POLYMER MATRIX FROM ACRYLIC COPOLYMERS FOR TRANSDERMAL DELIVERY OF PLANT CO_2-EXTRACTS

V.F. Uryash[1], A.E. Gruzdeva[2], V.A. Izvozchikova[3], N.V. Grishatova[2], A.V. Uryash[4], I.G. Karpova[2]

1 - Research Institute of Chemistry University of Nizhni Novgorod, Russia

2 - "Biocenter" Joint-Stock Company, Nizhniy Novgorod, RUSSIA

3 - "Extramed" Ltd., Nizhni Novgorod, RUSSIA

4 - Mount Sinai Medical Center, Department of Research, Miami Beach, USA

ltch@ichem.unn.ru

Mechanism of action of Polymer Carriers recently became a major area of interest in biochemical research. These polymers can transport a drug of interest through the skin of a patient. Polymer Carriers also capable of delayed drug-to-tissue release that can be modulated to achieve desired therapeutic effect. Chemical characteristics of these Polymers can be adjusted according to the type of medicine they are designed to carry. Polymer Carriers are required as a major component for large variety of Transdermal Drug Delivery Systems, because of their special adhesive properties.

The goal of this investigation was to design a Polymer Adhesive based on acrylic copolymers that can be used for prolonged release of biologically active substances. We have used plant substrate purified with supercritical state carbon dioxide (CO_2) extraction.

We employed differential thermal analysis and low-temperature adiabatic calorimetry to study physicochemical and thermodynamic properties of the adhesive and CO_2-extracts. Heat capacity of a few acrylic copolymers was measured in the range of 80–330 K. Thermodynamic parameters (enthalpy, entropy and Gibbs energy) were measured. Relaxation transition temperatures were determined for investigated polymers. Physical state diagrams of copolymer–plasticizer systems were constructed and analyzed for a wide range of temperatures and concentrations of components.

Polymer matrix that exhibits optimal skin adhesion, does not produce an irritation and releases biologically active substances within required period of time was developed as a new component for transdermal therapeutic system.

The researches were performed with the financial support of the Foundation for Assistance to Small Innovative Enterprises (FASIE) according to the program "Development", project No 7595 (2007).