

THE THEORETICAL DESCRIPTION FOR THE ANTI-COVID-19 DRUG REMDESIVIR ELECTROCHEMICAL DETERMINATION, ASSISTED BY A POLY(ACRIDINE ORANGE)-VO(OH) COMPOSITE

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In 2019-2020 the world has been influenced by a strange virus infection [1]. The virus structure was resembling the known 2003 atypical pneumonia virus SARS, Middle East β -coronavirus MERS and newly found bat coronavirus, which received the code name of SARS-CoViD2. Yet the proper infection has been put the code name COVID-19. The pandemic outbreak has led to the cancellation and postponement of different events, including the European Football Cup and Summer Olympics. The development of an effective drug and vaccine is still in progress.

The clinical trials have confirmed the efficiency of Remdesivir drug (Fig. 1) [2]. It manifested exclusive efficiency and activity against COVID-19 in patients with mild and moderate symptoms. It was the first EU-approved drug against COVID-19.

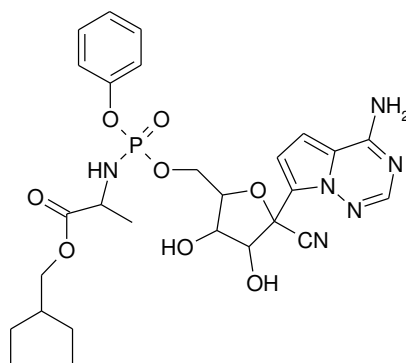


Figure 1. Remdesivir.

Nevertheless, remdesivir has shown some adverse effects [3], like respiratory insufficiency, reduction of erythrocyte and thrombocyte concentrations in blood, excess of melanin secretion and allergic reactions. Moreover, as it contains a nitrile group, it may show high toxicity while in excess. Therefore, the development of an efficient method for remdesivir electrochemical determination is really actual, and the electroanalytical methods, yet used for the similar drugs, could give it a good service.

Taking into account the remdesivir chemical composition, it is possible to conclude that this compound may be detected either anodically, or cathodically. In the second case, the

VO(OH)-nanoparticles could be used as an electrode modifier. In order to enhance their stability and electroanalytical activity, they are deposited over a polyurethane matrix.

In this work, a remdesivir electrochemical determination over a PU/VO(OH)-modified electrode is theoretically evaluated. The scheme of the electroanalytical system is exposed on the Fig. 2:

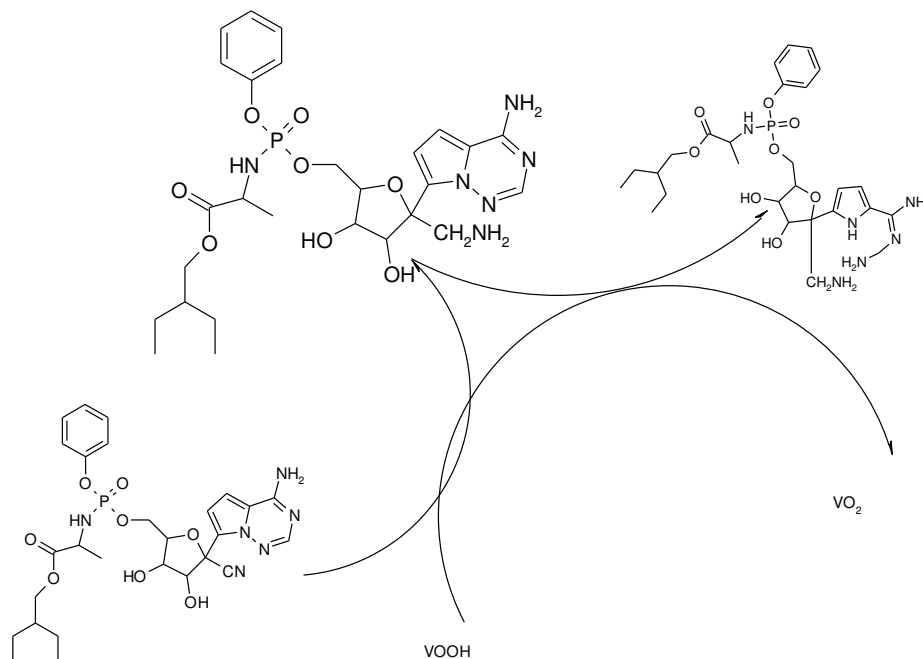


Fig. 2: The scheme of remdesivir cathodical electrochemical determination

Contrarily to the anodic determination, the mechanism of electroanalytical process isn't branched, which implies the relatively less dynamic behavior. Therefore, the analysis of the correspondent mathematical model analysis, made by linear stability theory and bifurcation analysis, confirms the composite electroanalytical efficiency as an electrode modifier.

References:

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2. J. Grein, N. Ohmagari, D. Shin, G. Diaz, New Engl. J. Med., 382(2020), 2327
3. Th. de Azevedo, P. de Azevedo, R. Silveira Filho *et al.*, Rev. Assoc. Med. Br., 66(2020), 838