TABLE III

The mortality of house flies after 24 hours interval at different concentrations of 2-methyl tetrahydrocarbazole

Compound	Concentration in gm/100 ml	% of mortality Mean
2-Methyl-tetrahydrocarbazole (II)	0·5	85·5 (67·62)*
do.	0·4	75·1 (60·07)
do.	0·3	74·0 (59·34)
do.	0·2	73·8 (59·12)
do.	0·1	39·8 (39·11)
do.	0·05	32·7 (34·88)
do.	0·02	29·1 (32·65)
do.	0·01	21·0 (27·28)
Ethanol (Control)		7·6 (16·00)
F value	29·4 (Significant at 1% level)	
CD at 1%	19·44	
CD at 5%	15·12	

* Figures in the brackets represents angular transformation.

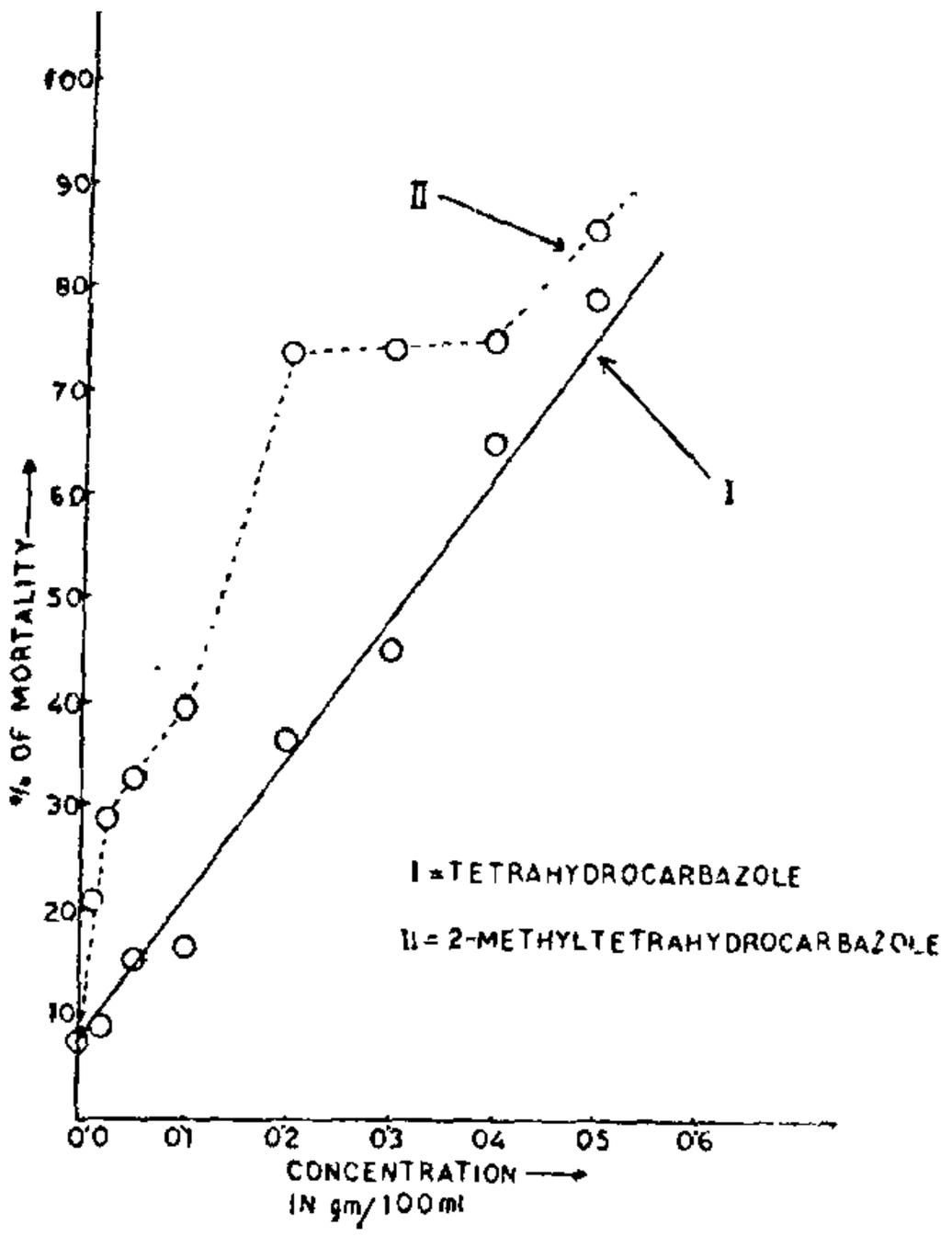

FIG. 1. Concentration-mortality relationship of house-flies (*Musca domestica* L.) in tetrahydrocarbazole and 2-Methyl tetrahydrocarbazole.

