TABLE I

Superoxide dismutase and catalase activity in red blood cells

Animal	Haemoglobin (Hb) gm/100 ml blood	Superoxide dismutase activity *EU/mg. Hb.	Catalase activity μ moles H_2O_2 disappeared/mg. Hb./min.
Man	11·00–15·53 (13·26)**	1·32–2·50 (1·76)	190·5–348·5 (260·8)
Dog	13·21–15·20 (14·30)	1·50–1·67 (1·54)	217·9–256·9 (237·4)
Sheep	10·97–14·27 (12·62)	1·40–2·01 (1·68)	179·6–226·0 (191·3)
Goat	11·42–14·69 (13·18)	1·57–2·04 (1·74)	220·9–279·8 (257·3)
Monkey	12·58–15·67 (14·30)	0·87–1·60 (1·35)	110·5–180·7 (144·9)
Mouse	10·83–14·30 (12·53)	1·04–1·52 (1·28)	89·5–140·7 (113·9)
Rat	11·37–13·29 (12·90)	1·35–1·62 (1·45)	90·0–153·5 (130·7)
Chick	7·06–10·26 (8·15)	1·54–2·02 (1·81)	180·8–301·2 (232·5)
Frog	6·01– 9·40 (8·26)	0·97–1·44 (1·23)	83–3–122·6 (100·6)

* EU = Enzyme unit : Enzyme required for 25 % inhibition of NBT reduction.

** Figures in parantheses are the average values.

both are scavangers of the probable toxic substances, *viz.*, superoxide anion and hydrogen peroxide, produced during the interaction of molecular oxygen with many dehydrogenases and non-heme iron proteins[8, 9].

The authors express their sincere thanks to Head, Chemistry Department, for necessary laboratory facilities. Financial assistance from CSIR, New Delhi, to Miss Usha Kiran is gratefully acknowledged.

Biochemistry Laboratory,
Department of Chemistry,
Punjabi-University,
Patiala 147 002, *January* 13, 1978,

B. S. AHUJA.
USHA KIRAN.

1. Stansell, M. J. and Deutsch, H. F., *Clin. Chim. Acta*, 1966, **14**, 598.
2. McCord, J. M. and Fridovich, I., *J. Biol. Chem.*, 1969, **244**, 6049.
3. —, Keele, B. B. Jr. and Fridovich, I., *Proc. Natl. Acad. Sci., U.S.*, 1971, **68**, 1024.
4. Hainline, A., In *Standard Methods of Clinical Chemistry*, D. Seligson (ed.), 1958.
5. Nishikimi, N., Rao, N. A. and Yagi, K., *Biochem. Biophys. Res. Commun.*, 1972, **46**, 844.
6. Sinha, A. K., *Anal. Biochem.*, 1972, **47**, 389.
7. Hartz, J. W., Funakoshi, S. and Deutsch, H. F., *Clin. Chim. Acta*, 1973, **47**, 125.
8. Massey, V. Palmer, G. and Ballour, D., In *Flavins and Flavoproteins*, Edited by H. Kamin, University Park Press, Baltimore, 1971, p. 349.
9. Misra, H. P. and Fridovich, I., *J. Biol. Chem.*, 1971, **246** 6886.

STABILITY CONSTANTS OF CADMIUM (II) AND LEAD (II) CHELATES OF 2-AMINO-3-HYDROXYPYRIDINE

2–AMINO–3–HYDROXYPYRIDINE (AHP) has recently been described as a potential spectrophotometric reagent[1]. In continuation to our work[2,3] on polarographic investigations on cadmium (II) and lead (II) complexes of substituted pyridines, in this note, we describe polarographic determinations of stability constants for cadmium (II) and lead (II) chelates of AHP. Stability constant data on cadmium (II) and lead (II) are valuable as they form the basis for the choice of a suitable chelating agent for removal of the metal ions from human body in the case of metal-poisoning.

Experimental

Details of the polarograph and the experimental technique have been described in earlier communication[4]. Analar grade reagents were used and the solutions were prepared in double distilled water. pH was maintained using NH_4Cl–NH_4OH buffer (pH = 9·1 ± 0·1). Potassium chloride was used as supporting electrolyte (μ = 0·1) and gelatin (0·005%) as maximum suppressor. Polarograms were recorded for solutions containing 1×10^{-4} M metal ion and varying amounts of AHP along with suitable amounts of buffer, supporting electrolyte and maximum suppressor. All measurements were made at 35·0±0·1° C.

Results and Discussion

Well defined single cathodic waves are obtained in each case. Analysis of the polarographic waves was

done following standard method[5]. Plots of i_d vs $(h_{eff})^{\frac{1}{2}}$ are straight lines. Slopes of conventional log-plots are 31 ± 2 mV for both the metal ions. These results indicate diffusion controlled reversible two-electron reduction processes. With the increase in AHP concentration the $E_{\frac{1}{2}}$ shifts towards more negative potential (Table I), showing complex formation. The plots

