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GENETIC EFFECT OF MAGNETIC FIELD ON GROWTH AND PROTEIN CONTENTS OF MAIZE, BEAN AND *Bacillus sp IN VITRO*.

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ABSTRACT

Physical mutagenesis as radiation, electrical field, magnetic field...etc., were inspired to enhance or modify their biological behavior. This work was carried out to detect the change in some properties and chemical constituents of maize (variety S.C.10) and bean (variety Nebraseca) seeds after exposure to magnetic field such as root weight and length, shoot height, proteins, amino acids and protein banding pattern. The density flux of magnetic field was 0.5 Tesla and exposure times were 15 and 30 min. Seeds were placed at suitable distance between magnetic dipoles. Paper chromatography detected increase in some amino acids as aspartic acid, glutamic acid, and methionine in both maize and bean seeds after exposure to magnetic field. The total protein of maize seedlings decreased by 66% after 30 min of exposure to magnetic field. Protein pattern detected new bands after 30 min of magnetic field exposure in maize and bean. The germination and growth of maize and bean seeds were affected after magnetic field exposure. Root weight of maize was decreased 66% but in bean the decrease of root weight was not significant. The maize shoots were increased 66% and 233% after magnetic field exposure for 15 and 30 min, respectively. The bean shoots increased 27.3% and 63.6% after magnetic field exposure for 15 and 30 min, respectively. The results indicated that the magnetic field can produce plants free of *Bacillus* sp, increases some amino acids contents and also increases maize and bean shoots growth.

Keywords: Maize, Bean, Magnetic field, *Bacillus sp*, Protein pattern.

INTRODUCTION

Chemical and physical mutagens were used widely for producing mutations and/or increasing genetic variability in target materials. It is well known that mutagens could directly induce physiological changes, point mutations and chromosomal aberrations. Magnetic field (MF) can also be used for the same purpose due to their biological effects (Mastude *et al.*, 1993). There are a lot of biological effects include carcinogenesis that has been attributed to MF, but there is no clear data about the mutagenic effect of MF (Schreiber *et al.*, 2001; Novikov *et al.*, 2002). The evaluation of MF effects on the biological systems is difficult, since most of the biological structures are heterogeneous (Goodman *et al.*, 1995).

The previous studies indicated that the MF affects on plant growth and germinations, and that frequency of the field is an important factor on germination rates. Maximum germination rates (20% increasing in the treatment higher than the control) were obtained at around 10 Hz. The MF of 10 Hz also produced a statistically significant effect on plant growth, as measured by leaf area. The difference in growth rate between treated and control plants decreased after the field was removed (Namba *et al.*, 1995).