



Table of Contents

Introduction.....	9
1 Literature review	13
1.1 Biological systems	13
1.2 Effects of magnetic fields on biological systems.....	22
1.2.1 Interaction of external magnetic fields with atom nuclei and absorption spectra.....	26
1.2.2 Mechanism of magnetic field effects	26
1.2.3 Non-ionizing electromagnetic field.....	29
1.2.4 Heating effects of EMFs	30
1.2.5 Non-heating effects of EMFs.....	31
1.2.6 Effects of high-frequency EMFs.....	32
1.2.7 Effects of low-frequency EMFs	33
1.2.8 Biological effects of non-ionizing EMFs.....	34
1.3 Geomagnetic fields and evolution of plants	41
1.3.1 Impact of magnetism on growth, evolution and development of plants.....	42
1.3.2 Effects of MFs with intensity lower than the GMF intensity on plant growth	43
1.4 Effects of MFs on plant seed germination	45
1.5 Effect of MFs on cryptochrome	46
1.6 Effects of MFs on roots and shoots.....	46
1.7 Effects of MFs on gravitropism	46
1.8 Effects of MFs on redox potential	47
1.9 Effects of MFs on photosynthesis	47
1.10 Effects of MFs on lipid composition.....	47
1.11 Other effects caused by MFs.....	48
2 Objective.....	51
3 Material and methods	53
4 Results and discussion	63
5 Conclusion.....	89
6 Bibliography.....	95