Preparation of Nanocrystalline TiO₂/Activated Carbon Composite Catalyst for the Removal of Phenol in Aqueous Solution

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The nanocrystalline TiO₂/activated carbon composite catalyst (TiO₂/AC) was prepared through sol-gel method in isopropanol mixed with activated carbon (AC). The prepared TiO₂/AC was calcined at 400 °C and characterized. The XRD pattern indicated that the TiO₂/AC was in Anatase phase. TEM image showed that the crystallite size of TiO₂/AC was in the range of 7-9 nm. The specific surface area from BET method was 441 m²/g and adsorption capacity determined from adsorption isotherm was 5.0x10⁴ mg/g. The TiO₂/AC calcined at 400 °C was used to remove phenol in aqueous solution under UV irradiation, which showed the highest removal efficiency when compared with TiO₂ (Degussa P25) and AC. The % removal of 100 ppm phenol by 0.4 g of TiO₂/AC in 4 hours was 62.61%, due to both adsorption and photocatalytic degradation.

Effect of Filter Media Characteristics, pH and Temperature on the Ammonia Removal in the Wastewater

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Biological filtration in the broadest sense includes any filtration technique that utilizes biological (living) organisms to remove impurities from the wastewater. Filter media selection is critical in the operation to achieve efficient quality requirements. The most important is to choose the correct types of filter media. Laboratory studies were conducted to evaluate the optimum ammonia removal performance using four different types of filter media (Ceramic Ring A, Ceramic Ring B, Japanese Filter Mat and Filter Wool) at different ammonia loading rates of 20 until 120 mg/L. Ceramic Ring A has been found to give the best performance with respect to their efficiency of ammonia removal because of high surface area and characteristic roughness. In general, nitrification is most efficient at pH levels ranging from about 7.5 to 9.0. Water temperature was kept between (27 and 30 °C). Nitrification efficiency is slower at lower temperatures.

Nanostructural Analysis of Finogel (Fish Nano Gelatin) for New Process Development

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One of the most important applications of nanotechnology is process evaluation and development. Different pattern was observed for gelatins pretreated differently. Four types of pretreatment solution were used during fish gelatin extraction in this study. They were acetic acid (A), acetic acid-NaCl (AS), acetic acid-NaOH (AB) and acetic acid-NaOH-NaCl (ABS). Results showed that each pretreatment gave different nano imaging patterns; A (fibril), AS (zig-zag cracks), AB (straight rods) and ABS (cross-linked rods). Cross-linked rods observed in ABS denote adequate removal of non-collagen content of the fish skin and increase its surface area. ABS is suggested as the best pretreatment for perch fish gelatin.