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Research Article

Electromagnetic ELF Range Effects on Phospholipidpc100

A.Arefi[1]; Z.Emami[1*]; M.A.Arefi[2]
[1]Dept .of Physics, Faculty of Science, Islamic Azad University, Mashhad Branch, Mashhad, Iran
[2]Dept .of chemistry engineering, Faculty of Engineering, Islamic Azad University, Fars Sciences and Researches Branch, Iran

***Corresponding author**
Z.Emmi
Email: zahra_sh_emami@yahoo.com

Abstract: Today, with advance in technology and industry, using variety of devices which work by electricity is very widespread and conventional. In electrical devices electromagnetic fields are created, then electromagnetic waves are seen around human more than ever before. These fields are strong or weak depending on the type of electric devices. Though now, household electrical appliances are standardized from production of electro-magnetic fields But how is the effect of waves of weak fields on cells and materials inside of living organisms body? The purpose of this research is studying the effect of electromagnetic waves energy on one of types of phospholipids that are exist in living organism bodies.
Keywords: electromagnetic waves , LFE, phosphoinositide lipids, spectroscopic

INTRODUCTION

On the one hand, use of electrical energy has an important role in development of today societies. The use of electric energy accompanies with production of weak magnetic field [1]. Therefore, people who live in developed and developing countries are always exposed to electromagnetic fields. In recent decades, to adventure health of people exposed to such fields is a considerable subject and many studies have been performed about it [2]. Medical and biological effects of electromagnetic is discussed but this question that whether such fields can lead to genetic damage and other biological effects or not still under studied, and definitive answer to it yet has not been found. It is believed that electromagnetic fields with very low frequency are harmless for healthof human that has particular importance and it is necessary that the metabolic rate of the human body is affected by field studies [3, 4].

The effect of ELF(Extra Low Frequency) electric field on plasma concentrations of triacylglycerol, free fatty acids, phospholipids and total cholesterol are under consideration .The study report about lipid metabolism indicates that triacylglycerol or free fatty acid levels in plasma have been reduced by 50 - 60 Hz sine ELF [5, 6]. Another theory suggests that ELF does has the metabolic effects but it has anabolic effects on lipid metabolism [7].The performed experiments about effects of ELF electromagnetic waves cholesterol also indicate these waves on cholesterol increase the intensity of cholesterol absorption [8]. The magnetic field can affect the chemical bonds among adjacent atoms with subsequent production of free radicals [9]. Free radicals as reactive oxygen species and reactive nitrogen species are causal agents of oxidative damage of cellular molecules and structures such as lipids, proteins and nucleic acids that are cellular structures susceptible to attack free radicals [10]. The recent results suggest that ELF-MF (Magnetic Field) can increase lifetime of cell free radicals [11, 12].

Phospholipids are a class of lipids that are a major component of all cell membranes as they can form lipid bilayers. Most phospholipids contain a diglyceride, a phosphate group, and a simple organic molecule such as choline; that one exception to this rule is sphingomyelin, which is derived from sphingosine instead of glycerol. The structure of the phospholipid molecule generally consists of hydrophobic tails and a hydrophilic head. Biological membranes in eukaryotes also contain another class of lipid, sterol, interspersed among the phospholipids and together they provide membrane fluidity and mechanical strength[13].

RESEARCH METHODOLOGY

Crucial to study the structure of macromolecules, different methods are used. Spectroscopy methods to study the structure Makromolekulehast important way.

In this research we solely considerevedthe Electromagnetic low frequency (ELF) waves effects on the Phospho lipidpc100 agent.

The wave selected frequency is ELF, and we used the following:

- Prepared Phospho lipidpc100
- Hegzano buffer prepared

- Electromagnetic used for preparing EM radiation is in afixed temperatur.

The highest magnetic field selected was 1.9 μT.

First we solved Phospho lipidpc100 in hegzan buffer then we measured the radiation abscrption of 200 -8 nμ wave length EM radiution. Then we put it, into the EM waves and in different time ranges including 15, 30 and60 minutes, while we measured the radiation abscrption of the Phospholipidpc100 after exposures.

We considered elf electromagnetic waves on a type of phospholipid in body about PC 100 in this research E = hv energy effects on atoms and molecules because of electromagnetic radiation and cause atom stimulation or increase molecule movement. In this research, after we put materials on electromagnetic waves radiation, we record radiation effect by spectrometry in ultraviolet and visible lighting spans and we study the obtained results, in order to see vital macro molecule structure differences. The spectrometry methods is one the most important methods for study.

