# CPE-1

## MODIFICATION AND CHARACTERIZATION OF PHYTASES FOR ANIMAL FEED PRODUCTION

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Phytases catalyze the hydrolysis of inorganic phosphate from phytic acid and improve the nutritional quality of phytate rich diet. Monogastric animal such as poultry and fish do not have the ability to completely hydrolyze phytate. As a result, beneficial nutrient necessary for growth becomes unavailable and its elimination through excretions leads to land pollution, eutrophication of ground water and aquatic environment. Besides, it leads to the negative effect on vitamin utilization that lead to the emaciation, retarded growth and reproductive failure in animals. In view of these adverse effects phytases are added in animal feeds. Phytases from microbial sources are commonly used for their commercial exploitations. Waste water bacterium phytase is the subject of interest in this project. In the present study i*n-silico* experiments are used to identify and examine active site of phytase. The factors influencing the ligand binding strength in the active site is analyzed and computational site directed mutagenesis experiments have been carried out to evaluate the effects of mutations on the binding strength. Compare to native enzyme, structural prediction suggest that single mutations at position M216R and E219R add hydrogen bonds surrounding the active site, which increases in the binding of the phytate substrate eventually leading to better degradation. Detailed results from out single and multiple mutation studies provide new direction towards design and development of new phytases with enhanced functional properties.

**Keywords:** *Phytase, In silico, Site directed mutagenesis and Ligand binding*

# CPE-2

## PYROLYSIS CHARACTERISTICS AND KINETICS OF OIL SEED CAKES

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Three different oil cakes were analyzed for their pyrolysis characteristics and kinetics to check the suitability for the preparation of activated carbon. A kinetic investigation of different oil cakes (Mahua, Karanjia and Jatropha) was carried out using thermogravimetric analysis (TGA) at heating rates of 5$^{o}$C/min, 10$^{o}$C/min and 20$^{o}$C/min. Most of the materials decomposed between 210$^{o}$C and 500$^{o}$C at each heating rate. The region of decomposition of Karanjia and Mahua oil cakes are slightly lower than that of Jatropha. Mahua oil cake decomposed in three stages, while Karanjia and Jatropha decomposed in two stages. Increase in apparent activation energies was found when the pyrolytic conversion increased from 1% to 99%.The proximate and ultimate analyses revealed that the composition (cellulose and lignin) of the residue was one of the important parameters to evaluate the pyrolysis characteristics.

**Keywords:**