

PolFerAsh - sustainable technology for phosphorus recovery

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More than 75% of world reserves of phosphorus deposits used for fertilisers production is located in Morocco. Europe is strongly dependent on imported raw materials and the prices dictated by the world's leading mining industry. The search for alternative phosphorus raw materials is therefore justified not only because of the principle of sustainable development or circular economy, but also for safety reasons due to rapidly changing geopolitical situation in the world. The PolFerAsh technology is deduced to the management of ashes after incineration of sewage sludge and the production of solid and suspension fertilizers

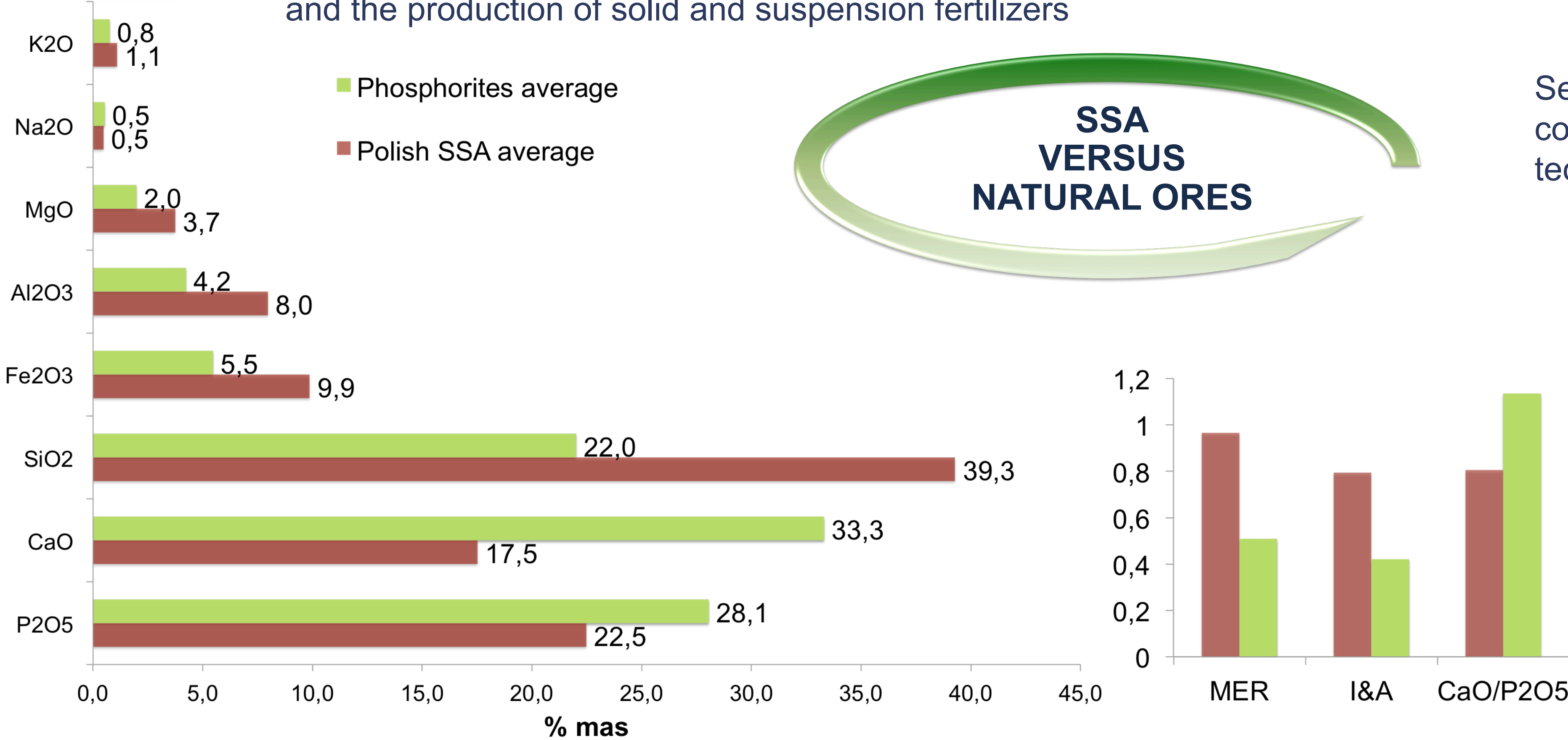


Fig.1. The comparison of SSA and non-renewable raw materials (phosphorites)

Sewage sludge ash (SSA) is one of the alternative raw material considered in large scale production with stable and suitable technological parameters:

- ✓ P concentration
- ✓ Ca concentration, counted as CaO/P₂O₅
- ✓ Fe, Al, Mg concentration
- MER (minor element ratio) = (Fe₂O₃ + Al₂O₃ + MgO)/P₂O₅
- I&A (Iron and aluminium ratio) = (Fe₂O₃ + Al₂O₃)/P₂O₅
- Al i Fe form insoluble compounds or cause phosphorus losses during the technological process
- ✓ SiO₂ concentration, non-reactive ballast