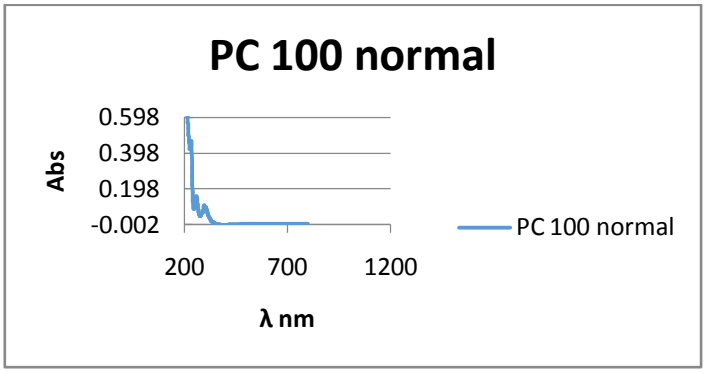

Fig. 1:reative absorbed spectrum of Phospho lipidpc100 in 280 nano meter wave length spectrometer

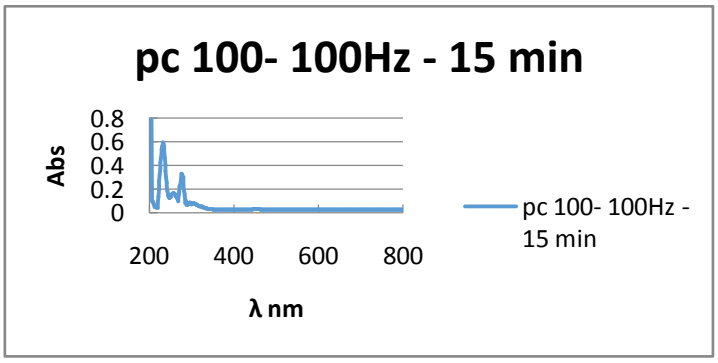

Fig. 2: relative absorbed spectrum of Phospholipidpc100after 15 minutes to 100Hz wave length exposure

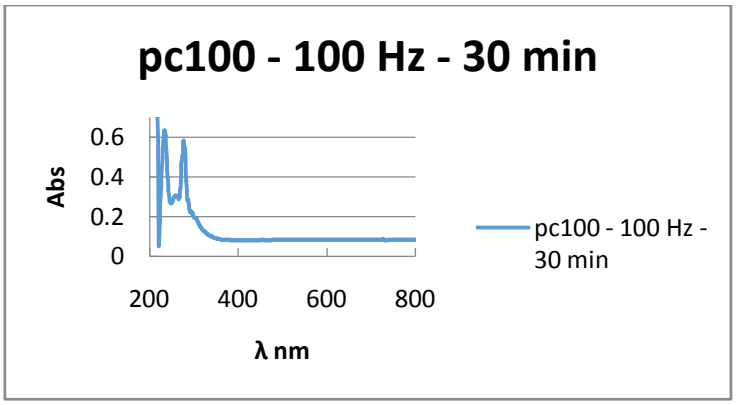

Fig. 3: relative absorbed spectrum of Phospholipidpc100after 30 minutes to 100Hz wave length exposure

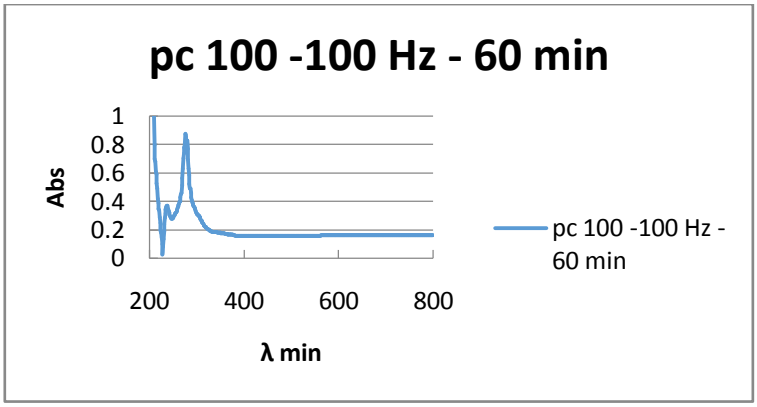

Fig. 4: relative absorbed spectrum of Phospholipidpc100after 60 minutes to 100Hz wave length exposure

