

Abstract

This paper discusses the use of Simplex Lattice Design approach to plan the experiment for yield of watermelon with an overall objective of optimizing the multiple responses of watermelon to organic manure. Multiple linear regression models have been adopted to express the output parameters (responses) that are decided by the input process parameters. Poultry manure, cow manure and goat manure were the independent variables to optimize the response values of interest that includes; watermelon fruit weight, number of fruits of watermelon per plant. Mixture experiments are appropriate to use when a researcher wishes to determine if synergism exists in mixing components which increases productivity. Three-component design presented in this study illustrated how to apply mixture designs in agricultural research. Mathematical Model evolved for response show the effect of each input parameter and its interaction with other parameters, depicting the trend of response. From, the equation of fruit weight and number of fruits, it can be concluded that goat manure has a more important role on watermelon production in the current study. Conclusively, the current study attained the optimal condition of 17.68 ton/Ha, 11.69 ton/Ha and 19.16 ton/Ha of poultry manure, cow manure and goat manure respectively, would guarantee the farmer a maximum yield of 22.13kg fruit weight of watermelon per plant and 7.74 \approx 8 Fruit of watermelon per plant. The study exemplified that the development of statistical models for crop production can be useful for predicting and understanding the effects of experimental factors.