Effect of Cu and palm stearin coatings on the thermal behavior and ammonia volatilization loss of urea

ABSTRACT

Problem statement: Cu coated urea with palm stearin will be beneficial for plant nutrition and environment which can be beneficial for plant physiology and growth. Due to coating layer of natural materials, the nitrogen will be available to plants for a long period after a single application of coated urea. On the other hand, it will be slow down hydrolyses process of Cu coated urea by inhibiting the activity of urease enzymes. This combination can decrease the ammonia volatilization losses. Temperature is the one another important factor which reduces urea use efficiency of crops. Coating of urea with palm stearin and Cu can increase the thermal stability of urea. Approach: hundred grams of urea was coated by seven grams of palm stearin and 5Î¼g of Cu by fluidized bed coating machine. After coating the coated urea was dried in vacuum desiccators for 48 hours. The urea and Cu- and palm stearin- coated urea were analyzed for TGA (thermo gravimetrical analysis) and DSC (diffraction scanning calorimetric).as well as the coated urea was evaluated for the ammonia volatilization losses till six weeks to compare the effect of coated urea with uncoated urea in selected soil series. Results: The analysis showed that there is a scope to increase thermal stability of urea to reduce ammonia volatilization losses by using coating of some natural material. As well as the combination Cu and palm stearin coated urea can reduce 50% ammonia loss from soils. Conclusion: This study has potential to develop a environmental friendly coating to reduce urea losses.

Keyword: Thermo gravimetric analysis; Diffraction scanning calorimetric analysis; Fluidized bed coating machine