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# PREPERATION OF LOW-TEMPERATURE POLYPHOSPHATE FERTILIZER SUPLIMENTED WITH SERPENTINE

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Nowadays most consideration acquires for manufacturing of phosphorus fertilizer. More perspectives for apply as a highly concentrated phosphorus fertilizer belong condensed phosphate which is have different degrees of polymerization with higher content $P_2O_5$ on it.

It is known that the content and properties of the polymer phosphate is change dramatically from the nature additive.

In this regard the goal of this investigation work is to provide a low temperature polyphosphate fertilizer in basis low grade nature phosphates. Also study the effect of adding sulfuric acid and serpentine on the properties polyphosphates. A feature of this method is to replace sulfuric acid to serpentine which is non-deficient magnesium silicates waste in asbestos production that to investigate its effects on the poly condensation process in the system phosphorus - $H_2SO_4$.

The table clearly presents the content of the polyphosphate fertilizer at different temperature and minutes. This means that content of the $P_2O_5$, % general, $P_2O_5$, % digestible, $P_2O_5$, % water solution which is determined by per cent in the fertilizer. The optimal time is concluded during the seven experiments. The obtained results show to the high content of general and digestible $P_2O_5$ forms by temperature poly condensation 300$^0$C and 30 minutes. The small difference between content of the general and digestible $P_2O_5$ indicates that polyphosphate fertilizer obtained under this conditions is well absorbed by soil.

The content of the general, digestible and water $P_2O_5$ decrease by the increasing duration calcinations at 360$^0$C. It is considered that forming of insoluble long chain polyphosphates. In polyphosphate fertilizer is not loose acidity which is an advantage of these products. The physical properties of products which have obtained are satisfactory as granular and hydroscopic. All these results indicate that the serpentine is de polymerization that is form a long polymer in process poly condensation. Furthermore, the content of the nutrient elements such as magnum and silicon would rise by adding serpentine ($3MgO{\cdot}2SiO_2{\cdot}2H_2O$).

**Table 1. The content of polyphosphate fertilizer**

| № | Condition for preparation polyphosphate | | $P_2O_5$, % general | $P_2O_5$, % digestible | $P_2O_5$, % water solution | $P_2O_5$, % loose | $F^-$, % | CaO, % general | CaO, % water solution | MgO, % general | MgO, % water solution |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | t$^0$C | τ,min | | | | | | | | | |
| 1 | 300 | 15 | 48.78 | 41.88 | 13.95 | - | 1.02 | 23.43 | 0.99 | 8.23 | 0.87 |
| 2 | 300 | 20 | 49.87 | 45.57 | 14.42 | - | 1.01 | 25.44 | 0.74 | 8.23 | 0.87 |
| 3 | 300 | 30 | 51.41 | 47.86 | 19.89 | - | 1.00 | 25.45 | 0.75 | 8.21 | 0.74 |
| 4 | 300 | 45 | 50.09 | 43.45 | 10.45 | - | 1.00 | 23.38 | 0.92 | 8.20 | 0.73 |
| 5 | 360 | 15 | 49.69 | 44.05 | 12.45 | - | 1.01 | 25.44 | 0.75 | 7.98 | 0.87 |
| 6 | 360 | 30 | 48.16 | 43.37 | 10.89 | - | 1.02 | 24.75 | 0.99 | 7.98 | 0.93 |
| 7 | 360 | 45 | 45.36 | 34.86 | 4.93 | - | 1.02 | 24.75 | 0.77 | 7.98 | 0.87 |

To sum up, well digestible polyphosphate product could be obtain without application sulfuric acid so by replacement to it serpentine which improves the quality of polyphosphate fertilizer at 300$^0$C and 30 min.

**LIST OF POSTERS AT THE INTERNATIONAL FERTILISER SOCIETY CONFERENCE DECEMBER 2014**

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1. FACTS: A professional accreditation scheme for crop nutritional advice- operation, development and value (Summary unavailable)
   *J Salter*

2. Recent development of the Growhow Nmin® Test for the determination of Soil Nitrogen Supply (SNS).
   *L. Blake, M.M.A Blake-Kalff and A. Grundy*

3. Effect of different rates of liming material on the pH value of soil.
   *Barbara Čeh*

4. Grassland nitrogen uptake and use efficiency as affected by fertiliser nitrogen source and inhibitors
   *P J Forrestal, M Harty, C J Watson, K Richards and R Carolan*

5. The effect of urea fertiliser formulations on gross nitrogen transformations in a permanent grassland soil
   *M Harty, K L McGeough, C J Watson, K G Richards , G Lanigan, P J Forrestal and R J Laughlin*

6. Reducing gaseous emissions from landspreading of slurry in Ireland
   *Gary J Lanigan, Conor Dowling, Fredric Bourdin, Grainne Meade, Enda Cahalane, Ray Brennan, Catherine Watson, Tom Curran, Karina Pierce,Mark Healy, Owen Fenton and Karl G. Richards*

7. Effects of soil properties and temperature on the efficacy of the nitrification inhibitor dicyandiamide
   *K L McGeough, C Müller, R Olave, C J Watson, R J Laughlin and D Chadwick*

8. Timing and form of organic fertiliser application affects greenhouse gas emissions from an arable soil
   *Nicola Hinton, Robert Rees and Madeleine Bell*

9. Ammonia loss rates from urea and calcium ammonium nitrate applied to winter wheat on three different sites in Germany.
   *T Kreuter, K N,M Gaßner, U Schmidhalter, J Döhler and A Pacholski*

10. A comparison of urea and calcium ammonium nitrate in long term trials.
    *Carola Schuster, T Kreuter and M Fuchs*

11. Preparation of low-temperature polyphosphate fertiliser supplemented with serpentine.
    *G S Kuanysheva, B D Balgysheva, and N S Dalabayeva*

12. The N-Pilot®, an optical sensor to enhance nitrogen use efficiency
    *S Marquis, E Minier, T Genter and P Dugast*

13. Exploiting yield maps and soil management zones
    *Shibu E Muhammed, Alice E Milne, Ben P Marchant, Simon Griffin and Andrew P. Whitmore*

14. Using the handheld manganese tester NN-Easy 55 to back-up decisions on Mn foliar applications: experiences from Germany.
    *Hans-Werner Olfs, Anne Borchert and Herbert Pralle*

15. A proposal for a new approach to soil testing and fertiliser recommendations for phosphorus in Poland.
    *Alicja Pecio and Kazimierz Kęsik*