

ISMA* Technical Meetings

Paris, France

25-27 September 1951

**In 1982, the name of the International Superphosphate Manufacturers' Associations (ISMA) was changed to International Fertilizer Industry Association (IFA).*

RMC

THE INTERNATIONAL SUPERPHOSPHATE MANUFACTURERS' ASSOCIATION

AGRICULTURAL COMMITTEE
1, AVENUE FRANKLIN D. ROOSEVELT
PARIS (8^e)
TEL. BALZAC 57-25

SECRETARY:
R. M. COLLINS

CENTRAL OFFICE
32 OLD QUEEN STREET
LONDON, S.W.1.
TEL. WHITEHALL 7262

LE 300

September 1951.

TECHNICAL MEETINGS 1951

Paper No. 15

CONFIDENTIAL

This paper will be presented at the Technical Meetings in Paris on September 25th and 27th, 1951. It must not be published prior to that date and, in any case, it must not be published without the permission of the author.

CALCINED PHOSPHATES

By Dr. G. Behnen, (Chemische Werke Rombach G.m.b.H.)

After the 1914/1918 war the development of calcined phosphates in Germany resulted in a considerable production of alkaline phosphate of lime products such as Rhenania Phosphate.

In the rest of the world Calcined Phosphates hardly emerged from the laboratory stage and certainly did not involve the erection of important plants.

The present world shortage of sulphuric acid gives a renewed impetus to the development of Calcined Phosphate works.

The following is a short summary of the situation now obtaining in Germany.

RHENANIA PHOSPHATE

Messerschmitt developed a process in the Rhenania works according to which rock phosphates with an addition of phonolite and soda, later soda alone, is subjected in rotary kilns to a calcination process at a temperature of 1100° to 1200° centigrade. Clinkers of alkaline phosphate of lime are formed which after grinding are sold as Rhenania Phosphate, a fine powder of light colour, containing about 25% of citrate-soluble P₂O₅, which can be readily spread.

Used as a phosphatic fertiliser, Rhenania Phosphate has given excellent results. Nowadays it represents an important factor in the German phosphatic fertiliser industry.

The production cost of the process is considerably affected by the addition of soda, further by heavy fuel consumption and the considerable repairs to the brick lining of the kilns.

Experience of many years shows that these costs correspond in normal times to the cost of sulphuric acid in the production of Superphosphate. When by-product acid is used in the Superphosphate industry, Rhenania phosphate can only compete if specially cheap and plentiful soda ash from soda works is available.

With to-day's exaggerated world market prices for sulphuric acid the Rhenania process is, generally speaking, lucrative and interesting if it is possible to ensure adequate soda supplies.

For the construction of calcined phosphate works it is necessary to have at one's disposal the services of experienced engineers and chemists since the processes are very complicated and require long experience at the works if severe setbacks are to be avoided.

PALATIA PHOSPHATE.

Messrs. Giuliani, Ludwigshafen, are placing a calcined phosphate on the market which is produced in a manner similar to that of Rhenania Phosphate soda being replaced by sodium sulphate. This process is only economic if the sodium sulphate is available as a waste product from another production line. Pure sodium sulphate would be too expensive for the production of calcined phosphates.

RÖCHLING PHOSPHATE.

With the acid process for making steel the molten iron ore in the blast furnace is desulphurated by means of soda. This process results in a waste product called "soda slag". The Chemists dealing with smelting processes suggested the use of this soda slag for the calcination of rock phosphates. The reactions are exactly the same as with Rhenania process. In view of the fact that the soda portion of the slag is exceptionally cheap the production of calcined phosphate by this process is economic.

MG - PHOSPHATE

During the past year a magnesium phosphate has been developed in Eastern Germany. It is a calcined phosphate where the addition of soda is replaced by Magnesium sulphate - Kieserite. When treating potash salts this Kieserite is obtained in large quantities as a waste product. It is, therefore, possible to use it in the calcining process as being cheaper than soda. According to information not yet confirmed the reaction temperature, when using Kieserite instead of soda, is alleged to be about 300° centigrade lower, i.e. about 900° centigrade in the calcining process which is an advantage which must not be underestimated in connection with fuel consumption and repairs to the kilns. The fertiliser effect of calcium magnesium phosphates may be particularly advantageous. All the information which the author has so far received in regard to these products has not been verified but he is of the opinion that special attention should be paid to this development at Hainrichshall, Rüdersdorf and Oranienburg.

Attached hereto is an extract from the publicity leaflet of Alcid Radobeul containing data in regard to the composition.

OUR CONTRIBUTION TO THE FIVE-YEAR-PLAN.

Mg-PHOSPHATE, the new phosphatic fertiliser for the farmer.

Mg-Phosphate is a new citrate-soluble phosphatic fertiliser. It was developed in the laboratory of the calcined phosphate works at Rüdersdorf in order to place at the disposal of agriculture a cheap phosphatic fertiliser which can be readily spread.

COMPOSITION: 18 - 22% phosphoric acid (P_2O_5)
of which 95% is in citrate-soluble form (neutral ammonium citrate)

12 - 14 % magnesium (MgO)

26 - 28% Lime (CaO)

28 - 30% sulphate (SO_4)

It contains all the important trace elements such as:- manganese, boron, copper, vanadium, chromium and zink.

Colour: light brown.

Form: granular, structure of sand (about 0.5 to 1.5 millimetres)

Physical properties: Easy to handle, without taste or smell, not affected by moisture, can be stored indefinitely.

Weight: 1.5 kg per litre.

Chemical Properties: Physiologically and chemically neutral, can, therefore, be mixed with any fertiliser.

The product is delivered in a granulated form without smell or taste, which can be spread readily and does not burn or attack. These properties constitute important advantages when storing, distributing or mixing with other fertilisers and when spreading on the field. Above all, its granulated form is particularly advantageous for the farmer when spreading by hand or machinery. The absence of hygroscopicity (absorption of water) is advantageous during storage in piles or sacks. The weight of the product amounting to about 1.5 kg per litre is 50% greater than that of superphosphate resulting in a further considerable saving in transport space and sacking during storage, transport and stacking in bags.

The fertiliser action of Mg-Phosphate is equal to that of superphosphate and Rhonania phosphate.

The magnesium content of the product increases the ready absorption of phosphoric acid by the plant. It is especially efficacious on soils with a magnesium deficiency which occurs frequently in acid soils. But also in the ordinary metabolism of the plant magnesium as the central atom of chlorophyll plays a decided rôle.

Owing to its composition and its excellent physical properties Mg-Phosphate constitutes an additional help in the five-year-plan to increase the yield per hectare, by facilitating operations, during storage and spreading on the

field, by avoiding losses in transport and by its beneficial and rapid action on the plant.

APPLICATION:

Mg-Phosphate is practically free from chlorine and hence it can be used for any crop or soil. It is advisable to spread it in autumn or early spring before or with the seeds. It can be mixed with all fertilisers. A simultaneous application of farmyard manure or other stable manures results in an additional increase in yield.