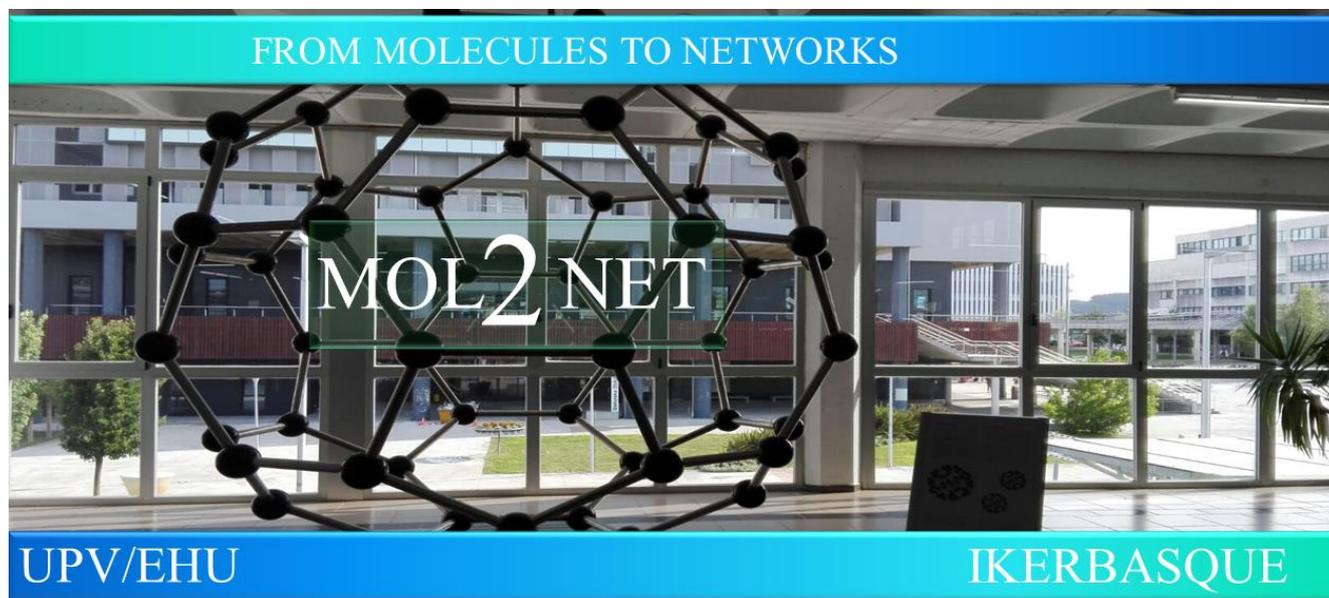




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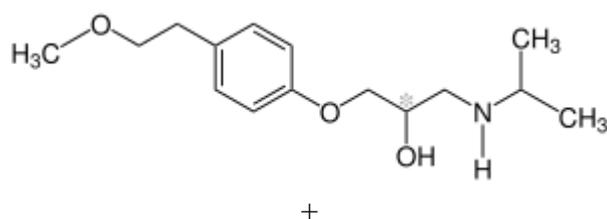


### DEVELOPMENT OF THE SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF METOPROLOL IN TABLETS BY USING BROMOPHENOL BLUE

