ASPECTS OF FUMARIC ACID USING IN PHARMACY AND OTHER AREAS

Struk Ya. I., Gorizdra I. A., Shpychak T. V., Chernykh V. P.
National University of Pharmacy, Kharkiv, Ukraine
orgchem@nuph.edu.ua

Introduction. Fumaric (*trans*-ethylenedicarboxylic) acid (FA) derivatives have been traditionally attracted researchers attention as building blocks for medicines creating. They are presented in every living organism, human skin produces them under the sunlight. They also take part in the Krebs cycle as intermediate metabolites. Fumaric acid was first extracted from the mushroom *Boletus pseudoignarius*, it was also found in lichens and Iceland moss. It was named after the plant *Fumaria officinalis*, from which it was isolated in 1832.

Aim. To analyze the current state of the FA derivatives using in various areas, particularly in pharmacy.

Materials and methods. FA, fumarates, alkyl esters, amide derivatives. The study of biological activity and application.

Results and discussion. Nowadays FA is produced by chemical industry. It is used for succinic and malic acid, polyester resins, synthetic drying oil and plasticizers production. It is also used as acidifying agent in food industry for preparation of beverages and bakery since 1946 (food conservant *E297*). Based on FA food additive *Libekrin* is used for poultry. It is also used in hygiene products manufacturing. There are many different pharmacological groups of drugs based on FA at the pharmaceutical market. *Konfumin, Mafusol, Sodium fumarate complex* are infusion drugs for rehydration and detoxification. *Polioxyfumarin is a* multifunctional blood substitute. *Iron fumarate, Heferol, Ferronat* have hematopoietic, erythropoietic, antianemic properties and replenish iron deficiency. *Tenofovir disoproxil fumarate, Viread* are antivirals, *Zaditen* is antihistamine drug for systemic use. *Fumaderm* is used in psoriasis therapy, *Fumaramidmicin* is a broad-spectrum antibiotic. *Tekfidera dimethyl fumarate* is used for treatment of adult patients with relapsing-remitting multiple sclerosis. *Bisoprolol fumarate* is used in coronary heart disease and hypertension treatment. The scientific school led by Academician of NAS of Ukraine, prof. Chernykh V.P. (Organic Chemistry Department, NUPh) carried out the research of biologically active substances synthesis based on FA heterylamides, 2-carboxyphenylamide, arensulfonohydrazides. New amides, esters, hydrazides, salts with anti-inflammatory, analgesic, hemostatic, diuretic, glucose-lowering and antihypoxic activities were synthesized.

Conclusions. FA is a perspective substance for various industries, especially for new drugs creation.