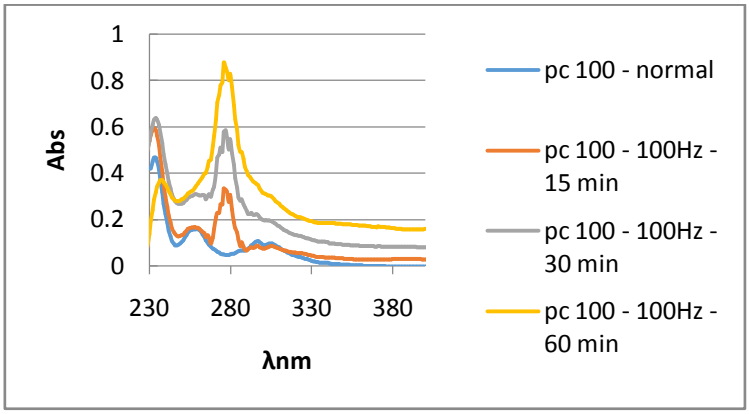

Fig. 5 relative absorbed spectrum of Phospholipidpc100after 15,30 and 60 minutes exposure to 100Hz wave length EM radiation

Table 1: comparison of 100 Hz EM field absorotion of Phospho lipidpc100

Changes as normal amount	Amount of Abs	The time of Phospho lipidpc100presence in the EM field
0	0.157	0
1.06	0.167	15 min
1. 91	0.3	30 min
5.09	0.8	60 min

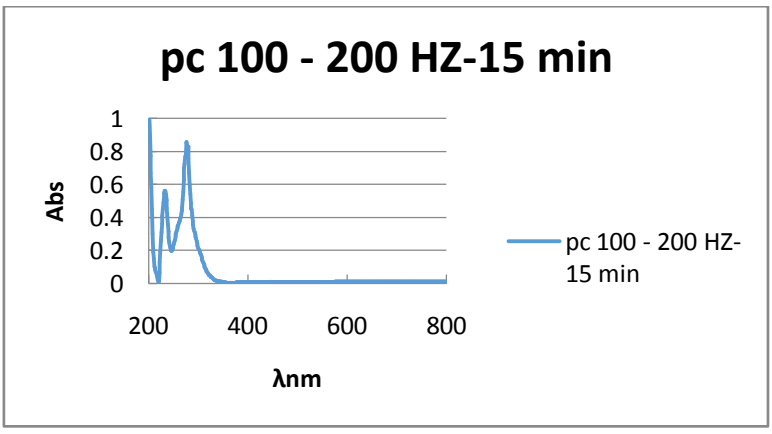

Fig. 6: relative absorbed spectrum of Phospho lipidpc100after 15 minutes exposure to 200Hz wave length

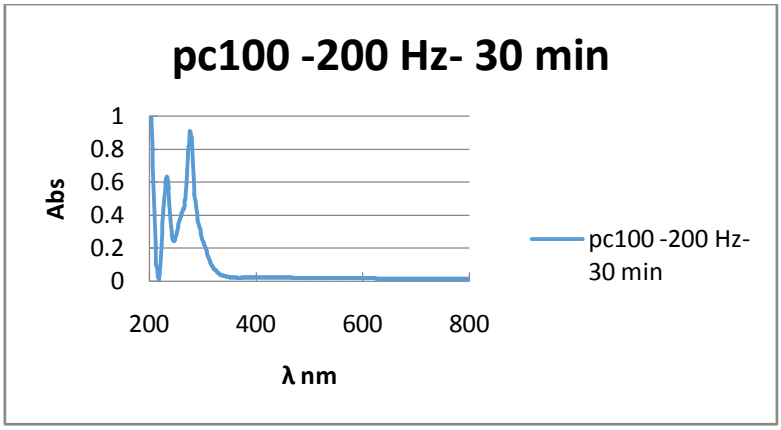

Fig. 7: relative absorbed spectrum of Phospholipidpc100after 30 minutes exposure to 200Hz wave length exposure

