

PENGARUH ASAM NITRAT TERHADAP PENINGKATAN DEGRADASI ZAT WARNA RHODAMIN B SECARA FOTOLISIS DI BAWAH PAPARAN SINAR ULTRAVIOLET

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INTISARI

Fotolisis telah menjadi metode degradasi zat warna yang sering dimanfaatkan dan terus berkembang dalam beberapa dekade terakhir. Pada penelitian ini, dilakukan degradasi zat warna Rhodamin B (RhB) melalui fotolisis UV dengan penambahan HNO_3 . Tujuan dari penelitian ini adalah mengetahui pengaruh penambahan HNO_3 terhadap degradasi zat warna RhB melalui fotolisis UV dan mempelajari pengaruh pH, volume HNO_3 , daya lampu UV, jarak lampu dengan sampel dan waktu iradiasi untuk mengetahui kondisi optimum degradasi RhB. Selain itu, laju degradasi RhB pada kondisi optimum akan dibandingkan dengan zat kationik lain yaitu metilen biru dan metil violet.

Proses degradasi dilakukan dengan menambahkan HNO_3 ke dalam larutan zat warna RhB kemudian pH diatur menggunakan NaOH. Hasil pencampuran dimasukkan ke reaktor untuk disinari dengan lampu UV dalam jangka waktu tertentu. Larutan hasil iradiasi dianalisis menggunakan spektrofotometer UV-Vis pada panjang gelombang 554 nm.

Pengaruh penambahan HNO_3 terlihat ketika dibandingkan dengan asam lain seperti HCl dan H_2SO_4 serta dibandingkan dengan penelitian sejenis yang dijadikan sebagai acuan. Degradasi dilakukan pada pH 7,00 dengan hasil degradasi RhB optimum pada volume HNO_3 2,00 mL, daya lampu 30 Watt, jarak larutan 7,00 cm dari lampu dan waktu iradiasi selama 9,0 jam. Uji T dilakukan untuk memperkuat hasil yang diperoleh dari eksperimen. Ketika dibandingkan dengan zat warna kationik lain, RhB memiliki laju degradasi paling lambat. Zat warna dengan laju degradasi tercepat adalah metil violet kemudian diikuti oleh metilen biru. Hasil ini dipengaruhi oleh struktur zat warna yang berbeda.

Kata kunci: degradasi zat warna, fotolisis, HNO_3 , RhB

THE EFFECT OF NITRIC ACID IN THE INCREASE OF PHOTOLYSIS DEGRADATION OF RHODAMINE B UNDER ULTRAVIOLET LIGHT

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ABSTRACT

Photolysis has become a dye degradation method that is used and continues to develop in the last few decades. In this study, the degradation of Rhodamine B (RhB) dye was carried out through UV photolysis with the addition of HNO_3 . The purpose of this research was to study the effect of HNO_3 on the photolysis process of RhB dye and to determine the optimum degradation conditions based on pH, concentration, volume of HNO_3 , UV lamp power, distance between lamp and sample and irradiation time. In addition, the rate of degradation of RhB at optimum conditions will be compared with other cationic dyes, methylene blue and methyl violet.

The degradation process was carried out by adding HNO_3 to the RhB dye solution, then the pH was adjusted using NaOH. The results of the mixing are put into the reactor to be irradiated with a UV lamp for a certain period of time. The irradiated solution was analyzed using a UV-Vis spectrophotometer at a wavelength of 554 nm.

The effect of HNO_3 is seen when compared with other acids such as HCl and H_2SO_4 and compared with similar studies that serve as a reference. Degradation was carried out at pH 7.00 with optimum RhB degradation results at 2,00 mL volume of HNO_3 , lamp power 30 Watts, solution distance of 7,00 cm from lamp and irradiation time for 9,0 hours. T test was conducted to strengthen the results obtained from the experiment. When compared with other cationic dyes, RhB has the slowest rate of degradation. The dye with the fastest rate of degradation is methyl violet, methylene blue is arranged next. This result is influenced by the dissimilar structure of the dyes.

Keywords: dye degradation, HNO_3 , photolysis, RhB