CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
S1304

Project Title
The Effect of Electromagnetism on the Competency of Escherichia coli

Abstract

Objectives/Goals
The objective is to determine whether electromagnetism has an affect on the competency of E. coli. The hypothesis is that the field will cause more E. coli to take up the plasmid and transform

Methods/Materials
The experiment requires E. coli culture, pBLU, calcium chloride, Luria Broth, test tubes, pipets, glass beads, LB agar, glass beads, and transfer loops. Petri plates, an ampicllin/ X-gal solution, and equipment such as an incubator, Bunsen burner, and water bath are also needed. On the first day pour all of the plates and then put them in the refrigerator. The next day streak the plates and when done put them upside down in an incubator at 37 for 12-20 hours. After 12-20 hours, bacteria should be at its peak competency. The bacteria are then ready to go through the actual transformation. During the transformation the electromagnetic field is applied to half of the tubes after they had completed the heat shock. After the transformation is complete put the plates in the incubator for a day and then leave them at room temperature for two days.

Results
For the plates with magnetism, plate 1 had 221 colonies, plate 2 had 1,076 colonies, plate 3 had 200 colonies, plate 4 had 520 colonies, plate 5 had 864 colonies, plate 6 had 664 colonies, plate 7 had 588 colonies, plate 8 had 824 colonies and plate 9 had 626 colonies. For the plates without magnetism, plate 1 had 128 colonies, plate 2 had 164 colonies, plate 3 had 84 colonies, plate 4 had 188 colonies, plate 5 had 128 colonies, plate 6 had 128 colonies, plate 7 had 132 colonies, plate 8 had 152 colonies and plate 9 had 108 colonies. This suggests that electromagnetism does indeed increase the competency of E. coli.

Conclusions/Discussion
The hypothesis that electromagnetism increases the competency of E. coli was supported by the experiment. This suggests that plasmids may become more antibiotic resistant when treated with electromagnetism. Electromagnetism may also be beneficial in terms of genetic engineering and creating transgenic bacteria.

Summary Statement
Electromagnetism does increase the competency of Escherichia coli.

Help Received
Mrs. Avants and Mr. Garabedian supervised, parents helped cut paper