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SPECTROPHOTOMETRIC DETERMINATION OF COPPER IN ALLOYS WITH SALICYLALDEHYDE HYDRAZONE

SALICYLALDEHYDE hydrazone has been recommended as a spectrophotometric reagent and its various complexes with bivalent metal ions have been isolated[1–3]. It forms a yellow coloured complex with copper (II) at room temperature in the pH range 7·5 to 8·7. The complex shows maximum absorbance at 400 nm. In the present study, attempts have been made for the micro determination of copper (II) spectrophotometrically in alloys.

Experimental

Salicylaldehyde hydrazone (SH) was synthesised by refluxing salicylaldehyde (1 mole) with hydrazine hydrate (anhydrous 1 mole) in ethanolic medium for about 4–6 hours. The crude compound thus obtained was recrystallized from ethanol to get bright yellow flakes (m.p. 97° C). The purity of SH was checked by thin layer chromatography and elemental analysis. Calcd. C, 61·76%; H, 5·88%; N, 20·58%; Found: C, 61·6%; H, 5·8%; N, 20·2%. Acetone solutions of the ligand were used.

Solutions of metal ions were standardised by conventional methods. Absorbance was measured with a Unicam SP 600, spectrophotometer, with 10 mm matched glass cells.

Results and Discussion

Physico-chemical characteristics of the complex

The absorbance of the Cu (II)–(SH) (1 : 1) complex was found to remain constant at λ_{max} 400 nm in the pH range 7·5 to 8·7. For complete development of the colour, 30 times molar excess of the reagent per mole of copper (II) is required. The colour reaction obeys Beer's law up to 5·6 ppm of copper and the optimum range of concentration for accurate determination of copper, obtained from Ringbom's plot is

0·93 to 4·41 ppm. The Sandell's sensitivity is 0·008 μg of copper/cm² and molar absorptivity is 7800.

Recommended procedure

To an aliquot of solution containing 9·2 to 44 μg of Cu (II) added excess of SH in acetone (50 mole), adjusted the pH between 7·5 to 8·7 with NaOH or HCl and raised the volume to 10 ml maintaining 75% (v/v) acetone medium. Measured the absorbance as 400 nm against the corresponding reagent blank and deduced the amount of the copper from the calibration curve.

Effect of foreign ions

For this purpose, solutions containing 31·5 μg of copper (II) and different amounts of foreign ions were used. The following ions, (ppm given in parentheses), did not cause deviation by more than ± 2% in absorbance:

Br^- (500), Cl^- (500), IO_3^- (100), I^- (100), No_3^- (300), No_2^- (100), tartrate (14), SO_3^{2-} (500), Ca^{2+} (1000), Ba^{2+} (1000), Pb^{2+} (100), Cd^{2+} (100), Fe^{3+} (5·6), Fe^{2+} (25), Th (IV) (232), Ce(III) (26) and Mo(VI) (4·8). However, Bi^{3+}, Ni^{2+}, Co^{2+}, Mg^{2+}, Mn^{2+}, Al^{3+}, Zn^{2+}, UO_2^{2+}, phosphate, borate, thiourea, thiocyanate and platinum metals, were found to interfere seriously.

Determination of copper in alloys

Copper has been determined successfully in brass, bronze and copper-aluminium alloys by this reagent.

Procedure

Known amounts of analysed alloys were dissolved in concentrated HNO_3. Excess of nitric acid was evaporated and the residue was heated twice with hydrochloric acid to get the chlorides. The copper content was determined as stated above. The following are the accuracy for the determination of copper in gun metal, brass and Cu-Al alloy ± 1·2%, ± 1·4% and ± 0·8% respectively.

Discussion

A search of literature reveals that many methods have been employed for the spectrophotometric determination of copper. Most important and widely-used reagents are 2, 2′-biquinoline, quinoline-2-aldehyde-2-quinolyl hydrazone, dithizone and rubeanic acid. 2, 2′-Biquinoline is quite selective reagent for copper and its sensitivity is fairly good (0·010 μg). Dithizone is one of the most popular organic reagent for the spectrophotometric determination of copper. Strong colour of dithizone and the medium stability of its solution are disadvantages. Complex of quinoline 2-aldehyde-2-quinolyl hydrazone is stable for one hour and its sensitivity is fairly good (0·001 μg).

