EIP-AGRI practice abstract

Short title:

3R Recycle-Reuse-Reduce zero emission pyrolysis technology for phosphorus recovery from food grade animal bone grist for production of Bio-Phosphate products

Summary:

This auto-thermal 3R zero emission pyrolysis and phosphorus recovery technology has been specifically developed and designed for added value valorisation of food grade animal bone by-products into high value recovered Phosphorous fertilizer by integrated thermal and biotech recycling means. The Animal Bone Char Bio-Phosphate product is made of different types of food grade animal bone grist, most importantly cattle bones, which mono feed input is already pre-processed at 133°C, 3 bar for 20 minutes. The bio-based apatite based cattle bone grist input feed is low value by-product and unexploited biomass. In the 3R process the bone grist is continuously processed at a material core carbonization temperature as high as 850°C, which is far higher than usual biochar processing temperatures, but absolute needed to get high quality product, which is formulated to BIO-NPK-C bio-fertiliser. Zero emission means that all material streams in all forms are recycled-reused and converted into useful products. During the advanced 3R pyrolysis (reductive thermal processing) all volatile and protein based substances are removed from the biobased apatite mineral frame, and a highly macro-porous hydroxyapatite (70-76%), $CaCO_3$ (7-13%) and carbon (8-11%) contained mineral products were produced. This innovative technology is successfully high TRL proven through field demonstration in industrial operational environment, market launch 2021.The standard 3R industrial productivity is 20,800 t/y throughput capacity/unit, resulting 12,500 t/y BioPhosphate product for organic farming and adsorbent applications, and surplus 2 MWe/hour green electricity.

For more information: https://nutriman.net/farmer-platform/technology/id_193

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