J. Natn.Sci.Foundation Sri Lanka 2005 ***33****(2): 151-152*

OPINION

IMPORTANCE OF EPPAWELA APATITE TO PRODUCE FERTILIZER FOR THE AGRICULTURAL DEVELOPMENT OF SRI LANKA

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Rock phosphate reserves are a non-renewable and dwindling resource world-wide. It has been estimated that all known deposits of rock phosphate will be depleted within the next 50 years and the remainder of the reserve base in the next 100 years[1]. This conclusion has a great bearing on what we do with our own resources of phosphate.

Eppawela rock phosphate deposit first discovered in 1971, has an estimated ore of 25 million tons with the possibility of a 60 million ton reserve. Eppawela rock phosphate is currently used as fertilizer for long term crops such as tea, rubber and coconut. It cannot be used for short term crops such as rice and vegetables which require either triple super phosphate (TSP) or single superphosphate (SSP). TSP is manufactured by the reaction of rock phosphate with phosphoric acid which itself is manufactured from rock phosphate by treatment with sulphuric acid. Under a different set of conditions, the same reaction can be employed to give single superphosphate (SSP). TSP is preferred over SSP when it comes to transporting phosphate fertilizers over long distances by ship since weight per weight, TSP contains approximately 2.4 times the phosphorus content compared to SSP. SSP however is suitable for use in a small country such as ours and the Agriculture Department has accepted SSP as being equally effective as TSP for our needs.

Producing phosphate fertilizers locally will have a direct benefit to our agricultural sector. The cost of one tonne of SSP imported to Sri Lanka is sold for approximately US$ 130. One tonne of SSP can be produced locally for approximately US$ 40. At present the amount of Phosphate fertilizer used in Sri Lanka is one of the lowest in Asia. The availability of low cost phosphate fertilizer will increase usage and result in immense economic benefits. Already the Lanka Phosphate Limited (LPL) has produced nearly 20 tons of SSP using simple technology. Preliminary field results show that the SSP so produced is equal to or better, than TSP when used in the fertilizer mixture.

Eppawela apatite deposit is one of the best in the world and has a high phosphorus content (40-42% as P_2O_5). Nearly 33 years after its discovery, there are still no plans to develop the full potential of this deposit. This deposit is often portrayed as an inferior quality deposit with impurities such as fluoride and iron and hence the idea is that it cannot be developed by Sri Lankans using simple technology. This has been conclusively disproved by the work of local scientists[2] and also by a study undertaken by scientists from New Zealand in 1998[3]. Recent work at Eppawela by Lanka Phosphate Ltd. too has proved beyond any doubt, the feasibility of producing well granulated SSP from the normal Eppawela phosphate rock.

Geologists have identified two distinct components in the Eppawela rock phosphate deposit, one with weathered rock rich in iron and fluoride and the other with single crystals of apatite which has relatively low fluoride and iron[4]. It is from this latter component that HERP (High quality Eppawela Rock Phosphate) is extracted, which is marketed by Lanka Phosphate Ltd. It has also been shown that this HERP is almost as effective as imported TSP when used in acidic paddy fields in Southern Sri Lanka. The solubility of the primary apatite in 2% citric acid is 6% (as P_2O_5) compared to the bulk deposit which is 3.5%. The matrix alone has a solubility of only 3.2%.

In 1998, the New Zealand Government sponsored a comprehensive study which yielded all necessary details for the setting up of a superphosphate (SSP) plant. The total cost of this project was estimated as US$ 42 million. The payback period was only 2.5 years. This study concluded that the nature of the Eppawela phosphate deposit strongly favours the production of SSP over other high analysis products,

particularly TSP for which the ore is unsuited and in spite of the impurities present, good quality SSP can be produced. The high chloride content of the Eppawela phospate generates strongly acidic conditions during acidulation to produce phosphoric acid which is the starting material for all high analysis phosphate fertilizers such as TSP, Di Ammonium Phosphate (DAP) and Mono Ammonium Phosphate (MAP).

The production of SSP is technologically very simple and the necessary machinery can be fabricated locally other than for the sulphuric acid plant. The production process is also environmentally friendly since it is a zero effluent process. Sulphuric acid produced is a useful chemical for the mineral and industrial development of Sri Lanka. Therefore definitive action to locally produce SSP from the eppawela rock phosphate reserves should be undertaken without delay.

References

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