SPECTROPHOTOMETRIC STUDIES OF URANIUM (VI) COMPLEX WITH 3-PHENYLDAPHNETIN

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The use of 3-substituted hydroxycoumarin for the spectrophotometric estimation of uranium (VI) has already been reported. The present investigation deals with the spectrophotometric studies of the uranium complex with 3-phenyldaphnetin and the possible use of this reagent for the spectrophotometric estimation of uranium.

An ethanolic solution of the reagent when added to a uranium (VI) salt solution produces an orange-yellow-coloured complex soluble in aqueous ethanol. The molar composition of the complex has been found to be 1:1, and it obeys Lambert-Beer's law at 430 mμ up to 9.00 p.p.m. of uranium.

EXPERIMENTAL

Reagents

3-Phenyldaphnetin.—This was prepared by the method of Bargellini as improved by Seshadri and Krishnaswamy. It was purified by sublimation at 140–45° under reduced pressure and its 10–3 M ethanolic solution was used.

Standard solution of uranium (VI).—Standard solution of uranium (VI) was prepared by dissolving uranyl nitrate (Baker Analysed reagent) in distilled water.

Apparatus

Beckman pH meter model H-2 was used for pH measurements and dilute solutions of hydrochloric acid and sodium hydroxide were used for pH adjustment.

Unicam spectrophotometer model SP-600 was used for spectrophotometric measurements.
Absorption spectrum of the complex.—The orange-yellow complex showed no absorption maximum in the visible region. However, the studies were carried out at 430 m\(\mu\) since the reagent had minimum absorption at this wavelength.

Minimum amount of the reagent necessary for full colour development.—The optical densities of a series of solutions containing the reagent and the uranium in the molar ratio of 1:1 to 8:1 showed that the full colour development required a fourfold concentration of the reagent (Fig. 1). During the subsequent studies the molar ratio of 3-phenyldaphnetin to uranium was maintained at 7.

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**Fig. 1**

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**Fig. 2**