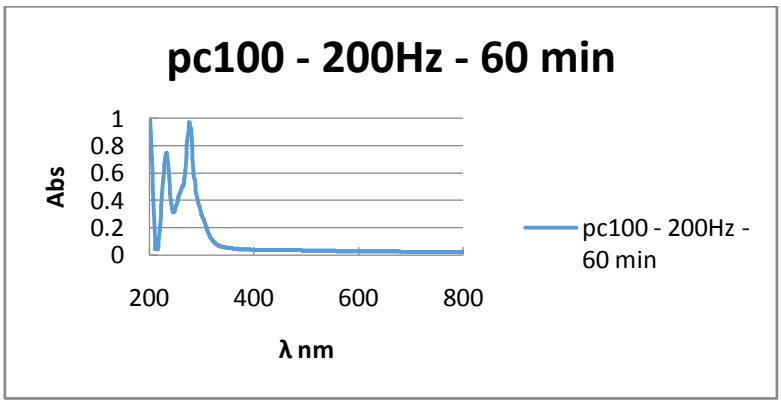

Fig. 8: relative absorbed spectrum of Phospholipidpc100after 60 minutes exposure to 200Hz wave length

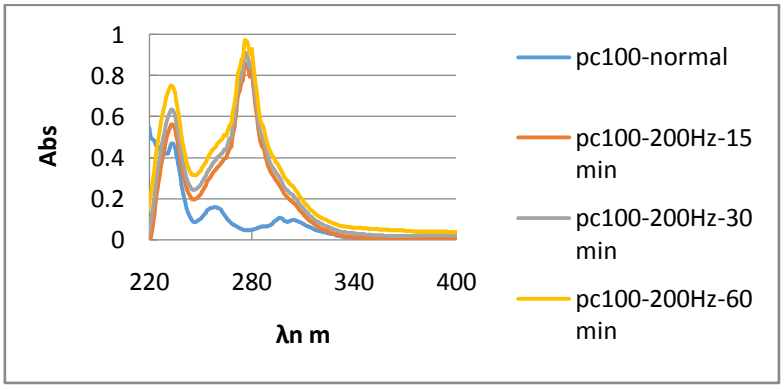

Fig. 9: relative absorbed spectrum of Phospholipidpc100after15,30 and 60 minutes exposure to 200Hz wave length

Table 2: Comparison of 200 Hz EM field absorotion of Phospho lipidpc100

Changesas normal amount	Amount of Abs	The time of Phospho lipidpc100presence in the EM field
0	0.157	0
5.41	0.85	15 min
5.73	0.9	30 min
6.17	0.97	60 min

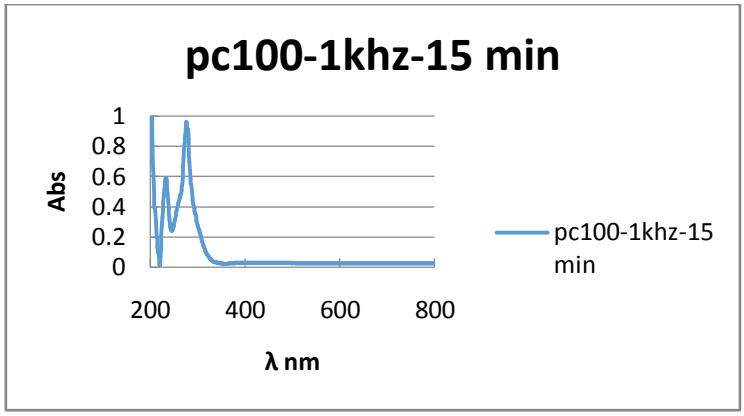

Fig. 10: relative absorbed spectrum of Phospho lipidpc100af ter 15 minutes exposure to 1KHz wave length

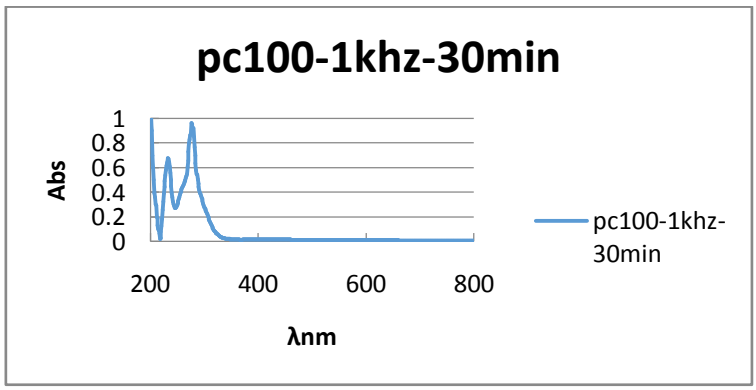

Fig. 11: relative absorbed spectrum of Phospholipidpc100after 30 minutes exposure to 1KHz wave length

