

PENICILLIN G AND OTHER β -LACTAMIC ANTIBIOTICS DETERMINATION USING A NEW IMMUNOSENSOR IN REAL SAMPLES.

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A number of analytical methods for penicillin control were developed in the last years, involving chromatographic techniques. Nevertheless the need for rapid and inexpensive tests has also encouraged the use of biosensor methods. In previous years, for instance, also the authors of the present communication developed some useful ISEs for analysing β -lactamic antibiotics [1], although their selectivity was not particularly high. In more recent years therefore more specific enzymatic biosensors have been developed for the analysis of penicillin and other β -lactamic antibiotics using penicillinase as enzyme and as transducer a sensor for pH measurement of different types: potentiometric (glass, metal-oxide, membrane electrodes, ISFET [2]), or fluorescence and absorbance optodes. The difficulty encountered in developing this type of enzymatic sensor is that found in all those biosensors in which a pH variation produced by an enzymatic reaction is to be measured even when having to operate practically in a pH buffered solution. Several kinds of immunosensors for clinical and environmental purposes were developed in recent years in view of the possibility of generating a large number of antibodies for the analysis of numerous chemical species. The availability of antibodies for β -lactamic antibiotics on the market is thus now encouraging the development of immunosensors that do not have this drawback and which also have good selectivity and offer the advantage of being able to analyse real samples without any need for pre-treatment. The present communication describes the development of a new immunosensor for penicillin. In actual fact two different competitive procedures were used for penicillin determination, in which the antigen (Penicillin) or the antibody (anti-Penicillin), respectively, were conjugated with horseradish peroxidase enzyme, using a biotinylation process. The response of the new immunosensor was tested also for other β -lactamic antibiotics such as ampicillin, amoxicillin, dicloxacillin. After optimizing the 'competitive' measurement procedure, the penicillin immunosensor was used to determine penicillin and other β -lactamic antibiotics in several types of pharmaceutical formulations sold in chemist's shops, but also the same antibiotics found in river water. Lastly, selectivity vis-à-vis other antibiotics and the affinity constant values were determined.

[1] L. Campanella, M. Tomassetti, R. Sbrilli, *Ann. Chim.* **1986**, 76, 483-497.

[2] S. Caras, J. Janata, *Anal. Chem.*, **1980**, 52, 1935-1937.