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TECHNOLOGY DEVELOPMENT OF OBTAINING HIGH CONCENTRATION AMMONIA WATER AND LIQUID MULTIPLE-NUTRIENT FERTILIZERS ON ITS BASIS

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Decreasing of the crop productivity and falling-off in agricultural production make farmers in Ukraine look for a solution from the critical situation. The main factor of increasing productivity and effective land use is applying organic and mineral manure. The use of organic fertilizers is complicated by a sharp reduction in the number of livestock, and thus the number of organics as well.

Farmers don't have enough money to stock up with mineral fertilizers. According to the world experience, using liquid fertilizers is the most technologically and economically advantageous. They provide drastic fertilizer loss reduction, full mechanization of handling operations, high uniform soil fertilization and labor costs reduction.

Taking into consideration difficult economic conditions in Ukraine production engineering of ammonia water and liquid multiple-nutrient fertilizers have become more important. There is a need to put together devices using block-modular method and it enables to transport the equipment to a place of destination. It offers an opportunity for agrarian partnerships to rise to a new level and unite into associations for co-production and management of their own small manufacture producing liquid fertilizers as in the USA.

There are the following research tasks we need to complete to create an advanced technology of liquid fertilizer production: to analyze physical and chemical properties of ammonia, its aqueous solution and complex chemical compounds; to analyze basic methods of obtaining liquid fertilizers; to develop the technology of obtaining ammonia water and liquid multiple-nutrient fertilizers based on high-nitrogen ammonia water.

The research has shown the following results: dependence of phase equilibrium of the studied gas-liquid systems according to the Henry's law, upon which the optimal conditions of obtaining ammonia water with concentration of 25 or 34 percent and above were selected; the shortcomings of traditional obtaining of liquid nitrogen fertilizers were identified; advanced technology of intensive nitrogenation and mineralization of liquid fertilizers was developed.

The obtained research results are source information for performing of numerical static and dynamic modeling of chemical and technological process based on the software package for thermodynamic modeling that enables to define technological parameter sand to make prior selection of the equipment.

The present work has been carried out under the guidance of Assoc. Prof. Liaposhchenko O. O., and senior lecturer Skydanenko M. S.