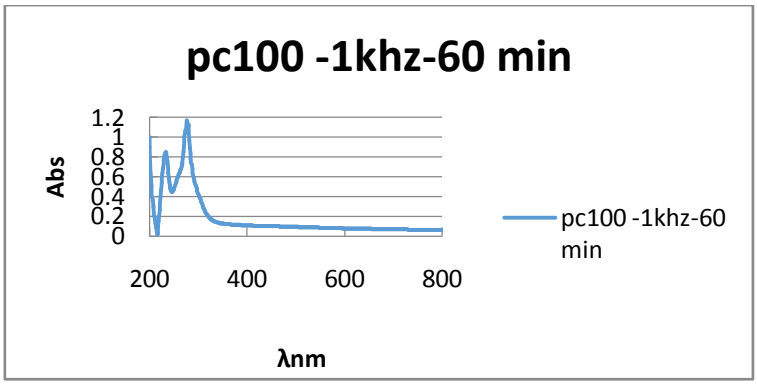

Fig. 12: relative absorbed spectrum of Phospholipidpc100after 60 minutes exposure to 1KHz wave length

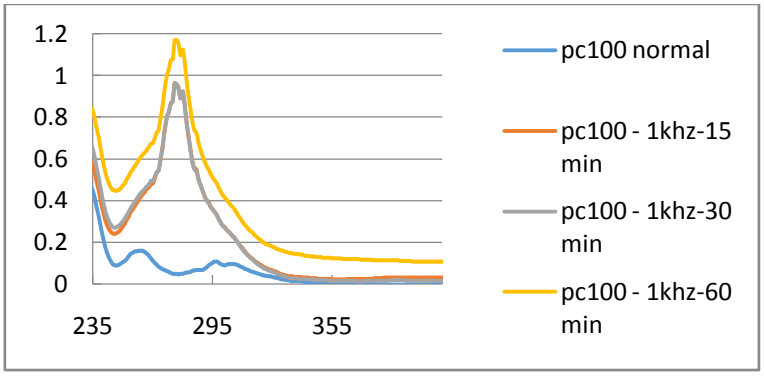

Fig. 13: relative absorbed spectrum of Phospholipidpc100after 15, 30 and 60 minutes times exposure to 1KHz wave length

Table: 3 comparison of 1 KHz EM field absorotion of Phospho lipidpc100

Changes as normal amount	Amount of Abs	The time of Phospho lipidpc100presence in the EM field
0	0.157	0
6.11	0.96	15 min
6.11	0.96	30 min
7.38	1.16	60 min

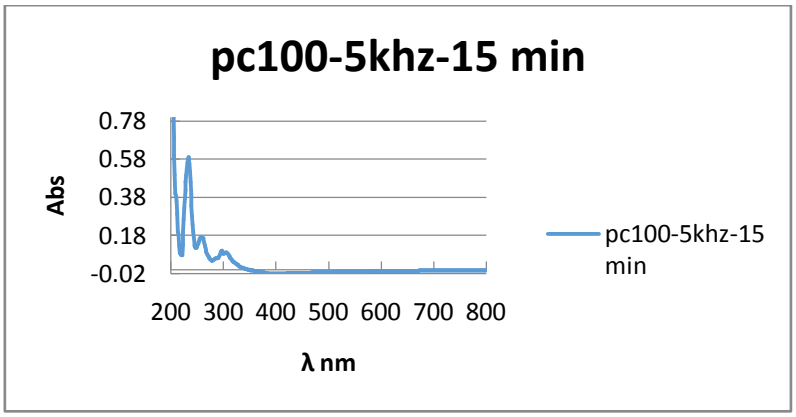

Fig. 14: relative absorbed spectrum of Phospholipidpc100after 15 minutes exposure to 5 KHz wave length

