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Green biocides, a promising technology: Current and future applications to industry and industrial processes

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The study of biofilms has skyrocketed in recent years due to increased awareness of the pervasiveness and impact of biofilms. It cost the U.S. literally billions of dollars every year in energy losses, equipment damage, product contamination and medical infections. But biofilms also offer huge potential for cleaning up hazardous waste sites, filtering municipal and industrial water and wastewater, and forming biobarriers to protect soil and groundwater from contamination. The complexity of biofilm activity and behavior requires research contributions from many disciplines such as biochemistry, engineering, mathematics and microbiology. The aim of this review is to provide a comprehensive analysis of emerging novel antimicrobial techniques including those using myriad organic and inorganic products as well as genetic engineering techniques, the use of coordination complex molecules, composite materials and antimicrobial peptides and the use of lasers as such or their modified use in combination treatments. This review also addresses advanced and recent modifications, including methodological changes, and biocide efficacy enhancing strategies. This review will provide future planners of biofilm control technologies with a broad understanding and perspective on the use of biocides in the field of green developments for a sustainable future.

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Identification, virus-vector relationships and molecular characterization of tomato yellow leaf curl virus (TYLCV) in Saudi Arabia

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Tomato Yellow Leaf Curl bigeminivirus (TYLCV-SA) is a serious disease in tomatoes (LycopersiconesculentumMiller) is transmitted by whiteflies BemisiatabaciGenn. That affects some production areas of the Kingdom of Saudi Arabia under field and greenhouse conditions. TYLCV cause serious damage to the tomato plants with the results of 98-100% in a yield loss and reduction of crops. The virus was isolated from infected tomato plants growing naturally in Jazan, Najran, El-Kharj and Abha provinces in Saudi Arabia. The infected tomato plants exhibited systemic viral symptoms in the form or severe leaf curling, general stunting, vein clearing, leaf blade reduction, twisted, distorted, leaf crinkle with marginal yellowing,marginal chlorosis, stem upright as well as stunted plant growth. TYLCV-SA in the same area was a positive reaction with polyclonal antibodies specific to TYLCV using double antibody sandwich enzyme linked immune-sorbent assay (DAS-ELISA). Dot-blotting immune-binding assay (DBIA) and Tissue-blotting immune-binding assay (TBIA) proved to be successful tools in detecting TYLCV-SA antigen in naturally infected tomato and mechanically infected host plants. TYLCV had TIP of 72-75°C, DEP OF 10-5-10-6 and LIV of about 4-6 days. It was found that the virus is transmitted easily by whiteflies BemisiatabaciGennadius (Hemiptera: Aleyrodidae) when given access period of the acquisition of the tomato plants infected with insects in the incubation period, the transmission efficiency of about 98%-100% and transmitted by syringe injection of infected tomatoes to a different host range with transmission efficiency of about 78-83%. Transmitted TYLCV-SA isolates different species BY belonging to the families Solanaceae, Fabaceae, Chenopodiaceae, Cucurbitaceae, Amaranthaceae. DNA was extracted from infected plants and analyzed by polymerase chain reaction (PCR) using degenerate oligonucleotide primers for the viral coat protein gene, and the production of the PCR fragment of the expected size 500bp from tomato infected plants. The viral genome was detected by specific DNA probe using dot blot hybridization technique. Nucleotide sequence Comparisons of the Cp gene of the Saudi Arabia- Gizan isolate showed a similarity of 98% between TYLCV-SA-Gizan and other same strain.

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