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The Effect of Electric Field Distributions on Grains and Insect for Dielectric Heating Applications

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Abstract : This paper presents the effect of electric field distribution which is an electric field intensity analysis. Consideration of the dielectric heating of grains and insects, the rice and rice weevils are utilized for dielectric heating analysis. Furthermore, this analysis compares the effect of electric field distribution in rice and rice weevil. In this simulation, two copper plates are used to generate the electric field for dielectric heating system and put the rice materials between the copper plates. The simulation is classified in two cases, which are case I one rice weevil is placed in the rice and case II two rice weevils are placed at different position in the rice. Moreover, the probes are located in various different positions on plate. The power feeding on this plate is optimized by using CST EM studio program of 1000 watt electrical power at 39 MHz resonance frequency. The results of two cases are indicated that the most electric field distribution and intensity are occurred on the rice and rice weevils at the near point of the probes. Moreover, the heat is directed to the rice weevils more than the rice. When the temperature of rice and rice weevils are calculated and compared, the rice weevils has the temperature more than rice is about 41.62 Celsius degrees. These results can be applied for the dielectric heating applications to eliminate insect.

Keywords : capacitor copper plates, electric field distribution, dielectric heating, grains
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