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The Effect of Tillage Methods on Energy Pulverization Requirements Under Various Operating Conditions in Silty-Loamy Soil

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ABSTRAC

A field experiments were conducted at one of the fields of Agricultural College- University of Basrah, Karmatt-Ali campus in silty loam soil by using randomized complete block design (RCBD) with a split-split plots. The experiment parameters are three plowing treatments as maim plot, three plowing depth (10, 15 and 25 cm) as sub plot and three forward speed (0.46, 0.73 and 1.18 $m.sec^{-1}$) as sub-sub plot. The plowing treatments included: First plowing treatment by using chisel plow in single pass, second plowing treatment by moldboard plow in a single pass and third plowing treatment by using moldboard plow in a second pass after using chisel plow. While pulverization index, specific energy, equivalent energy and pulverization efficiency were measured and determined as a pulverization energy parameters. The results showed that the moldboard plow after the chisel plow had a significant decrease in specific energy and pulverization index (PI) compared with chisel plow and moldboard plow by 29.47, 8.40% and 56.47, 48.90 % respectively, while equivalent energy and pulverization efficiency increased significant for moldboard plow after chisel plow compared with chisel plow and moldboard plow by 7.75, 29.45% and 52.85, 41.35% respectively. The interaction plow type, plowing depth and forward speed had a significant influence on pulverization energy parameters, The optimal performance were found with the forward speed 1.18 $m.sec^{-1}$ and plowing depth 10 cm for moldboard plow after chisel plow where recorded best pulverization index(PI), equivalent energy and pulverization efficiency were 12.73 mm, 61.10 $kJ.m^{-3}$ and 95% respectively.

Key Word : chisel plow , moldboard plow moldboard plow , pulverization energy,(PI)