Chapter 5

Summary and Conclusion
An attempt is made in the present work to combine polymeric soil conditioners and fertilizer urea so that CR properties and soil conditioning properties were tried to be merged in a single product. Using polyacrylamide/poly(methylmethacrylate) (PMMA) as the major polymer backbone, and divinylbenzene (DVB) / N,N'-methylene-bis-acrylamide (NNMBA) / tetraethylene-glycol diacrylate (TTEGDA) / pentaerythritol triacrylate (PETA) as crosslinking agent different CR urea fertilizers were prepared by coating method. In each of the crosslinked systems used for coating polystyrene (PS), natural rubber (NR), ethylene vinyl acetate copolymer (EVA) and polyvinyl chloride (PVC) were separately used as sealants. The prepared fertilizer systems were evaluated for their slow release character by leaching and incubation experiments.

In another approach, by distributing urea in NNMBA crosslinked PAM matrix, CR urea formulations were prepared. By varying crosslinking density, four different formulations were prepared and evaluated for their slow release character by incubation experiments.

While synthesizing the polymer, coating process of urea was carried out. Urea did not inhibit the co-polymerization of acrylamide / methylmethacrylate and DVB/NNMBA /TTEGDA or PETA . The method may be attractive economically since the two processes are combinely carried out in a single step.

Crosslinked PAM / PMMA can be effectively utilized for coating urea fertilizer. The coated products have CR properties. The release is generally faster in PAM systems than in PMMA systems. Depending on the sealant incorporated, the release rate varies in each crosslinked polymer based fertilizer systems. Among DVB-PAM systems PS and PVC systems had a more sustained or prolonged release profile than NR or EVA systems and among them PS system was having a lower initial release rate. Among NNMBA-PAM systems EVA system had a better slow release profile. Among TTEGDA-PAM systems PS system was having more slow release...
character than other systems. Among PETA-PAM systems, EVA system was having a better release profile.

Among DVB-PMMA systems, PS system, and among NN MBA-PMMA systems EVA system were found to have better slow release profile. Among TTEGDA-PMMA systems PS system and among PETA-PMMA systems EVA system has better slow release profile.

In the matrix type CR urea fertilizers prepared it was observed that the crosslinking density affects the release rate. As the crosslinking density increased the slow release character also increased.

Detailed field studies are necessary to assess the improvement in soil physical properties like aggregation stability and water holding capacity by the use of prepared CR fertilizers. Attempts are also to be made to find cheaper crosslinking agents to be used in PAM / PMMA for coating urea. Further refinement in the process is required in optimizing coating thickness. Moreover the prepared fertilizers are to be tested in various other soil types at varying temperature regimes.