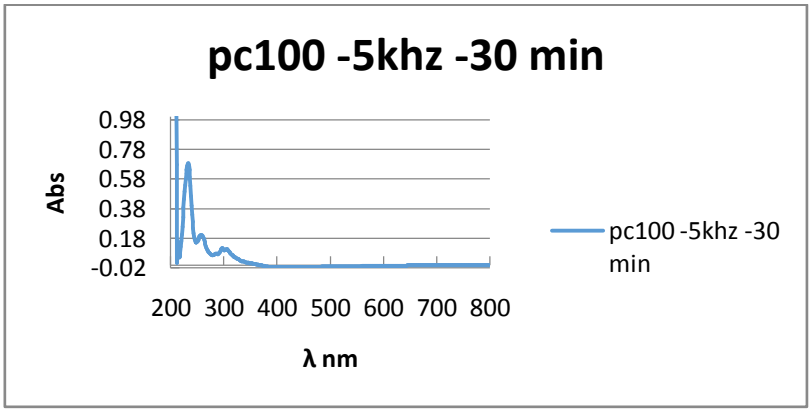

Fig. 15: relative absorbed spectrum of Phospholipidpc100after 30 minutes exposure to 5 KHz wave length

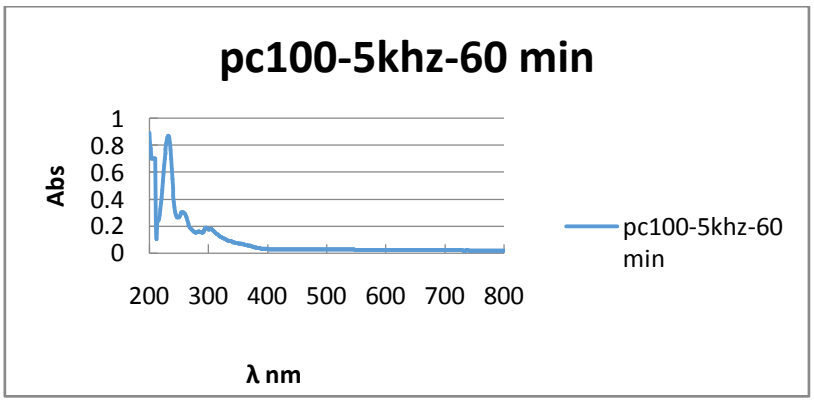

Fig. 16 relative absorbed spectrum of Phospholipidpc100after 60 minutes exposure to 5 KHz wave length

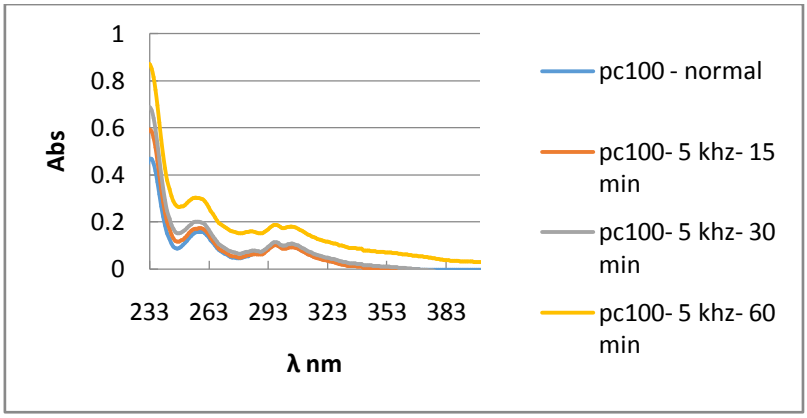

Fig. 17: relative absorbed spectrum of Phospholipidpc100after 15,30 and 60 minutes exposureto 5 KHz wave length

Table 4: Comparison of 5 KHz EM field absorotion of Phospho lipidpc100

Changes as normal amount	Amount of Abs	The time of Phospho lipidpc100presence in the EM field
0	0.157	0
1.08	0.17	15 min
1.27	0.2	30 min
1.91	0.3	60 min

