

Ion Release from Zn-Incorporated Polymer Nanosheets for Biomedicine

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Zinc is known as one of vital micronutrients that assists epithelization and its deficiency results in delayed wound healing [1]. Zinc oxide has antibacterial properties which is also beneficial for biomedicine. Therefore, incorporation of Zn-containing nanomaterials in polymer nanosheets is expected to add value to wound treatment and healing. Correspondingly, investigation of zinc-ion release capability of such systems seems very vital for their effectiveness as wound dressing.

In this work, we prepared polymeric nanosheets of poly L-lactic acid (PLLA) incorporated with Zn-containing nanoparticles and conducted their ion-release tests. The release tests were carried out at constant pH and temperature for 4 days. The nanosheets were incorporated with different Zn-containing nanoparticles. Both commercially available nanoparticles and those prepared via laser ablation in liquid were used. The nanoparticles were incorporated into PLLA nanosheets using spin-coating technique reported elsewhere [2]. The as-prepared nanosheets were immersed into a buffer aqueous solution (pH-7.4) and kept at 37 °C for 4 days to release ions, whose concentration was determined spectroscopically.

The conducted tests revealed that both commercial and laser-generated nanoparticles actively released zinc ions within the first 20 h and steady. This confirmed that both nanoparticle types dissolved under the applied conditions gradually releasing zinc ions.

References.

[1] M. Arnold, A. Barbul, *Plastic Reconst. Surg.* 2006, 117, 42s.

[2] Y. Okamura, K. Kabata, M. Kinoshita, D. Saitoh, S. Takeoka, *Adv. Mater.* 2009, 21, 4388.