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Peter Lazarakis
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Effects of a Static Magnetic Field on Biological Samples

by

Peter Lazarakis

**A thesis submitted in partial fulfilment of the requirements for
the award of the degree of**

**Master of Science (Research)
Physics**

from

**UNIVERSITY OF WOLLONGONG
SCHOOL OF ENGINEERING PHYSICS**

September 1, 2009

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Abstract

FTIR spectroscopy uses the absorbed light in an IR beam to determine the composition of a sample. This study was done using FTIR techniques to determine the damage done or alterations caused when a magnetic field was applied to a biological sample (cell cultures).

The effects of magnetic fields on biological samples is an area that is not very well understood with little reliable data available.

Various experiments investigating the influence of a magnetic field on cell growth, the chemical bonds in cells and the effects during irradiation were performed. Consistently it was seen that the largest changes to the cell were found in hydrogen bonds, most commonly in water. Though perhaps this may not normally create any significant biological impact when a biological sample is irradiated, as in radiotherapy, the chemical and physical structure of water is quite important.

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Notations and Abbreviations

Deoxyribonucleic Acid	[DNA]
Double Strand Break	[DSB]
Fourier Transform Infrared	[FTIR]
Hydrogen	[H]
Linear Quadratic No Threshold	[LQ]
Oxygen Enhancement Ratio	[OER]
Relative Biological Effectiveness	[RBE]
Single Strand Break	[SSB]