OBTAINING OF COMPLEX MINERAL FERTILIZER BY PHOSPHOGYPSUM CONVERSION WITH AMMONIUM NITRATE

Anna Ivanchenko[®] ^{a*}, Dmytro Yelatontsev[®] ^a, <u>Anatoliy Savenkov</u>[®] ^b, Olena Nazarenko ^a, Viktoria Kundirenko ^a

^aDniprovsk State Technical University, 2, Dniprobudivska str., Kamianske, 51918, Ukraine ^bNational Technical University "Kharkiv Polytechnic Institute", 2, Kyrpychova str., Kharkiv, 61002, Ukraine ^{*}e-mail: ivanchenkodgtu@gmail.com; phone: +380970695877

Abstract. The paper proposes an environmentally friendly method for phosphogypsum processing into N,Ca,S,P-fertilizers. The liquid complex mineral fertilizer was obtained by treating phosphogypsum with an ammonium nitrate solution. The dependence of the content of Ca^{2+} , SO_4^{2-} , NO_3^{-1} ions in the temperature range of 20-80°C at the ratio CaSO₄:NH₄NO₃= 1:0.5 was studied. The optimal temperature for the fertilizer obtaining was established at 60°C. It was obtained a complex liquid N,Ca,S,P-fertilizer with the content of nutrients (wt. %) N:Ca:S:P= 56:26:12:6 in the dry product, and 16.8:3.6:7.8:1.8 in the liquid phase. The obtained fertilizer increased the yield of radish by 7.16% compared to the control. The advantage of the proposed method is reducing the cost of the fertilizer, increasing its nutritional value, and obtaining useful products from the waste.

Keywords: phosphogypsum, ammonium nitrate, complex mineral fertilizer, wet conversion.

Received: 16 November 2021/ Revised final: 28 March 2022/ Accepted: 31 March 2022