



# Microwave Discharge Electrodeless Lamps (MDEL). V. Microwave-assisted Photolytic Disinfection of *Bacillus Subtilis* in Simulated Electroplating Wash Wastewaters

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## ABSTRACT

This short article examines the microwave-assisted photolytic disinfection of aqueous solutions contaminated by *Bacillus subtilis* microorganisms using UV and vacuum-UV radiation emitted from a microwave discharge electrodeless lamp (MDEL), a device containing a Hg/Ar gas-fill that was proposed recently for use in Advanced Oxidation Processes (AOPs). Results of the disinfection are compared with those obtained from UV radiation emitted by a low-pressure electrode Hg lamp and by an excimer lamp. Also examined is the disinfection of *B. subtilis* aqueous media that contained Au<sup>3+</sup> or Ni<sup>2+</sup> ions, species often found in the treatment of electroplating wash wastewaters.

**KEYWORDS:** Microwaves; Ultraviolet light; *Bacillus subtilis*; Microwave discharge electrodeless lamp (MDEL)

## INTRODUCTION

Microwave-based disinfection technologies are used extensively in the field of foodstuffs [Datta and Anantheswaran, 2001]. The principal process in these technologies implicates thermal events since chemical bonds cannot be cleaved directly by the microwave energy alone. To the extent that the wavelength and the photon energy of commonly used 2.45-GHz microwaves