observed which makes it possible to make some advice regarding Gramicidin S administration.

Additionally, some technological parameters were evaluated for each mixture and compared to the unloaded β-cyclodextrin to reveal its potential or industrial application in solid dosage form production.

Particle size distribution, bulk density, flowability and slope angle were determined according to the European pharmacopoeia procedures [6].

As a result, it was found that Gramicidin S complexation with β-cyclodextrin applying any technique modifies its technological properties as well as the drug release parameters.

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A STUDY OF THE GRAPHENE OXIDE INFLUENCE ON THE MORPHOLOGY AND CRYSTALLINE STRUCTURE OF PIEZOELECTRIC BIODEGRADABLE ELECTROSPUN POLY (L-LACTIC ACID)-BASED SCAFFOLDS

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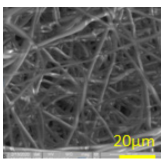
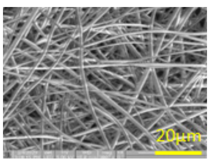
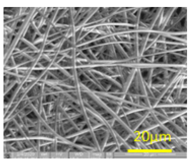
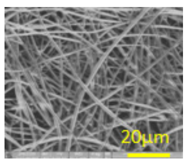
Introduction. Tissue engineering and regenerative medicine (TERM) aim to the regeneration or replacement of damaged or diseased tissues/organs using artificial materials, especially biodegradable. Moreover, a bioactive charged surface can provide enhanced cell adhesion and proliferation [1]. Poly (l-lactic acid) (PLLA) polymer is studied for diverse biomedical applications as a biocompatible and biodegradable material [2]. Compared to piezoelectric ceramics or non-biodegradable polymers, PLLA scaffolds demonstrate a weak mechanical and piezoelectric performance that can limit their successful use in TERM. However, some nanofillers, such dielectric graphene oxide (GO), can improve mechanical and piezoelectric properties of hybrid polymers [3]. Moreover, GO possesses unique physicochemical properties, flexibility and biocompatibility [4]. Thus, the present study aims to fabricate and analyze the morphology and structure of hybrid piezoelectric biodegradable composites based on PLLA and GO.

Results and discussion. Scanning electron microscope (SEM) was used to examine the morphology of the prepared PLLA-GO scaffolds (Table 1).

The addition of GO led to the formation of defect-free scaffolds (e.g. without beads), thereby resulting in GO homogenous distribution within fibers. Furthermore, it was found that a high concentration of GO led to the formation of thinner fibers. The decrease of the fiber diameter could be attribut-

Table 1. SEM images of PLLA-GO scaffolds with corresponding average diameters (D)

Scaffolds			
Pure PLLA	PLLA-0.2 % GO	PLLA-0.7 % GO	PLLA-1 % GO
			
D = 1.64±0.36 (µm)	D = 1.35±0.37 (µm)	D = 1.26±0.37 (µm)	D = 1.12±0.25 (µm)

ed to the charge accumulation on the GO surface in a polymer solution jet while electrospinning, i.e. leading to electrostatic repulsions [5].

X-ray diffraction analysis was used to study the crystalline structure of the prepared hybrid scaffolds. For pure PLLA, no sharp peaks were observed in XRD patterns (Figure 1), likely indicating the presence of amorphous or nanocrystalline structure [6]. Meanwhile, 0.7 % and 1 % GO content resulted in the appearance of two new peaks observed at 16.7 ° and 19.1 °, which can be assigned to (200)/(110) and (014)/(203) planes of α-phase or (200)/(110) and (111) planes of β-phase of PLLA, respectively [6, 7]. In addition, due to the increased GO content (1 %), XRD patterns revealed a (112) plane of GO in PLLA scaffolds.

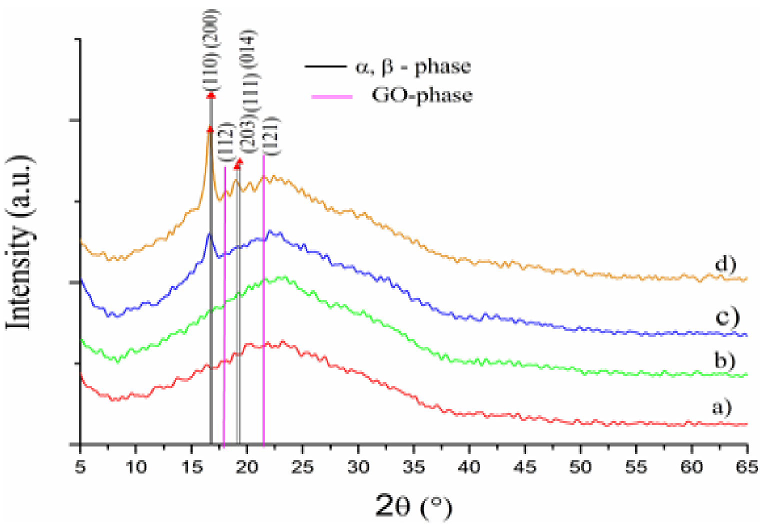


Fig. 1. *XRD patterns of (a) pure PLLA scaffold and with (b) 0.2 %, (c) 0.7 %, (d) 1 % GO doping*

Conclusion. Defect-free PLLA fibers with GO doping were sucessfully fabricated using electrospinning. SEM analysis showed that the increase of GO content resulted in the formation of thinner fibers. XRD analysis demonstrated the formation of the crystalline PLLA structure in the electrospun scaffolds with GO doping at 0.7 % and 1 %.

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PREPARATION AND CHARACTERIZATION OF POROUS PTFE MEMBRANES PREPARED BY ELECTROSPINNING METHOD

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Materials with good mechanical properties and excellent hydrophobicity are applicable for the purification of gases, osmotic distillation (OM), membrane distillation (MD), and their varieties. One of this group of materials is polytetrafluoroethylene (PTFE) – a fluoropolymer synthesized by tetrafluoroethylene polymerization at high pressure [1]. Owing to its high chemical and thermal stability, good dielectric, hydrophobic properties, and excellent mechanical characteristics, PTFE is utilized in chemical technology for manufacturing of chemical reactors, chemical-resistant pipes, and membranes for various types of purification [2].

The main methods for the manufacture of PTFE-based membranes are biaxial stretching, laser ablation, and the method using pore-forming reagents. The disadvantages of these methods are difficulties with manufacturing of thin membranes with a high degree of pore interconnectivity and