The simulated wastewater containing 20 mg L⁻¹ bentazone (Fig. 1) was made by appropriately diluting the commercial pesticide Basagran® 48 SL (BASF) with tap water. Pilot-scale experiments were carried out in a slurry, fountain-type photocatalytic reactor, able to operate under artificial or solar light, shown in Fig. 2. The total working volume was 15 L and the system was exposed to artificial light, with intensities determined with a radiometer (PMA2100, Solar Light Co., equipped with a UV-A/S-N 8773 and a global detector-S/N 18031). All reagents used were analytical grade. pH was adjusted to 3.0±0.1 with H₂SO₄ prior to photocatalysis.

Materials and Methods

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Figure 1: Bentazone (3-isopropyl-1H-2,1,3-benzothiadiazin-4(3H)-one-2,2-dioxide, CAS No: 25057-89-0, Mᵣ: 240.28) is the active compound of Basagran® 48 SL, the commercial pesticide obtained by BASF.

Figure 2: A. Front and B. Side view of the pilot-fountain-type photocatalytic reactor operating under artificial illumination (UV-A or visible). The simulated wastewater overflows from the top of the photocatalytic tank (PT, 1), falls down to the reservoir (2) and is then recirculated back to the PT with an air pump (3) and through a plastic tube (4). The wastewater is spread on the PT through six orifices, which also provide adequate aeration and agitation of the liquid phase. Illumination is conducted by four parallel lamps emitting UV-A (Philips TLD 18W/58) or visible (OSRAM Biolum 115W/965) irradiation placed on top of the PT (5). Addition of reagents is conducted via two dosing pumps (6). The treated waste may be rejected through a tube and a port placed at the bottom of the reservoir (7) or may be channelled to an Imhoff tank via the pump and tap (8), for catalyst/wastewater separation.