

## Investigation of The Properties of Naftalan Oil Biomarkers' Structure and Revealing the Features of its Biological Effect

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### Abstract

Chemofossils (biomarkers) are fossil biomolecules or their identifiable fragments that are part of the organic matter of sedimentary rocks and fossil fuels. About a third of all chemofossils identified in the composition of the oil are retained a clear structural relationship with biomolecules of living matter and were formed at different stages of lithogenesis. Hydrocarbon biomarkers are represented by compounds of three main classes: alkanes (n-alkanes, isoprenoids, 2M-, 3M-, 12M-, 13M-alkanes, etc.), polycyclic naphthenes (heylantanes, steranes, gopans and other triterpanes) and arenes (naphthalenes, phenanthrenes, mono- and triaromatic steroids, etc.). Heteroatomic compounds from among the biomarkers are some oxygen (carboxylic acids, phenols), nitrogenous (porphyrins, homologues of pyrolysis and pyridine) and sulfurous (sulfides, thiosparts, thiophenes) compounds. Benzothiophenes and dibenzothiophenes do not have close analogs in the composition of living matter, but they can be formed in the early stages of diagenesis in the process of sulphuration of unsaturated compounds that are part of lipids and lipoids.

The physicochemical properties and chemical composition of the oil of the Naftalan deposit were studied using the B3PW92/6-311G++(d, p) and MP2/6-311G++(d, p) methods (Figure 1), features of the its biological action are revealed using the high-level quantum chemical calculations.

Various spectral methods of analysis are used in the work and the structural-group composition of white Naftalan oil obtained by the adsorption purification method is studied. A component analysis of white Naftalan oil was carried out to establish its "active principle". Such biomarkers like gopans, androstanes, cholestans, steranes are revealed in the composition of white Naftalan oil. Naftalan oil contains: cholestans — 1.450% of mass, norcholestans: ergostane, androstanes — 0.180% of mass, steranes — 0.249% of mass, gopans — 0.025% of mass.

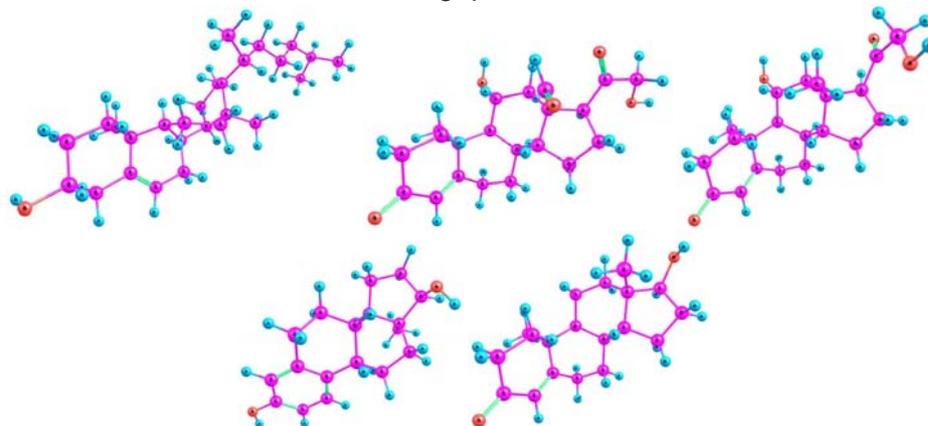


Figure 1. Biomarkers of Naftalan oil