TABLE I

Variation in $E_{\frac{1}{2}}$ with ligand concentration

Cd (II)-AHP		Pb (II)-AHP	
Ligand concentration (mM)	$-E_{\frac{1}{2}}$ (V *vs.* SCE)	Ligand concentration (mM)	$-E_{\frac{1}{2}}$ (V *vs.* SCE)
3·0	0·778	3·0	0·576
4·0	0·789	5·0	0·590
6·0	0·799	6·0	0·594
7·0	0·804	7·0	0·598
8·0	0·807	8·0	0·601
9·0	0·810	9·0	0·604
10·0	0·813	10·0	0·606

of $E_{\frac{1}{2}}$ against the total ligand concentration show curvature for both the metal ions, indicating successive complex formation. DeFord and Hute method[6] as molified by Irving[7] has been applied for evaluation of stability constants. The values of $F_{(r,}$, (λ) have been plotted against the ligand concentration (x). The plots of $F_2(x)$ show a horizontal line in both cases showing formation of two complex species, 1 : 1 and 1 : 2, metal to ligand. The values of the stability constants as read from these plots are: Cadmium (II). $\beta_1 = 5{\cdot}0 \times 10^7$ and $\beta_2 = 8{\cdot}75 \times 10^{10}$; lead (II), $\beta_1 = 30{\cdot}0 \times 10^7$ and $\beta_2 = 13{\cdot}10 \times 10^{10}$.

One of the authors (R. S. S.) is thankful to the Council of Scientific and Industrial Research, New Delhi, for the award of a Junior Research Fellowship.

Department of Chemistry,
University of Delhi,
Delhi 110 007,
January 9, 1978.

R. S. SINDHU.
K. B. PANDEYA.
R. P. SINGH.

1. Kushwaha, V., Katyal, Mohan and Singh, R. P., *Talanta*, 1974, 21, 763.
2. Sindhu, R. S., Pandeya, K. B. and Singh, R. P., *Indian J. Chem.*, 1976, 14A, 913.
3. —, — and —, *Rev. Roumaine Chim.* (to be published).
4. —, — and —, *Z. Anal. Chem.* (in press).
5. Kolthoff, I. M. and Lingane. J. J., *Polarography* (Vol. I), Interscience Publishers, N.Y., 1952, p. 65.
6. DeFord, D. D. and Hume, D. N., *J. Am. Chem. Soc.*, 1951, 73, 5321.
7. Irving, H., *Advances in Polarography*, 1960, 1, 42.

PRETREATING PROPERTIES OF ENDRIN ON PLANT CHROMOSOMES

IT was found that certain insecrides had a radiomimetic effect on mitotic chromosomes of *Vicia faba* and *Lathyrus sativus* leading to various abnormalit es (Reiger and Michaelis, 1962 and Reddy and Rao, 1969). This note reports the effect of Endrin EC 20 on the plant chromosomes.

To observe the pretreating effect, root tips were treated with 0·1 % Endrin EC 20 (Kilburn Product) solution for 1·5 to 2 hours at 10° C.

Pretreated root tips show contraction and metaphase chromosomes took deep stain. The function of spindle is destroyed and dies not interfere with the spreading of the chromosomes during squash preparation. The centromeric region becomes distinct and visible in prophase–metaphase chromosomes (Fig. 1 *a* and *b*). At prophase hetero- and eu-chromatin regions may be differentiated (Fig. 1 *c*) and the relational coiling of paired chromatids are visible.

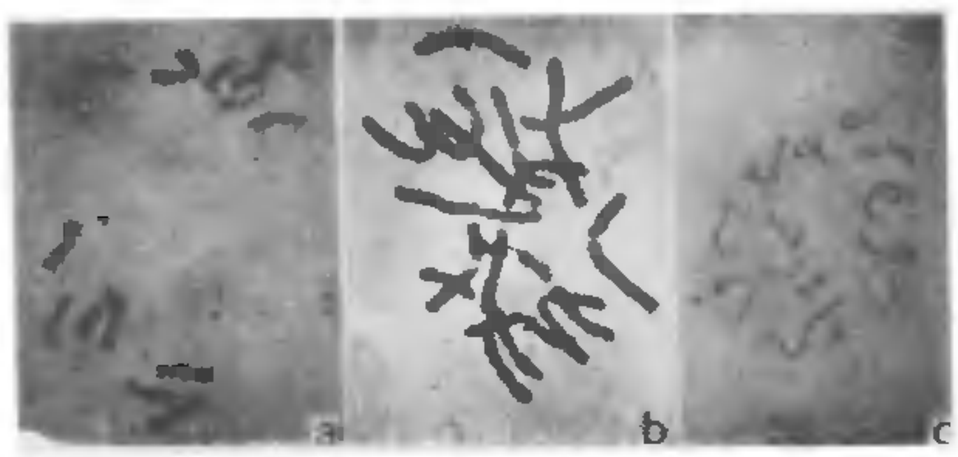

FIG. 1. Pretreating effect of Endrin in (*a*) *Lathyrus sativus*, anaphase, (*b*) *Allium cepa*, metaphase and (*c*) Prophase of *Pisum sativum*.

The Endrin technique has been tested in about fifteen species both monocotyledonous, *e.g., Allium cepa, Hordeum vulgare, Zea mays* and dicotyledonous, *e.g., Lathyrus sativus, Vicia faba, Pisum sativum, P. arvensis, Nigella sativa, Cicer arietinum, Lens esculentum, Aloe* sp., *Capsicum* sp., *Trigonella foenum–graecum* plants, with larger chromosome size and it proved favourable in most materials. However, higher concentration and over-treatment showed high contraction, stickiness and fragmentation of chromosomes.

Endrin is a member of cyclodiene insecticides developed in 1945, by Julius Hyman in the United States The composition is Hexachloro epoxy octahydro endo-endo dimethanonapthalene. Flat formula of Endrin may be represented as