Effects of a Switched Weak Magnetic Field on Lecithin Liposomes, Investigated by Nonlinear Dielectric Spectroscopy

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Three types of liposomes in aqueous solution were subjected to a low frequency switched weak magnetic field. A differential non-linear dielectric spectroscopy (DNLDS) was performed at 40 °C with two planar orthogonal electrodes, positioned parallel and vertical to the earth surface. The difference of the free voltage release (FVR) signals for the two orthogonal directions following electric pulses with an amplitude of 1.0 V and a duration of 25 ms, were *Fourier*-transformed. An additional magnetic field was switched with a period of 400 ms and a variable amplitude from 0 to 100 G, whose direction was parallel to the vertical electrode plane. With two of the liposomes (egg yolk lecithin (EY), asolectin doped with cholesterol (ASCO)) a decrease of the signal amplitude with increasing magnetic fields could be seen in most of the 25 observed harmonic frequencies (relative to the electric pulse frequency f(0) = 40 Hz). For EY liposomes this decrease was highly significant and not linear for the 1.–5., and above the 20. harmonic frequency, ASCO liposomes showed a similar effect. Asolectin liposomes showed the reverse response.
Quantum mechanical conditions of charges on the liposome surface are discussed as a possible origin of these effects.

Key words: Liposome, Biological Magnetic Field Effect, Nonlinear Dielectric Spectroscopy (NLDS)