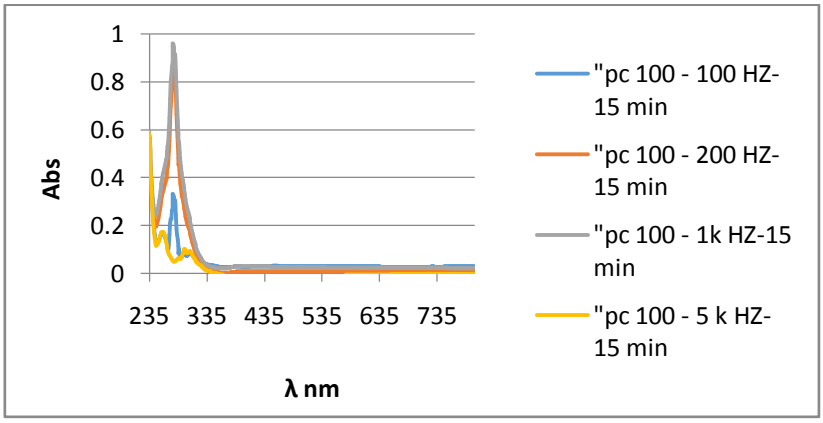

Fig. 18: relative absorbed spectrum of Phospholipidpc100after 15 minutes exposureto 100 Hz, 200Hz, 1KHz,5 KHz wave length

Table 5: comparison of 100 Hz, 200Hz,1 KHz and 5 KHz EM field absorotion after 15 min of Phospho lipidpc100

Abs changes to5KHz	Abs changes to1KHz	Abs changes to200 Hz	Abs changes to100 Hz	Abs 15 min	EM field
0.98	0.17	0.19	1.00	0.167	100Hz
5.00	0.88	1.00	5.08	0.85	200Hz
5.64	1.00	1.12	5.7	0.96	1KHz
1.00	0.17	0.20	1.01	0.17	5KHz

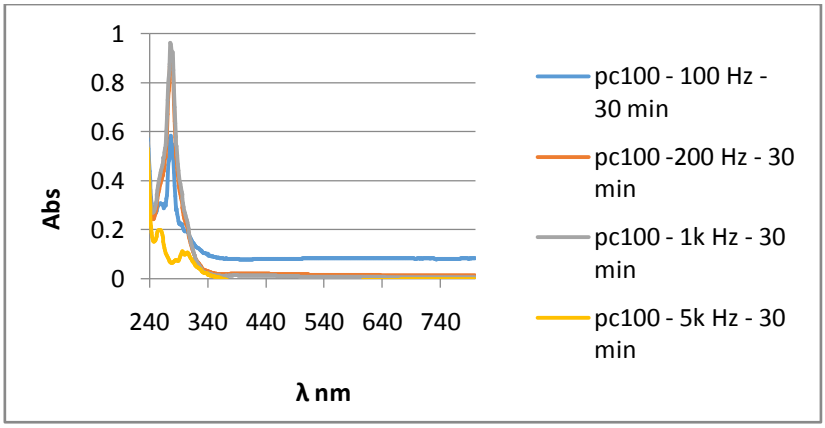

Fig. 18: relative absorbed spectrum of Phospholipidpc100after 30 minutes exposureto 100 Hz,200Hz, 1KHz,5KHz wave length

Table 6: comparison of 100 Hz, 200Hz,1KHz and 5 KHz EM field absorotion after 30 min of Phospho lipidpc100

Abs changes to5KHz	Abs changes to1KHz	Abs changes to200 Hz	Abs changes to100 Hz	Abs 15 min	EM field
1.50	0.31	0.33	1.00	0.3	100Hz
4.50	0.93	1.00	3.00	0.9	200Hz
4.80	1.00	1.06	3.20	0.96	1KHz
1.00	0.20	0.22	0.66	0.2	5KHz

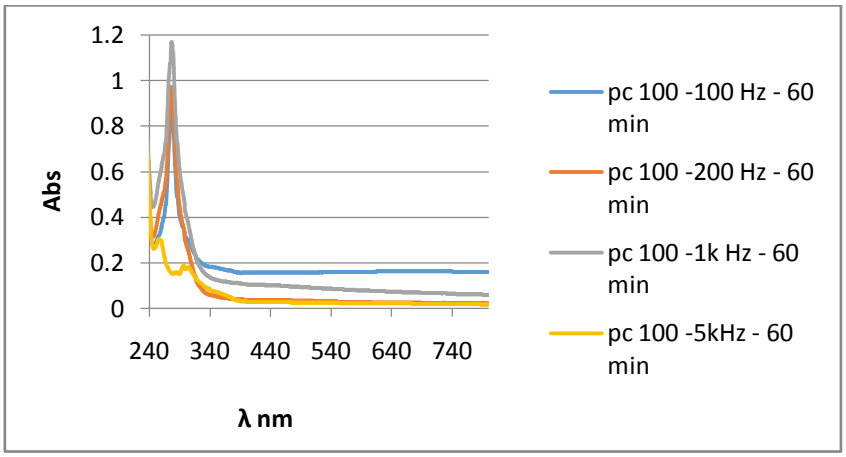

Fig. 19: relative absorbed spectrum of Phospho lipidpc100after 60 minutes exposureto 100 Hz, 200Hz, 1KHz,5KHz wave length

