence, defoliation is an important management practice associated with this high yield and high quality cotton [2]. The role of physiologically active substances like monoethanolammonium sulfate in defoliation is to increase yields by accelerating the opening of young bolls after the fall of cotton leaves [3].

To find the optimal ratio of sulfuric acid and monoethanolamines, which provides a neutral pH of the medium (pH = 6–7), during the neutralization process, the acid was added in stages and at each stage the pH of the medium, the temperature of solution and the ratio of the components corresponding to the concentration of the acid in the solution. The study found that the optimal ratio of sulfuric acid and monoethanolamine, providing a neutral pH of the medium (pH = 6–7) in solution, is 0.60 : 1.

To determine the optimal mode that allows maintaining the temperature of solution at a constant level, the experiment was carried out using the following modes of the sulfuric acid inning rate in the MEA: 1 ml/min., 0.5 ml/min. and 0.17 ml/min. The temperature of solution, the pH of the mixture medium, the degree of decomposition, and the color change of the final products were determined for each mode.

The results of the study showed that different modes of the neutralization process differ from each other in terms of the observed properties of the solution and loading products. Based on the results obtained, a comparative diagram of the process modes was constructed.

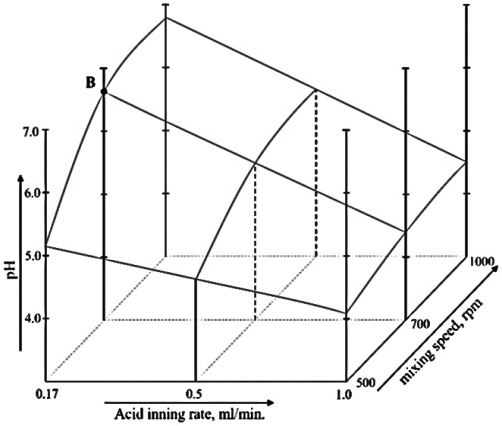

Fig. 1. – Comparative diagram of the modes of the process of neutralization of triethanolamine with sulfuric acid (Ratio H_2SO_4: MEA (0.60: 1))

The study showed that saturated solution of monoethanolammonium sulfate with 6–7 pH of medium can be obtained at sulfuric acid inning rate of 0.17 ml/min. and mixing speeds of 700 and 1000 rpm. The optimal mixing speed mode, which allows you to achieve the desired result at mi-nimal cost, was accepted as 700 rpm. As a result of the interaction of sulfuric acid with monoethanolamine, a 95.8 % saturated solution of monoethanolammonium sulfate is formed with a pH value 6.61 and a crystallization temperature of –52.4 °C.

References

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