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Photocatalysisremoval of pharmaceutical pollutants in water by using ultraviolet light and TiO2

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Some organic substances are either extremely stable or they have à very slow rate of natural degradation. Pharmaceuticals for example are widely used globally by humans and for food production and may react differently and persist in the environment. During their life cycle, they create a new and emerging problem and pose a threat of important magnitude with significant adverse effects on human health and ecological risks which requires the development of new efficient processes which can deteriorate these recalcitrant pollutants. On the other hand, any process requires, in addition to the necessary treatment products, the source of energy. The intensity solar of radiation reaching earth can be an alternative source used especially in developing countries. Indeed, this renewable energy is free and inexhaustible; it is the most abundant energy on Earth, especially in Algeria. The photocatalytic treatment presents itself as a technology of choice for the cleanup and integration of these wastewaters because it is a simple and efficient process. These attractive features have generated great interest from researchers for understanding and optimizing the industrial application of this treatment method. The present work aims to study the efficiencies of the photocatalytic process for treating wastewater contaminated with pharmaceutical pollutants by using irradiated catalysts and U.V. light radiation. Two pollutants model were used (tylosin and spiramycin) withTiO2 Degussa P25 and ZnO catalysts. Both pollutant model compounds are active ingredients used in the pharmaceutical industry in Algeria. Different parameters were studied: the photolysis, the effect of the concentration of catalyst, the degradation of a pollutant in the presence of each other, the effect of the concentration of contaminant, the ratio of the used catalyst and the pH effect. The kinetics of degradation follows the model of Langmuir Hinshelwood and speed photo-degradation is pseudo first order.

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On the intrinsic allergenicity of a phytase gene transformed potato

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The genetically modified (GM) Solanumtuberosum line 2-1 obtained by transforming an E. coliphytase gene into CK line was developed by Dr. Su-May Yu's team in the Institute of Molecular Biology, Academia Sinica, Taiwan. This study aims to investigate the effect of genetic modification on the intrinsic allergenicity of the parental potato line. Immunoblot and ELISA were used to identify the IgE binding of potatoes. Extracts from GM line 2-1 and the parental CK line harvested in 2010 and 2011 and one wild type potato from local market were used as testing materials. Dust mite and ConA protein were used as the positive and negative antigen control, respectively. Sera were collected form Taichung Veterans General Hospital via Immuno CAP assay. Seven sera with positive reactions to potato-specific antigens were selected as the antibody; three of the sera also reacting with dust mite-specific antigens were used as positive control. Three normal sera were used as negative control. Test of IgE reactivity showed a significant positive correlation in level of dust mite specific-IgE between Immuno CAP and ELISA assay among three subjects allergic to both potato and dust mite. But no positive correlation in subjects allergic only to potato was found. Using Western blot, there were heterogeneous IgE reactive allergenic components in potato-allergic sera. No significant difference in allergenicity was found. The study showed there was no difference in intrinsic allergenicity between GM and non-GM potatoes as detected by specific IgE from potato-allergic sera. This indicates that genetic modification may have no effect on the intrinsic allergenicity of the host potato line.

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