

Biodegradation of two new biomaterials

Paola Coppa¹, Maria Adelaide Continenza², Leonardo Adamo Pajewski¹, Raniero D'Ascoli³, Francesco Vegliò¹

¹Dip. Chimica, Ing. Chimica e Materiali, Università degli Studi dell'Aquila, Italia

²Dip. Scienze della Salute, Università degli Studi dell'Aquila, Italia

³Baxter Manufacturing S.p.A, Rieti, Italia

Introduction. As in the previous experiments the haemostatic swab *Antema* revealed the disadvantage of troublesome adhesion both to surgical instruments and to serous surfaces of internal organs, the addition of *Matemo* could speed up the haemostatic performances of both biomaterials reducing the adhesion. For that reason *Antema* pads were treated with *Matemo* obtaining new haemostatic swabs. A comparison between the *Matemo* and the *Antema + Matemo* pads was then performed to test the haemostatic power and the biodegradation of both biomaterials.

Materials and methods. For the experimental protocol the dorsal skin of each anesthetized animal was shaved, incised and two pouches were performed inside the subcutaneous tissue of the back, to introduce a specimen (1 cm² of size) of *Matemo* on the left side, and *Matemo+Antema* on the right side. The same operation was repeated in 3 animals, and 3 other rats were used as controls and treated only with the selected anesthetic without intervention. The treated animals were all killed after 90 days from the operation. All the animals were daily controlled and no accident happens during the post-operation time. After death the dorsal skin of each animal was inspected in the two sides of implant and the samples from the skin and the subcutaneous tissues were taken in both sides of the back, to submit to the histological studies.

Results. The microscopic analysis of the histological sections showed that at the deadline of the experiment both biomaterials disappeared from the site of implant, but the two regions were very different. In the left side (*Matemo*) the subcutaneous tissue appeared quite normal and very poorly infiltrated by the inflammatory cells, without proliferation of new fibrous tissue, neither dermal adhesion to the musculature. In the right side (*Antema + Matemo*) indeed, a significant infiltration of inflammatory cells was jet detectable and many dense neo-proliferate connective tissue attached the dermal plane to the muscular layer. Then, this protocol confirmed the very interesting results obtained in these studies in which the new synthesized haemostatic biomaterial *Matemo* was compared with *Tabotamp* and *Antema*, both currently used surgical sponges. Also in this experiment *Matemo* revealed a significant decrease in bleeding time with an absorption rate of the blood very quick and fast and its biodegradation at the 90th day were almost perfect.

Keywords: Biomaterials, Haemostatic, Biodegradation, Antema, Matemo