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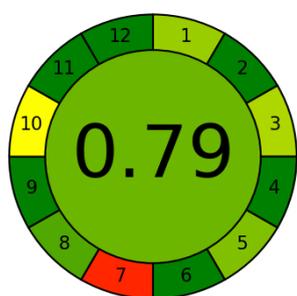
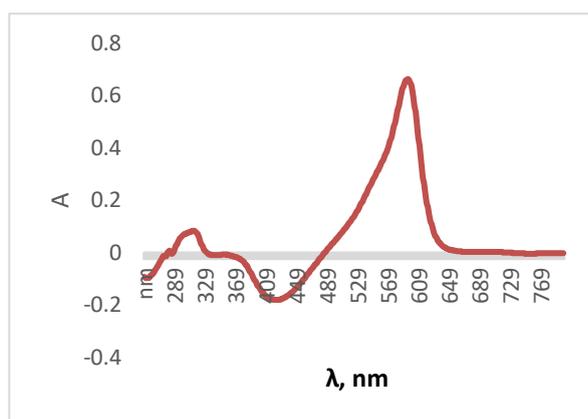
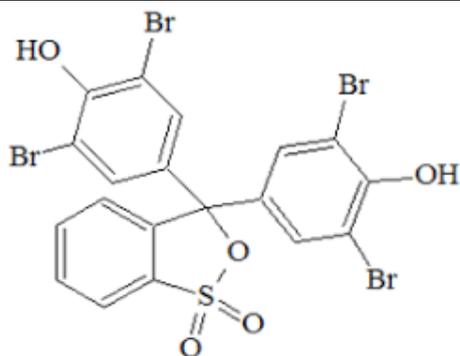
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#### Graphical Abstract



#### Abstract.

*Metoprolol belongs to the most famous drugs of this class and has been used in clinical practice for more than a quarter of a century. Chemically, metoprolol tartrate is bis [(2RS)-1-[4-(2-methoxyethyl)phenoxy]-3-[(1-methylethyl)amino]propan-2-ol] (2R, 3R)-2,3-dihydroxybutanedioate. It is water soluble molecule with  $\log P = 1.8$ ,  $pK_a$  (strongest acidic) = 14.09,  $pK_a$  (strongest basic) = 9.67. There were only one published analytical method for the spectrophotometric determination of metoprolol tartrate in dosage forms using 2,3-dichloro-1,4-naphthoquinone in dimethylformamide medium*



has been developed by Ukrainian scientists. There is a need for a simple, economic and ecofriendly spectrophotometric methods for the determination of metoprolol tartrate in tablets with less sophisticated equipment and budgets.

The aim of the work was to develop a simple, economic and ecofriendly spectrophotometric method for the determination of metoprolol tartrate in tablets based on the reaction with bromophenol blue (BPB).

**Material and methods:** A double-beam Shimadzu UV-Visible spectrophotometer, with spectral bandwidth of 1 nm wavelength accuracy  $\pm 0.5$  nm, Model –UV 1800 (Japan), Software UV-Probe 2.62, and a pair of 1 cm matched quartz cells, was used to measure absorbance of the resulting solution. All the chemicals were used of analytical reagent grade. Pharmacopeial standard samples of metoprolol tartrate and bromophenol blue (BPB) were provided by Sigma-Aldrich ( $\geq 98\%$ , HPLC). The used dosage forms of metoprolol tartrate: tablets Metoprolol 50 mg, 100 mg.

**Results and discussion:** The method of spectrophotometric determination of the quantitative content of metoprolol tartrate based on its reaction with BPB in methanol solution has been developed. The stoichiometric ratios of the reactive components as 1:1 were obtained by the methods of continuous changes and the saturation method. The developed method of quantitative determination of metoprolol tartrate was validated. Linearity regression equation was  $y = 0.0373x + 0.0038$  and the obtained correlation coefficient was  $R^2=0.9984$ . The linear relationship was found between absorbance at  $\lambda_{max}$  and concentration of metoprolol tartrate in the range 9.56-15.02  $\mu\text{g/mL}$ . The LOD and LOQ values were calculated to be 0.81  $\mu\text{g/mL}$  and 2.67  $\mu\text{g/mL}$ .

**Conclusions.** A simple, economic and ecofriendly spectrophotometric method has been developed for the quantitative determination of metoprolol tartrate in tablets based on the reaction with BPB. The developed method of quantitative determination of metoprolol tartrate was validated in accordance with the requirements of SPhU. We can suggest our work with offered detailed and successful solutions for the mentioned aim with less sophisticated equipment for QC lab for routine manufacturing control.