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RADIATION-INDUCED DEGRADATION AND  
DECOLORATION OF DISPERSE DYES IN  
WATHER

Agustin N.M. Wibagyo, Winarti A.  
Surtipanti S.\*

## RADIATION-INDUCED DEGRADATION AND DECOLORATION OF DISPERSE DYES IN WATER

Agustin N.M.Bagyo, Winarti Andayani and Surtipanti, S \*

### ABSTRACT

RADIATION-INDUCED DEGRADATION AND DECOLORATION OF DISPERSE DYES IN WATER. The aim of the study was to find out the possibility of using gamma rays to degrade or decolorize disperse dyes in water. Disperse dyes in aqueous solutions, i.e. Terasil Black CMS (TB CMS), Terasil Red 4G (TR 4G), Terasil Golden Yellow (TGY), Terasil Navy (TN) and Terasil Blue BGE (TB BGE) were irradiated with doses of 0-10 kGy at dose rates of 2 and 5 kGy/h. During irradiation, oxygen or air was bubbled through a porous plate at the bottom of the reaction vessel. The parameters examined were the change of absorption spectra, pH, total organic carbon (TOC), chemical oxygen demand (COD), and the percentage of disperse dyes precipitated after adding coagulants. By adding nitric acid to acidify the TB CMS, TR 4G, TGY and TB BGE solutions after irradiation, precipitation occurred at doses of 6, 12, 8 and 4 kGy, respectively. The precipitation was also induced by addition of coagulants i.e. iron (II) sulfate, aluminum sulfate, ammonium iron (III) sulfate and calcium hypochlorite.

In oxygen bubbling solutions, the degradation and decoloration occurred faster than in air bubbling condition.

### ABSTRAK

PENGARUH IRADIASI PADA PENGURAIAN DAN PENGHILANGAN WARNA LARUTAN ZAT WARNA DISPERSI. Penelitian ini bertujuan untuk melihat kemungkinan penggunaan sinar gamma untuk menguraikan dan menghilangkan warna larutan zat warna dispersi dalam air. Larutan-larutan zat warna Terasil Black CMS (TB CMS), Terasil Red 4G (TR 4G), Terasil Blue (TB) dan Terasil Golden Yellow (TGY) diiradiasi dengan dosis 0-10 kGy, dengan laju dosis 2 dan 5 kGy/jam, sambil dialiri gas oksigen atau udara. Parameter, yang diamati ialah perubahan spektrum, pH, jumlah karbon organik, kebutuhan oksigen kimia, dan persentase zat warna dispersi yang mengendap setelah penambahan koagulan. Penambahan asam nitrat ke dalam larutan TB CMS, TR 4G, TB dan TGY sesudah diiradiasi menyebabkan terjadinya pengendapan masing-masing pada dosis 6, 12, 4 dan 8 kGy.

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\* Centre for Application of Isotopes and Radiation,  
National Atomic Energy Agency, Jakarta, Indonesia