

minerals Al and Si to react and be removed from the ash.

Considering the Russian Federation, the main materials suitable with availability and characteristics favorable for the synthesis are the coals from the Seversk and Kemerovo regions.

Therefore, synthesis of Y zeolite is possible. Since zeolite are porous media. To assess the characteristics of the material formed, various methods

are employed. The main methods employed are: Scanning Electron Microscopy (SEM), XRF (X-ray fluorescence analysis), XRD (X-Ray Diffraction analysis) and BET (Brunauer–Emmett–Teller).

After characterization of the material formed, optimization of the process is carried under the identification of the main parameters of the synthesis process, especially time and temperature of the alkaline fusion and hydrothermal synthesis.

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VOLTAMMETRIC DETERMINATION OF INDOMENTHYL

M.A. Pavlenko¹, K.A. Leonov²

Scientific supervisor – PhD, assistant professor O.I. Lipskikh
Language expert – PhD, Head of Department of Foreign Languages L.M. Bolsunovskaya

¹National Research Tomsk Polytechnic University
634050, Russia, Tomsk, Lenin Avenue, 30

²Innovative Pharmacology Research, LLC (IPHAR, LLC)
634021, Russia, Tomsk, 79/4 Elizarovykh Str., map27@tpu.ru

The modern pharmaceutical market is characterized by high rates of development. Anti-inflammatory drugs are considered to be one of the most popular medicines. To minimize the side effects of nonsteroidal anti-inflammatory drugs (NAD) as well as to increase their effectiveness, prodrugs are being actively developed. This is a chemically modified form of a drug (ether, salt, ether salt, etc.), which turns into the drug itself in the biological environment as a result of metabolic processes [1].

In this paper Indomethylyl (IML; IPHAR, LLC, Tomsk) was chosen as the test object. The molecule

of IML represents indomethacin, which is bound to menthol by covalent bonds (Fig. 1). IML is a white crystalline powder without odor. The best solvent for IML is dimethylformamide.

The purpose of this work is selection the conditions of the electrochemical determination of IML for the subsequent development of a method for its determination. For experimental studies, a TA-2 voltammetric analyzer was used (Tomanalyt, Tomsk, Russia). The electrochemical cell consisted of 20 cm³ quartz cups, which were installed in a special hole on the platform of the voltammetric

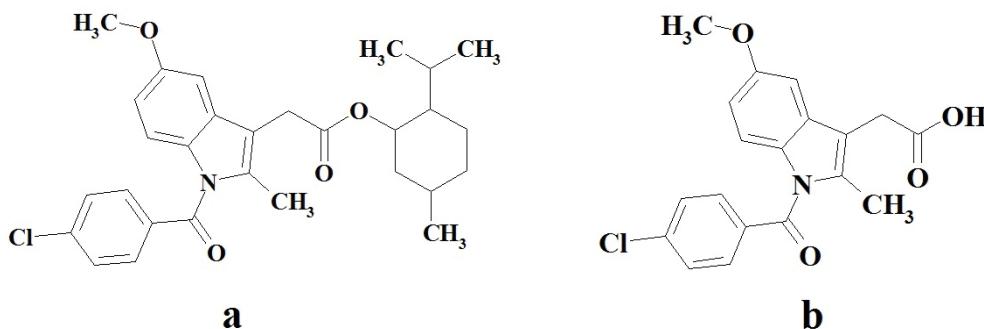


Fig. 1. Chemical structure of indomethylyl

analyzer. A glassy carbon electrode (GCE) was used as an indicator electrode. Silver chloride electrodes were used as auxiliary and reference electrodes. A 0.1 M methanol solution of sodium perchlorate was used as the background electrolyte. The solvent DMFA was selected in accordance with the Pharmacopoeia article.

Cyclic voltammograms were recorded in the potential range from 0.7 to 2 V (Fig. 2). According to the data obtained, it can be seen that IML undergoes the process of electrochemical oxidation at the electrode, while the peak of electrochemical reduction is absent.

As was shown in the figure 2, the current of IML electrooxidation is proportional to its concentration in solution and may be used for the determination of the substance in pharmaceuticals. The IR spectrum in KBR was recorded for confirmation of IML

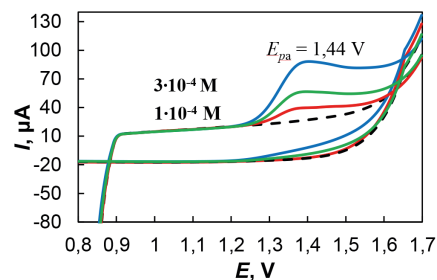


Fig. 2. Cyclic voltammograms of IML on the GCE in 0.1 M NaClO₄, W = 100 mV/s

originality. Infrared spectrometer Agilent Technologies Cary 600 was used for this purpose. Absorption bands position was of obtained spectrum is the same as in the pharmacopoeia article (Fig. 3).

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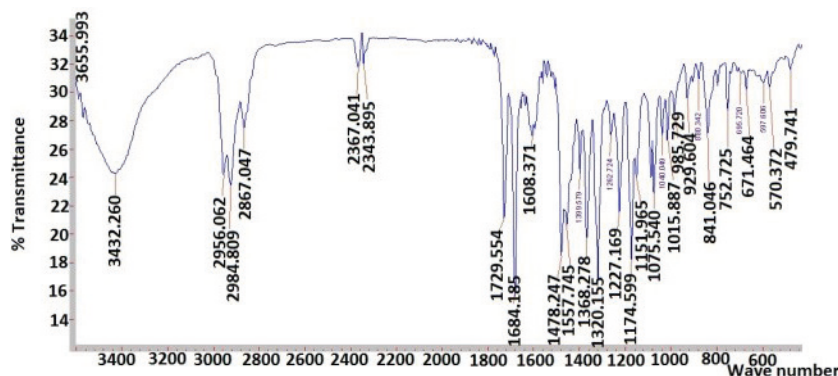


Fig. 3. IR spectrum of IML

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LASER TREATMENT OF FACE MASKS: A STEP FORWARD IN PERSONAL RESPIRATORY PROTECTION

I. Petrov, S. Shadenko, A. Lipovka, E. Konstantinova, V. Prakash, R.D. Rodriguez
Scientific advisor – Ph.D., Professor E. Sheremet

National Research Tomsk Polytechnic University
634050, Russia, Tomsk, 30 Lenin Avenue, iliaserpetrov@gmail.com

In 2020 humanity faced the new pandemic of COVID-19. Currently, the scientific community is aiming its efforts to develop new approaches for personal protection against viral and also bacterial infections. The most effective weapon against the COVID is a vaccine. But it is selective to each type

of virus, takes time for development, and has high costs. Moreover, there is no warranty whatsoever that vaccines will provide immunity against new viruses. This is not the case for facemasks that protect not just against viruses but also against bacteria that are a secondary cause of death due to respira-