

Área: FIS

Diatomite-TiO₂ composites as photocatalyst on degradation of 17-methyltestosterone (17MT)

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Highlights

Composite preparation diatomite-TiO₂

Composite characterization by spectroscopic, difratometric and morphoogical techniques Photocatalysis of endocrine disruptor 17-metiltestosterone.

HPLC analysis of the degraded product

Resumo/Abstract

The hormone 17 α -methyltestosterone (17MT) is widely used in the fishing industry for the sexual reversal of fish fry. This hormone is an endocrine disruptor, with the potential to cause masculinization of aquatic fauna, compromising species survival and posing a risk to human health. Given the ineffectiveness of traditional methods of treating water for human consumption to remove this contaminant from water, research is turning to advanced treatments.

Composites made of diatomite and TiO₂ were prepared in four different m/m proportions (2,5%, 5%, 10% and 15%) (PAZ *et al.* 2024), characterized by X-ray Diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), Laser-Induced Breakdown Spectroscopy (LIBS), Scanning Electron Microscopy (SEM), and their performance as photocatalysts were evaluated. The analyte used in these experiments was 17-methyltestosterone (17MT), a pharmaceutical compound widely used in fish farming for sexual reversal. The photocatalytic experiments were done in lab-made photoreactor equipped with Hg medium pressure bulb. The aqueous solution of 17MT were irradiated for 2h, and the process was monitored spectrophotometrically by UV-vis. All the catalysts prepared showed similar performance, so it was decided to use only the catalyst with lower proportion in the following experiments for cost benefit reasons. A freshly prepared aqueous solution of 17MT was irradiated for 2h, and the final solution was submitted to HPLC analysis (Figure 1).

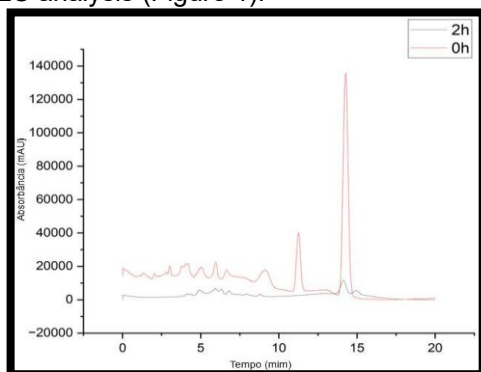


Figure 1 – HPLC analysis of the irradiated aqueous solution of 17MT.

In Figure 1 we can clearly see that the analyte (17MT) was almost all completely degraded, proving the efficiency of the prepared catalyst. More degradation experiments have been done to identify possible degradation products using the LCMS technique.

REFERENCE:

PAZ, J B. *et al.*, Compósito diatomita-TiO₂ na degradação fotocatalítica de 17alfa-metiltestosterona. *In*: 63º Congresso Brasileiro de Química, Centro de Eventos do Fiesta Bahia Hotel, Salvador. Novembro de 2024.

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