RAPID ESTIMATION OF ANTIOXIDANT CAPACITY OF SOME MEDICINAL PLANTS: ELECTROCHEMICAL AND PHOTOMETRIC APPROACHES

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Antioxidants are compounds capable to either delay or inhibit the oxidation processes which occur under the influence of reactive oxygen species Plant phenolic compounds (phenolic acids, flavonoids, quinones, coumarins, lignans, stilbenes, and tannins), nitrogen compounds (alkaloids, amines), carotenoids and vitamins are the most important plant substances presenting antioxidant activity.

The total antioxidant capacity (TAC) of some medicinal plants collected in the region of Malesevo Mountain was evaluated using cyclic voltammetry and FRAP method.

Infusions samples in the present research were prepared from: Oregano (*Origanum vulgare* L.), Lemon balm (*Melissa officinalis* L.), St. John's wort (*Hypericum perforatum* L.), Wild thyme (*Thymus serpyllum* L.) and Mint tea (*Mentha piperita* L.).

In this study we present rapid and simple electrochemical voltammetric method for estimation the total antioxidant capacity of medicinal plants in an ethanol/water phase by measuring the rate of homogeneous redox reaction with $ABTS^{\bullet+}$ radical (2,2'- azinobis (3-ethylbenzothiazoline-6-sulfonic acid)) by means of cyclic voltammetry. $ABTS^{\bullet+}$ radical was electrochemically *in situ* generated at the surface of glassy carbon electrode by electrochemical oxidation of ABTS in ethanol electrolyte solution. The method is based on the well-known regenerative catalytic EC´ mechanism, where the $ABTS^{\bullet+}$ radical serves as a redox mediator for catalytic oxidation of antioxidants present in the plant infusion.

The total antioxidant capacity of herb infusions was determined using photometric FRAP method (Ferric reducing antioxidant power) developed by Benzie and Strain.

As a conclusion we can say that there were strong correlations between the results obtained with cyclic voltammetry and FRAP method and both methods can be used for evaluation of total antioxidant capacity in medicinal plants infusions.

Keywords: antioxidants, total antioxidant capacity, medical plants, cyclic voltammetry, FRAP.