

Scientific report

Regarding the implementation of the project "Transdermal patch developed by laser-based methods for cardiovascular disease" in the period January–December 2012

Name of the phase: Intermediary phase II/2012 with the objective „Report on the optimal deposition parameters of the polymers chosen in Phase I/2011 (polyisobutylene (PIB), ethyl cellulose (EC), and hydroxypropyl methyl cellulose (HPMC))”.

Value of the project from the national budget for 2012: 236250 lei.

The activities carried out in phase II/2012, according to the Gantt diagram from the project proposal are:

- **A 2.1** Matrix assisted pulsed laser evaporation (MAPLE) of polymers (in WP 2).
- **A 2.2** MAPLE of polymer mixtures (in WP 2).
- **A 3.1** Morphologic characterization of the thin films deposited by MAPLE by atomic force microscopy AFM, scanning electron microscopy SEM, and contact angle measurements (in WP 3).
- **A 3.2** Chemical characterization of the thin films obtained, by Fourier transformed infrared spectroscopy FTIR , UV-VIS (in WP 3).
- **A 5.1** Dissemination activities: participation at one conference (in WP 5).

The objectives of this phase are the elaboration of a report on the optimal deposition parameters of the polymers chosen at phase I/2011 (PIB, EC, and HPMC), as well as the carrying out dissemination activities by participating at one conference.

The following results have been obtained within this phase:

- Thin films of PIB, EC, and HPMC with different thicknesses and roughness have been deposited by MAPLE.
- The thin polymer films have been morphologically (AFM, SEM) and structurally (FTIR, UV VIS) characterized.
- For all three polymers, by decreasing the laser fluence the roughness of the films decreases. The smoothest films are the PIB films (roughness under 70 nm), followed by EC, and finally HPMC.
- The FTIR spectra indicate that following MAPLE it is possible to obtain thin polymer films with a similar structure as in bulk.
- In addition, through FTIR it was proven that there are no traces of solvent in the polymer thin film deposited by MAPLE.
- The dissemination activities consisted in: the presentation of three invited lectures and two posters. One paper was submitted for publishing and one paper is under review in a ISI journal.
- The information on the web page of the project were actualized.
- Activities to be carried out in the IIIrd phase were planned:
 - MAPLE of polymer mixture/ polymer-drug;
 - Morphologic and chemical characterization of the thin films of polymer mixtures deposited;
 - Planning of animal tests.

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