ASSESSMENT OF THE ENVIRONMENTAL SITUATION IN THE PORT CITIES OF NSR

P. Chepliaeva

Lomonosov Moscow State University, MSU,
Moscow, Russia
polina30april@yandex.ru

The work is devoted to the typology of port cities of the Northern Sea Route according to the degree of environmental stress. The study of the nature and intensity of geoecological problems was carried out taking into account the main directions of the development strategy of the Arctic zone of the Russian Federation, by analyzing the natural and climatic conditions and their impact on the functioning of the urbanized territories of the Russian Arctic. The result of the study is a typology of port cities of the Russian Arctic, as well as an assessment of the degree of anthropogenic load of port ecosystems.

Keywords: the Arctic zone of the Russian Federation, the Northern Sea Route, port cities, geoecological problems.

Port cities, depending on their specialization, face similar geoecological problems: air pollution, surface water pollution, coastline degradation, pollution of bottom sediments, the formation of large amounts of waste, and so on. The degree of vulnerability of territories differs, which directly depends on the level of socio-economic development, as well as on the natural and environmental conditions in which the geosystem of the port city functions. When assessing the environmental situation, three groups of factors were taken into account: natural-ecological, socio-economic, and anthropogenic factors. The study was based on a system of point assessment for comparing cities among themselves and identifying patterns in the formation of the environmental situation. The table shows in red the most stressful situations caused by the relevant factors, yellow - with increased tension of the environmental situation, and green – moderately intense.

Table 1

Assessment of the environmental situation in the port cities of NSR

Cities/Research factors	Environmental	Socio-economic	Anthropogenic impact
Murmansk			
Arkhangelsk			
Naryan-Mar			
Dudinka			
Dixon			
Tiksi			
Khatanga			
Pevek			
Providence			There is no data
Anadyr			

Based on the results of the analysis, it can be concluded that among the cities studied, the most intense manifestation of geoecological problems is observed in the port city of Dudinka. This fact can be explained by natural conditions and economic factors prevailing in this territory. So, Dudinka belongs to narrowly specialized cities, the port works for a large enterprise, which is located in the estuary of a large river (Yenisei River) and transports a variety of cargoes. The lowest intensity of geoecological problems was noted in the port city of Tiksi, which is far removed from the main centers of economic development of the Arctic, and the landscape characteristics of the territory do not pose serious risks. Arkhangelsk and Murmansk are old-developed port cities, the intensity of geo-ecological problems of which is manifested due to a longer period of socio-economic development than in other cities under study.

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THEORETICAL MODEL OF PHYSISORPTION EFFECT OF CO ON CONIINE AND FURANOCOUMARINS FOR AIR PURIFICATION

V. Cheplya[1], S. Shahab[1,2,3], M. Murashko[1]

[1]Belarussian State University, ISEI BSU,
Minsk, Republic of Belarus
vlad1997.cheplya@gmail.com
[2]Institute of Physical Organic Chemistry, National Academy of Sciences of Belarus,
Minsk, the Republic of Belarus
[3]Institute of Chemistry of New Materials, National Academy of Sciences of Belarus,
Minsk, the Republic of Belarus
siyamakshahab@mail.ru

For the first time in the present work, the adsorption properties of the Coniine and Furanocoumarins at the non-bonded interaction with CO was investigated by density functional theory (DFT/B3LYP/MidiX, DFT/M062X/6-311+G* levels of theory) in the solvent water.

Keywords: physisorption, DFT method, Coniine, Furanocoumarins, Air Purification.

For the first time in the present study, the non-bonded interaction of the Coniine and Furanocoumarins with carbon monoxide (CO) was investigated by density functional theory (DFT/B3LYP/MidiX, DFT/M062X/6-311+G*) in the gas phase and solvent water. The adsorption of the CO over $C_8H_{17}N$ was affected on the electronic properties such as E_{HOMO}, E_{LUMO}, the energy gap between LUMO and HOMO, global hardness. Furthermore, chemical shift tensors and natural charge of the $C_8H_{17}N$ and complex $C_8H_{17}N$/CO were determined and discussed [1]. According to the natural bond orbital (NBO) results, the molecule $C_8H_{17}N$ and CO play as both electron donor and acceptor at the complex $C_8H_{17}N$/CO in the gas phase and solvent water. On the other hand, the charge transfer is occurred between the bonding, antibonding or nonbonding orbitals in two molecules $C_8H_{17}N$ and CO. We have also investigated the charge distribution for the complex $C_8H_{17}N$/CO by molecular electrostatic potential (MEP) calculations using the M062X/6-311+G* level of theory. The electronic spectra of the $C_8H_{17}N$ and complex $C_8H_{17}N$/CO were calculated by time dependent DFT (TD-DFT) for investigation of the maximum wavelength value of the $C_8H_{17}N$ before and after the non-bonded interaction with the CO in the gas phase and solvent water. Therefore, $C_8H_{17}N$ can be used as strong absorbers for air purification and reduce environmental pollution [2].

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EFFECTIVENESS OF PRENATAL DIAGNOSTICS OF CONGENITAL DEVELOPMENT DISORDERS IN THE REPUBLIC OF BELARUS ACCORDING TO THE DATA OF THE BELARUSIAN REGISTER

S. Chirlina, A. Ershova-Pavlova, N. Kokorina

Belarusian State University, ISEI BSU,
Minsk, the Republic of Belarus
chirlina98@mail.ru

Keywords: congenital malformations, the effectiveness of prenatal diagnosis.

Congenital malformations (CHD) in recent decades have occupied a major place in the world among the causes of stillbirth, infant and child morbidity, disability, and mortality.