



Determination of Wheat and Corn Seed Volume a Mathematical and Empirical Approach

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Abstract

The aim of this paper is to determine wheat and corn volume based geometric parameters L (length), width (W), and T(thickness). Wheat and corn represent random factors. The sample size included 100 seeds for each group and the grain measurement. A digital caliper was used to measure the geometric parameters for each single grain. In this data set, the means of each objective crop was calculated. The V(volume) of each grain was calculated based on formula. These characteristics were manipulated to create a mathematical model based on each crop and a mathematical model develop based on the two crops to determine the seed volume. SAS used to analysis data and Origin 2018 used to great 3D model graph. The results show that the overall for seed volume based one wheat and corn was highly significant $F_{(3,196)} = 5892.34$ P value < 0.0001 , R-Square was 0.9890, Adj R-Sq=0.9889, and RMSE=6.89130, and R-Square for each variables were 0.9441, 0.9419, and 0.8755 for W,T, and L. Furthermore, the R-Square for the interaction was higher than 0.95. Wheat Volume= $130.63+12.041W+25.869T+8.6016L$. The mathematical approach for wheat was $F_{(3,199)} = 3540.03$ P value < 0.0001 , R-Square was 0.9910, Adj R-Sq=0.9908, and RMSE=0.5423. Wheat equitation Volume= $-47.375+8.0457W+10.2T+3.6013L$. The mathematical approach for corn was $F_{(3,99)} = 6016.82$, P value < 0.0001 , R-Square was 0.9947, Adj R-Sq=0.9945, and RMSE=1.7085. Corn equitation Volume= $-293.34+21.479W+31.306T+16.742L$. The mathematical approach based on wheat and corn may help farmer and designer engineering in Iraq to get better idea when design storage bin and seed planter. Further studies need to be applied by using different seed crops.

Keywords: Mathematical approach, wheat, corn. geometric parameters, volume