Table 7: comparison of 100 Hz, 200Hz,1KHz and 5 KHz EM field absorotion after 60 min of Phospho lipidpc100

Abs changes to5KHz	Abs changes to1KHz	Abs changes to200 Hz	Abs changes to100 Hz	Abs 15 min	EM field
2.66	0.68	0.82	1.0	0.8	100Hz
3.23	0.83	1.00	1.21	0.97	200Hz
3.86	1.00	1.19	1.45	1.16	1KHz
1.00	0.25	0.30	0.37	0.3	5KHz

The results of study showthe effect of electromagnetic fields in different times on phospholipid PC 100.

What thing can be preceded from diagrams is that phospholipid PC 100 in electro magnetic field has caused to change relative absorption of radiation. The absorption change rate is equaled in filed and was determined with different times in diagrams 5, 9, 13and 17.

Also numeral data of these changes to normal (without magnetic field) was determined in tables 1,2,3and4.

100 Hz electromagnetic field has impacted on absorption of phospholipid PC100. The maximum wave length in normal phospholipids PC 100 and phospholipid PC 100 in the presence of field was 259 nm, whereas it changes to 276 nm during 15 and 30 minutes.

According to Figure 5 and Table 1, it is observed that: The relative absorption rate has increased by time 15 minute and this increase will be also increased by time and changes will be showed with more time. In time 60 minute, the increase rate will reach to 5.09.

In Figure 9 and Table2, information about changes in relative absorption rate 200 Hz electromagnetic fields are compared and analyzed. These show that:Relative absorption doesn't change significantly over time in this filed, the changes will increase slowly.

Figure 13 and table 3 shows 1 kHz field data.In this filed the effect of presence of phospholipid PC 100 is growing to time. But this increase doesn't follow any particular trend, so that during 15 and 30 minutes these changes get constant and during 60 minutes the relative absorption will got more than 1.16.

Figure 17 and table 4 have compared the presence of 5 kHz electromagnetic field. Some changes are made for normal mode in considering this graph and table but there is less variation than other fields. In this field the absorption increase will be observed by increasing time period.

Figures 18, 19 and 20 have compared the relative absorption in equal time but with different electromagnetic fields. In tables- 5, 6 and 7 the absorption rate has been investigated in the presence of different fields.

Figure 18 and table 5 have compared the relation of relative absorption for different fields during 15 minutes and can be referred to the following conclusions:The relative absorption rate will be increasing with increasing in 15 minutes, but this is not the same for 5 kHz.

As are shown we are face to increases from 100 Hz to 200 Hz and 1 kHz of relative absorption and this trend converts to reducing trend in the presence of 5 kHz field and maximum wavelength closes to wavelength of material in absence of field. Increase of relative absorption in 200 Hz and 1 kHz fields are very close together but the increases aren't closetogether during changes to other fields. In 5 kHz field, relative absorption minimises.

Figure 20 and table 7 also show between relative absorption in 60 minutes that are affected different fields.
In this time, increasing relative absorption isn't seen by increasing electromagnetic field. In this time also the least rate of absorption is happened in 1 kHz.

RESULTS AND DISCUSSION

The performed experiments all show that presence of field doesn't cause to change for above cases, but these changes aren't equal in all fields and time span. This result is approved by the reviewed experiments. The measure of electromagnetic fields and induced currents are important for determine the results of laboratory researches. The used electromagnetic field has chosen from ELF for this research which is not harmful for tissue works on living organism even human. Increased absorption of active drug molecules to the solvent molecules, suggest that these molecules have received material from electromagnetic field energy. Weak electromagnetic fields (low frequency) can induce currents and electric fields to biological systems.

Suggestions for Further Reading

Given the importance of elf wavesinfluence, it is proposed for commenting and better results, better tests should be performed on tissue of living organisms that contains a phospho lipids.

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