Although salicylaldehyde hydrazone is not very selective reagent and gives colour reactions with many other metals, yet it is a very sensitive reagent (0·008 μg) as compared to 2, 2′-biquinoline. The complex is more stable than quinoline-2-aldehyde-2-quinolyl hydrazone complex. Fe^{2+} and Cd^{2+} interfere in this method but in the case of SH these two ions do not interfere.

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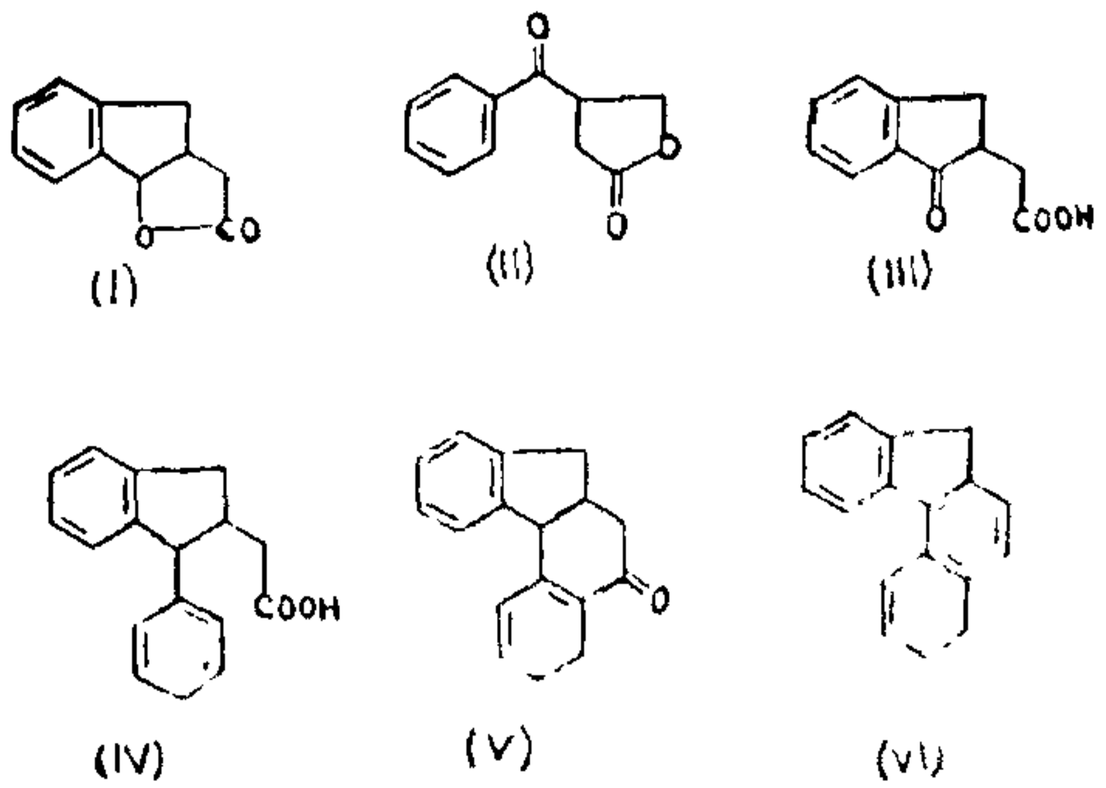
FRIEDEL-CRAFTS ALKYLATION OF AROMATIC HYDROCARBONS WITH THE LACTONE OF CIS 1-HYDROXY-2-INDANYL ACETIC ACID

Lactones derived from hydroaromatic compounds have been reported[1,2] to be suitable materials for the synthesis of polycyclic compounds. The yield in all these cases was somewhat lower due to undesirable rearrangement taking place in the alkylation process. Rearrangement has also been observed during alkylation of aromatic hydrocarbons with the unsubstituted lactone of cis-2-hydroxy-cyclopentaneacetic acid[3]. In order to explore the possibility of utilising the Friedel-Crafts reaction for the synthesis of polycyclic hydrocarbons with fused cyclopentene ring *via* cyclic ketones using lactones, we have synthesised the lactone of cis 1-hydroxy-2-indanylacetic acid (I) and studied the $AlCl_3$-catalysed alkylation of benzene with it.



The lactone (I) has been prepared from β-benzoyl propionic acid, m.p. 118°, obtained in excellent yield from benzene by succinoylation in presence of anhydrous