

## TABLE OF CONTENT

<b>1. INTRODUCTION.....</b>	<b>7</b>
<b>2. STATE OF THE ART .....</b>	<b>9</b>
2.1 SPIDER SILK – A BLUE PRINT FOR HIGH PREFORMING BIOPOLYMERS .....	9
2.2 RECOMBINANT SPIDER SILK PROTEIN VARIANTS .....	11
2.3 MATERIALS MADE OF RECOMBINANT SPIDER SILK PROTEINS.....	11
2.3.1 Nanofibrils.....	11
2.3.2 Hydrogels .....	12
2.3.3 Particles .....	12
2.4 PROTEIN PROCESSING FOR FUNCTIONAL PATTERNED SURFACES .....	13
2.4.1 Surface modification of protein-based materials .....	14
<b>3. AIM OF THE HABILITATION.....</b>	<b>15</b>
<b>4. RESULTS AND DISCUSSIONS.....</b>	<b>16</b>
4.1 FUNCTIONALIZATION OF SURFACES FOR BIOANALYSES.....	16
4.1.1 Modification of biomacromolecules for immobilization on surfaces.....	16
4.1.2 Modification of gold electrodes with enzyme-ODN conjugate for sensitive electrochemical detection of foodborne bacteria. ....	19
4.2 HIERARCHICAL ASSEMBLY AND FUNCTIONALIZATION OF PROTEIN NANO-SURFACES..	22
4.2.1 Mechanism of fibrils self assembly from recombinant spider silk proteins .....	22
4.2.2 Functionalization of spider silk nanofibril surfaces.....	23
4.2.3 Functionalization of surfaces via nanofibril self-assembly .....	27
<b>5. SUMMARY AND CONTRIBUTION OF THE WORK TO RESEARCH PROGRESS AND APPLICATIONS.....</b>	<b>33</b>
<b>REFERENCES.....</b>	<b>35</b>
<b>LIST OF FIGURES.....</b>	<b>43</b>
<b>LIST OF ABBREVIATIONS.....</b>	<b>44</b>
<b>LIST OF AUTHOR’S PUBLICATIONS.....</b>	<b>45</b>
<b>PROFESSIONAL CURRICULUM VITAE.....</b>	<b>48</b>