

# Electrochemical sensing platform based on carbon paste electrodes modified with natural nanomaterials for Beta-Blocker determination

Nevila Broli<sup>1,2</sup>

Majlinda Vasjari<sup>1,2</sup>, Sadik Cenolli<sup>1,2</sup>, Loreta Vallja<sup>1,2</sup>, Sonila Duka<sup>1,2</sup> Alma Shehu<sup>1</sup>

*1*Department of Chemistry, Faculty of Natural Science, University of Tirana, Boulevard Zogu I nn, 1001 Tirana, Albania

*2*Nano-Alb, Academy of Sciences of Albania, Fan Noli 7, 1001 Tirana, Albania

[nevila.broli@fshn.edu.al](mailto:nevila.broli@fshn.edu.al)

Abstract

Beta-blockers ( $\beta$ -blockers) are a special type of medicine that are prescribed for a wide range of health problems including cardiovascular diseases [1]. There is a narrow border between the therapeutic and toxic levels of  $\beta$ -blockers and at high dosages. Therefore, developing a rapid, simple, economic and accurate method for analyses of different receptor blocking agents is very important [2]. The electrochemical behaviour of Propranolol (PRO) at the surface of composite carbon paste nanosensors modified with natural zeolite (CPE/Ze) and rutile (CPE/R) is described. The prepared nanocomposite sensors shows a good electrocatalytic activity toward the oxidation of Propranolol, which is leading to considerable improvement of sensitivity (anodic current) [3]. The cyclic voltammetry (CV) and square wave voltammetry (SWV) were used for determination of PRO, in 0.1 M  $H_2SO_4$  using CPE/Ze and CPE/R. The effect of supporting electrolyte, pH, frequency, amplitude, loading of modifier and particles size, on voltammetric response of both sensors was studied. Under optimal condition, the analytical performance of the modified nanosensors toward propranolol, resulted with a linear range of 0.6 -15.7 mM and 0.2-8.9 mM and with detection limits of 0.45 mM and 0.08 mM for CPE/Ze and CPE/l, respectively. The proposed sensors were applied for detection of this drug (PRO) in pharmaceutical tablets. Finally, the obtained results indicate that the composite nanosensors CPE/R and CPE/Ze could be a good alternative method for the selective measurements of the propranolol in complex matrices [4].

## References

- [1] Mohammad Reza et al, Journal of Electroanalytical Chemistry 899 (2021) 115666,
- [2] Parisa Karami-Kolmoti and Reza Zaimbashi, ADMET & DMPK 11(2) (2023) 227-236
- [3] Nevila Broli et al; Open Chemistry, 19: (2021) 875–883,
- [4] Nevila Broli et al; Journal of Hygienic Engineering and Design, ISBN/ISSN: 1585-8489. vol. 37, (2022) pp 149-154

## Figures

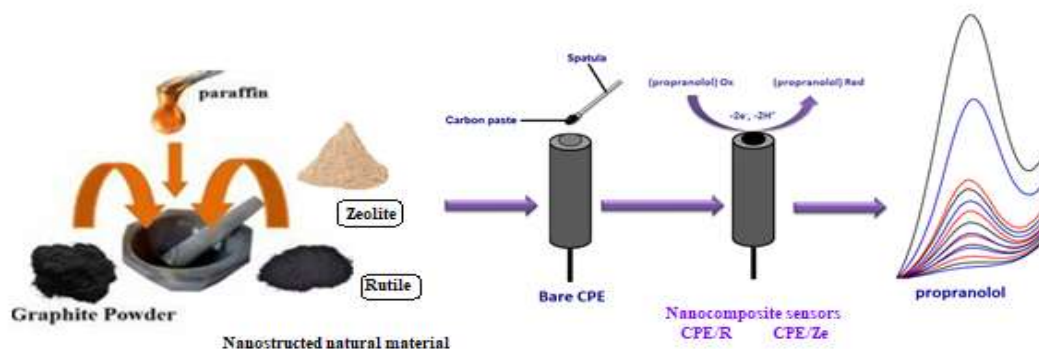


Figure 1: Schematic preparation of nanosensors for electrochemical sensing of PRO