

(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :11/08/2025

(21) Application No.202531076091 A

(43) Publication Date : 22/08/2025

(54) Title of the invention : A METHOD AND SYSTEM FOR STABILIZING ORGANIC PHOSPHATES IN SOIL USING ENGINEERED OXIDE SORBENTS FOR ENHANCED PHOSPHORUS RETENTION AND BIOAVAILABILITY

(51) International classification	:A61K0031661500, C07F0009090000, B01J0020320000, A61P0003120000, C08K0005523000	(71) Name of Applicant : 1)Brainware University, Kolkata Address of Applicant :398, Ramkrishnapur Rd, Near Jagadighata Market, Barasat, Kolkata, West Bengal 700125 ----- Name of Applicant : NA Address of Applicant : NA
(86) International Application No	:NA	2)Mr. Sanjay Mochary Address of Applicant :Assistant Professor, Department of Agriculture, Brainware University, Barasat, Kolkata -700125 -----
Filing Date	:NA	3)Dr. Parijat De Address of Applicant :Assistant Professor, Department of Agriculture, Brainware University, Barasat, Kolkata-700125 -----
(87) International Publication No	: NA	4)Dr. Avishek Chatterjee Address of Applicant :Assistant Professor, Department of Agriculture, Brainware University, Barasat, Kolkata-700125 -----
(61) Patent of Addition to Application Number	:NA	5)Dr. Ankur Mukhopadhyay Address of Applicant :Assistant Professor, Department of Agriculture, Brainware University, Barasat, Kolkata-700125 -----
Filing Date	:NA	
(62) Divisional to Application Number	:NA	
Filing Date	:NA	

(57) Abstract :

The present invention provides a method and system for stabilizing organic phosphate compounds in soil using engineered oxide sorbents, such as surface-modified goethite and aluminium oxide, to enhance phosphorus retention and bioavailability. By leveraging a dual-phase adsorption mechanism modeled through modified non-linear kinetics and the Sibbesten–Langmuir isotherm, the invention enables strong yet reversible binding of organic phosphates like inositol hexaphosphate, glucose-6-phosphate, and glycerol phosphate under diverse soil conditions. The stabilized oxide–phosphate complexes reduce phosphorus loss through leaching and microbial degradation, and release nutrients in a controlled manner to match plant uptake. The sorbents can be applied directly to soil, blended with compost, or formulated into slow-release fertilizers, offering a scalable, eco-friendly solution to improve phosphorus use efficiency in agriculture. Accompanied Drawing [FIGS. 1-2]

No. of Pages : 21 No. of Claims : 10