

OPPONENT REVIEW OF DIPLOMA THESIS

Name and surname of student: Yash Chandrashekhar Shah, B.Eng.

Title of thesis: Wetting behavior of electrospun biodegradable materials

Supervisor of thesis: doc. Ing. Eva Kuželová Košťáková, Ph.D.

Oponent: Aysegul Gul, MSc.

1. Evaluation of diploma thesis

Evaluation	Excellent	Excellent minus	Very good	Very good minus	Good	Failed
Fulfillment of the goal and assignment of the work		x				
Quality of research part	x					
Methodology of work solution	x					
Factual level of work	x					
Contribution of work and potential applicability of results	x					
Formal and graphic level of work	x					

Please, mark by X.

The classification of work in point 5 is given verbally, not numerically or by letter.

2. Comments and remarks on the diploma thesis

The primary goal of this research is to look into the effects of different times on the wicking of water into PCL electrospun nanofibrous layers. The theoretical part mainly focuses on the electrospinning process and parameters. Furthermore, the literature contains detailed information about the application areas of nanofibrous fibers, the types of polymers used, degradation mechanism of Polycaprolactane and wettability analyses. The theoretical information provided has set the basis for the experimental study.

In this study, the electrospinning method was used to create nanostructures from biodegradable PCL polymer in the experimental part. While executing the results, SEM was used to examine of the electrospun fibers diameters. The wettability of nanofibers produced at various times was evaluated using wicking and surface density tests and analyses.

When the results were examined, the author stated that the fiber diameters of the nanofiber structures produced at different dates using the same parameters were different from each other. The reason behind this was clarified as the original raw material used for electrospinning, which is taken from different bottles and which may contain the variation in the molecular weight or variation in distribution of molecular weight. However, they found that increasing the storage time caused an increase in the surface density of the PCL-

45 nanofibrous structure. The wettability findings show that the wettability properties of PCL-45 nanofibrous structure increase with the increase in storage time.

The theoretical part, as well as the tests and analyses, are adequate to achieve the study's goal. I'd like to make a few inferences about the theoretical sections:

- 4.1.2; In the section where the fiber diameter is calculated, it was stated that nanofibers were produced in April 2020, December 2020 and April 2021, while in other parts of the thesis, July calculations were taken instead of April 2020. The situation here causes confusion, if the necessary explanation is made in this section, it will be more understandable for the readers.

3. Diploma thesis questions

- a) 4.1.2 Fiber diameter calculation; The result obtained in the fiber diameter measurements made in December 2020 is greater than the results of April and July. How can the author explain the underlying reason, apart from the possible differences in the composition of the raw material taken from different bottles?
- b) The author stated that storage conditions such as temperature and humidity have an effect on the wetting properties of PCL-45. Can the author explain how temperature and humidity change the PCL-45 nanofibrous structure and affect the wettability?

4. Opponent's statement whether the diploma thesis meets the requirements for the award of an academic degree and whether it is recommended for defense

The submitted work is organized in a logical manner to cover the phenomenon under investigation in a broad sense. This research is suitable for a master's thesis.

5. Classification of the opponent of the diploma thesis

I suggest to classify this work by grade: **Excellent**

By signing I certify that I am not in any personal relationship with the author of the thesis.

In Liberec 7th September 2021

Aysegul GUL, MSc.

.....
signature and name of opponent

***Institute for Nanomaterials,
Advanced Technologies and
Innovation,CXI,TUL***