BOOK of ABSTRACTS

25th Congress of Chemists and Technologists of Macedonia

19-22 9 2018

OHRID, R MACEDONIA

CXTM

Сојуз на хемичарите и технолозите на Македонија

Society of Chemists and Technologists of Macedonia

25th Congress of SCTM
with international participation

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AEC P-2

INFLUENCE OF FLUOROQUINOLONE ANTIBIOTICS ON BIOSPECIATION OF IRON (III) ION IN HUMAN BLOOD PLASMA

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Fluoroquinolone (FQ) family drugs are frequently used to treat various bacterial infections due to their antibacterial activity against Gram-positive and Gram-negative bacteria pathogens [1]. The ability of FQs to compete with plasma metal ions and with other low molecular weight (LMW) ligands can be assessed in term of the plasma mobilizing index (PMI) proposed by May and Williams [2]. This index can be used to define mobilization power of FQs to the metal ions in blood plasma. The PMI of particular metal ion is defined as the ratio of the total concentration of LMW-metal species in the presence and absence of the exogenous ligand in blood plasma. This is a useful tool to carry out preliminary in vitro assessment of mobilizing influence of chelating agent using computer modeling based on the thermodynamic data for the equilibria occurring in blood plasma.

In this work influence of some fluoroquinolones (levofloxacin, ofloxacin, ciprofloxacin and moxifloxacin) on biospeciation of main Fe (III)- LMW complexes in blood plasma studied using program HySS[2009]. For simulation purpose the complex formation between iron (III) ion and FQ was studied by potentiometric titration at physiological condition and stability constants were calculated with Hyperquad[2006] program suite. In our previous work we improved a literature blood plasma model using HySS2009 software, taking into account 9 metal ions, 45 ligands, generating more than 6100 complexes [3]. To this model, the complexes with FQ were added. To estimate the complexation ability of these antibiotic agents *in vivo* with iron(III) ion, their plasma mobilizing indexes (PMI) were calculated.

The PMI curves of iron(III) ion with studied FQs are shown in Figure 1. Mobilization of iron(III) ion by FQs does not occur at ligand concentration less than 1×10^{-5} molL^{-1} (which is a therapeutic concentration). Results obtained from HySS2009 calculation indicate that FQs below the concentration of 10^{-5} molL^{-1} are dominantly bound into the calcium and magnesium complexes while iron(III) ion is mainly bound to the citrate complex (~ 99%) . From Figure 1 it can be seen that mobilization of iron ions is the most significant with moxifloxacin while other FQs show the order moxifloxacin > levofloxacin > ofloxacin > ciprofloxacin. This results indicate that fluoroquinolones at therapeutic concentration does not affect the biospeciation of iron(III) ion in blood plasma.

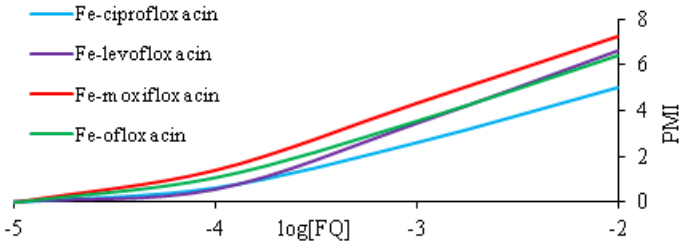

Figure 1. PMI curves of Fe(III) ion - Fluoroqiunolone systems

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