Extremely Low Frequency Electromagnetic Fields and the Vegetative Growth of some selected Fungi

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The effect of extremely low frequency Electromagnetic field on fungi has been in- vestigated using *Aspergillus fumigatus* , *Aspergillus niger* , *Aspergillus flavus* , *Mucor mucedo* and *Rhizopus stolonifer* . These fungi were exposed to the field of frequency of about $69Hz$ for 72 hours using the circuit in figure(1a). The effect was studied using their total mould count and optical density. The total mould count of *Aspergillus fumigatus* ranges from 2.0×10^4 to 8.7×10^4 , *As- pergillus niger* ranges from 5.8×10^4 to 13.7×10^4 ,*Aspergillus flavus* ranges from 5.5×10^4 to 11.8×10^4 , *Mucor mucedo* ranges from 6.4×10^4 to 11.2×10^4 and finally, *Rhizopus stolonifer* ranges from 1.5×10^4 to 11.7×10^4 .

Optical density (figure 1b) ranges for *Aspergillus fumi- gatus* ranges from 0.04 to 1.721, *Aspergillus niger* ranges from 0.016 to 0.71, *Aspergillus flavus* ranges from 0.016 to 0.541, *Mucor mucedo* ranges from 0.008 to 0.61 and finally *Rhizopus stolonifer* ranges from 0.032 to 0.482. From the results, electromagnetic field of such magnitude of frequency and strength can be used to kill, render inactive or reduce the number of live microorganisms particularly moulds in which complete sterilization is achieved. Hence, extremely low frequency field can be used to control microbial growth.

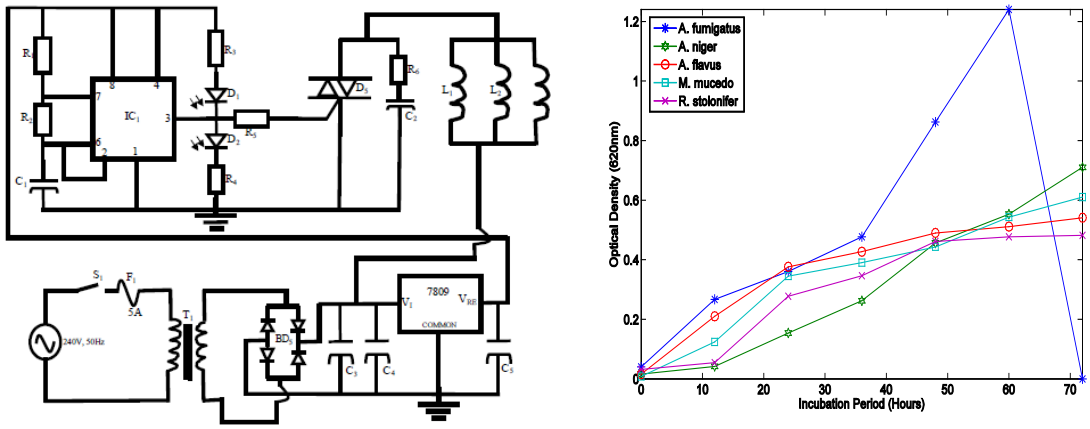

Figure 1: (a) Circuit of Extremely Low Frequency generator. The various components are: $R1 = 100\Omega$; $R2 = 22\Omega$; $R3 = R4 = R5 = 1\ k\Omega$; $R6 = 100\Omega$; $C1 = 100\ \mu F$, 16 V; $C2 = 100\ nF$; C3 = 1000 µ F, 50 V; $C4 = C5 = 0.1\ \mu F$,50 V; $D1 = D2$ = Light Emitting Diode; BD5 = Bridge rectifier; $L1 = 27$ mH; $L2 = 46$ mH; $L3 = 83.5$ mH, $L4 = 174.1$ mH, $L5 = 397.8$ mH, $T1 = 15$ V step down transformer, $F1$ = Fuse (5 A), $S1$ = Main switch, IC1 = 555 Timer, TR1 = BT 138 (b) Optical density of exposed micro-organism for a period of 72hours.