

ABSTRACT

Dielectrophoresis is a process to manipulate the movement of particles using non-uniform electric fields. The movement of particles is caused by the polarizing effect of the electric field used. In the process of dielectrophoresis, the particles will move to a high electric field (positive DEP) or to a lower electric field (negative DEP). *Dielectrophoresis* technique is used in biology sector, especially biomedicine because of the advantages offered such as low cost, fast and efficient processes. This technique continues to be developed until in 2016 researchers from Rice University discovered a new discovery which is *Teslaphoresis* where the process of *dielectrophoresis* is combined with the *Tesla coil*. The output of the *Tesla coil* that can be transmitted wirelessly becomes the input in the *dielectrophoresis* process.

In this final project, the technique of *dielectrophoresis* is used in *Escherichia coli* bacteria. This process uses a source from a function generator and particle movement observation is performed by using a microscope. In the study of energy wirelessly using the Tesla coil, the secondary coil of the *Tesla coil* is made into 3 types of turns, and using 3 different inputs. Testing with different coil and input variations will be tested to analyze the effect on the output of the *Tesla coil* which is a lamp by measuring the intensity of the light. In the *Teslaphoresis* test, the particles used were Fe_2O_3 and SiO_2 particles. The test will be tested using 3 different frequencies. The media used for the movement of particles were water and ethanol. In the *Teslaphoresis* test, each frequency and that is used in the test will be analyzed later on the movement of the particles and also the areal density of the particles formed in the *Teslaphoresis* process.

Keywords : *wireless, Tesla coil, Dielectrophoresis, Function generator, Teslaphoresis, Trap, Areal density, Fe_2O_3 , SiO_2 .*