In practice for NPK fertilisers (18-46-0) MER =0.08-0.2 and I&A =0.08-0.10

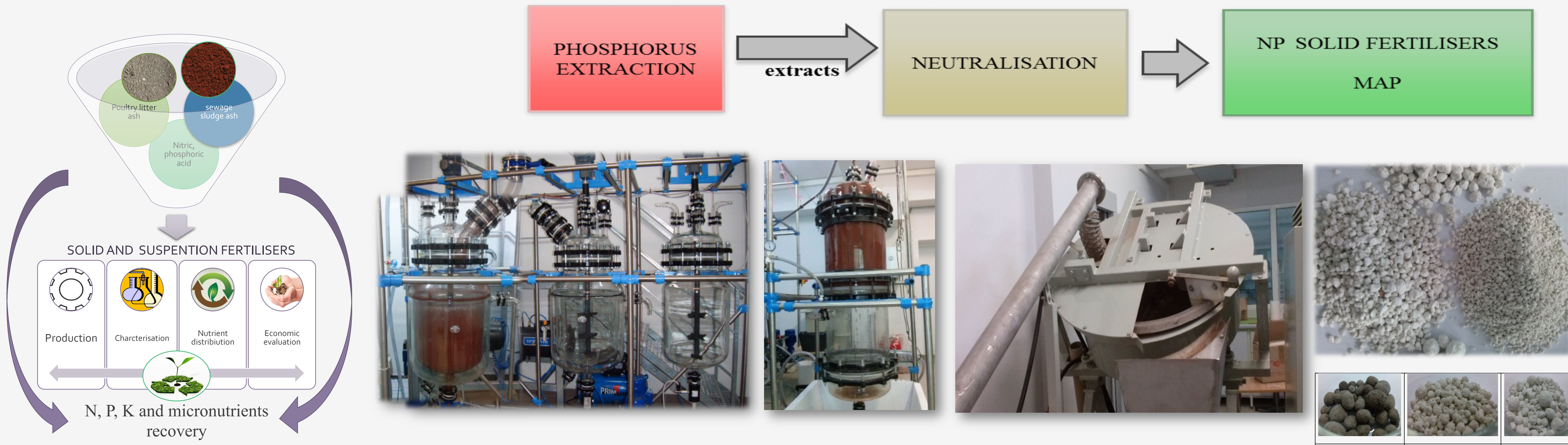


PolFerAsh- Polish Fertilisers from Ash

PATENTED TECHNOLOGY
PL237364B1
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The technology results from the demand of the fertilizer and municipal industry, and is a response to concerns related to reports of the depletion of natural phosphate raw materials. It is a way to manage waste, reducing the amount of waste sent to landfills and the associated costs. PolFerAsh technology uses only nitric or phosphoric acids to extract phosphorus compounds from ashes and ensures a high degree of phosphorus recovery without additional wastewater treatment. This can be achieved by operating the process at a low concentration of acids and an appropriate ash to liquid phase ratio. In the processes of leaching ashes with nitric and phosphoric acids, no additional waste is generated, and the extracts are rich in nitrogen and phosphorus compounds.



Tab. 1. Products characteristic

FERTILISER NP (Ca-Mg)		17-20 (7-2,4)	12-30 (10,6-2,4)	11-56 (2-0,5)	40 (14-1)
Total phosphates, %P ₂ O ₅		19,91	29,81	55,6	40,8
Phosphates soluble in neutral ammonium citrate, %P ₂ O ₅		19,76	28,68	55,3	37,2
Phosphates soluble in 2% citric acid, %P ₂ O ₅		19,74	29,00	55,4	42,8
Phosphates soluble in water, %P ₂ O ₅		7,80	9,69	53,4	1,2
Nitrogen, %N _{tot}		17,00	11,66	11,6	-
Ni	mg/kg	37	43	49	32
Cr		20	124	391	178
Zn		2676	2258	384	0,080
Cd		20	31	45	29
Cu		439	391	24	230
Pb		50	54	11	50
Fe	%	1,21	1,23	0,76	0,7
Ca		7,39	10,55	2,2	14,00
Mg		2,36	2,41	0,50	1,29

Analysis of the BAT and BATNEEC of producing fertilizers based on ashes from the incineration of sewage sludge obtained 82% of the maximum value, which on this basis can be considered the best available technique in the analyzed scope.

Medium scale targeted at smaller investors from the fertilizer industry and waste management technology or environmental technologies, or groups of sewage treatment plants with thermal treatment stations for sewage sludge.

Total revenues from the installation will range from 1 to 3 million euro, depending on the variant and the adopted price structure.