

Current trends and future perspectives in microbiological culture techniques

Tendencias actuales y perspectivas futuras en las técnicas microbiológicas de cultivo

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Abstract

Current microbiological methods with the use of culture media do not satisfy the requirements of modern diagnosis. New culture methods should show a significant reduction in procedure's time, higher accuracy (100 %) and maximum analytical sensibility (1 CFU/sample). Actual worldwide as well as our national trends include the modification of the traditional composition of media by adding new nutritive bases or inhibitors of non target microorganisms; the methods miniaturization down to the nano-scale; the use of new solid matrixes and new containers and the inclusion of chromogenic, fluorogenic and bioluminescent substrates. An increasing number of new procedures which combine different stages in one operation (enrichment-identification/count-confirmation) and also a higher level of the ready to use media production are observed. Numerous media are generated for the cultivation of new identified or genetically modified microorganisms for lab research and diagnosis or for the industrial production of metabolites. Several optical and electronic equipments and techniques are in development for the automation of sample preparation, inoculation, detection, identification and calculation steps. Finally an increasing number of new norms, guidance and directives have being published for the quality control, standardization, comparison and validation of new microbiological methods. Perspectives include the design of media components by identifying new targets and substrates based on data mining, bioinformatics and "in silico" molecular design; the incorporation of nano-technological miniaturized structured matrixes; novel nano- luminescent, chromogenic and fluorogenic substrates and the development of a new generation of electronic scanning family of equipments, fully integrated in an automated management laboratory systems.

Keywords: Culture techniques, culture media, nanotechnology, chromogenic, fluorogenic