

# Organic and Inorganic Chemistry

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## Effect of *Lavandula officinalis* on thyroid hormones in mice Balb/C

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*Lavandula officinalis* is a plant with many unknown effects on organism physiology. Previous articles about it were focused on some available and routine effects on brain and not specifically about other physiological realities. This study examines effect of hydro alcoholic extract on thyroid hormones. In this study 50 mature female mice Balb/C were applied. It was treated with *Lavandula officinalis* hydro alcoholic extract in three doses like 50, 100 and 200 mg/kg and two groups of them were control group without any injection and placebo group with normal saline injection. After 20 days (10 times every other day) in head guillotine way, blood was taken. Gained blood samples were kept in laboratory condition for 20 minutes and were centrifuged for 15 minutes with 2000 rpm. After that, serum of every tube has separated and TSH, T3 and T4 were measured by SYSMEX<sup>©</sup> autoanalyzer apparatus. Data were analyzed with SPSS and Excel software and t-student test. Significant difference between experimental and control groups considered with P value,  $P \leq 0.05$ . The results indicated that lavender hydro alcoholic extract has increased some thyroid hormones and it was proved that thyroxine (T4) hormone was increased compared with control group and the extract has caused hyperthyroidism. The research results can be a significant step in order to realize the usage of this plant in therapeutic purposes and the most important result is main compound of the extract *i.e.* 3, 7-dimethylocta-1, 6-dien-3-yl acetate (linalyl acetate) and the biochemical effects of this compound on organisms.

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## N-EBDD: Novel electrochemical route to benzimidazole dimer as deposit on platinum surface

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Benzimidazole dimers are recognized as nucleic acid minor groove binding agents, they are strongly candidate to act via DNA or RNA grooves and can directly or indirectly recognize sequences in these grooves resulting in inhibition of transcription at A/T sites consequently an effect drug to fight cancer. 3-(4-fluorophenyl)-2-methyl-[1,2a] benzimidazolo-1,3,5-triazin-4-thione was synthesized and electrochemically oxidized in an acetonitrile solution by means of cyclic voltammetry and controlled potential electrolysis on platinum, leading to its corresponding dimer through the anodic oxidation as a deposit material. In the voltammetric study, three irreversible oxidation waves were observed. When sweeping the potential repetitively about the first anodic one, a growing film was deposited on the platinum disk. With copper as anode, an adherent coverage by the oxidation product of the benzimidazole derivative was immediately observed, preventing the dissolution of the metallic electrode. On the preparative scale, the electrolysis at a potential located on the first wave yielded similarly to a deposit, but in addition to several oxidation products, in soluble and insoluble forms. The deposit was characterized by LC-MS and <sup>1</sup>H NMR as a dimer formed via one electron transfer followed by a C-S linkage, an intramolecular proton transfer, a C-C coupling and an elimination of two fluorine anions. The results were rationalized on the basis of quantum-chemical calculations, using the PCM approach with the density functional theory.

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