

TABLE I

Sample No.	Fossil track Density ρ_s (track/cm ²)	Induced track Density ρ_i (track/cm ²)	Age m.y. (million years)	Average age m.y.	U-Con. 10 ⁻⁸ gm/gm
1	2	3	4	5	6
MPG-1	1639 (245)	6287 (943)	547 ± 41		5.4
-2	1648 (247)	6333 (950)	546 ± 41		5.4
-3	1498 (225)	5893 (884)	534 ± 41		5.1
-4	1209 (181)	4941 (742)	515 ± 44		4.3
-5	1395 (209)	5360 (804)	546 ± 44		4.6
-6	1502 (225)	6173 (925)	512 ± 39	531 ± 15	5.3
-7	1346 (202)	6173 (926)	460 ± 37		5.3
-8	1406 (211)	4990 (748)	589 ± 48		4.3
-9	1456 (218)	5740 (861)	533 ± 41		4.9
-10	1432 (214)	5673 (851)	528 ± 41		4.9
MPK-1	456 (68)	2024 (303)	475 ± 65		1.7
-2	424 (65)	1958 (292)	466 ± 66		1.7
-3	404 (60)	1636 (245)	519 ± 77	501 ± 25	1.4
-4	629 (94)	2151 (326)	605 ± 73		1.8
-5	421 (63)	2085 (311)	428 ± 61		1.8
-6	553 (82)	1960 (293)	582 ± 77		1.7
-7	427 (64)	2093 (313)	432 ± 61		1.8

MPG—Muscovites from the pegmatite near Nengkhra, Garo Hills Dist., Meghalaya

MPK—Muscovites from the pegmatite near Nongkhlaw, Khasi Hills Dist., Meghalaya

Number of tracks counted is shown parenthetically.

Only the statistical errors of counting have been shown in column 4, whereas in column 5 mean values are given with the standard error.

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EFFECT OF ORTHENE ON TISSUE LEVEL OF RIBOFLAVIN AND SUCCINIC DEHYDROGENASE ACTIVITY

S. T. DEOTARE* AND C. H. CHAKRABARTI**

Department of Biochemistry, Nagpur University
Nagpur, India

RIBOFLAVIN is essential in the diets, the deficiency of which leads to glossitis, cheilosis, seborrheic dermatitis and reduction in activity of various riboflavin enzymes. The conversion of succinic acid into fumaric acid is catalysed by the enzyme, succinic dehydrogenase (SDH) which contains flavin adenine-dinucleotide (FAD) and nonheme iron. Vitamin content is found to decrease after poisoning with some organo-phosphorous and chlorophos insecticides^{1,2}. Decreased activity of some liver flavoproteins and

*Lecturer in Biochemistry, Medical College, Nagpur.

** Professor and Head of the Department of Biochemistry, Nagpur University, Nagpur.

some dehydrogenases is found in riboflavin deficiency in albino rats³. Moffett⁴ found that poisoning with DDT inhibits SDH activity. Inhibition of SDH activity was found in subacute poisoning with organophosphorus insecticide in rats^{5,6}. Cytochrome oxidase and SDH activity was found to be decreased in the tissues of housefly, after exposure to some insecticides^{7,8}. Intoxication with small doses of organochloro insecticides causes the change in enzyme activities of carbohydrate metabolism and mainly reduces the activity of SDH⁹. Joint action of insecticides shows the inhibition of SDH activity in housefly¹⁰. The activity of liver SDH was found to decrease after poisoning with cytostatic drugs¹¹.

In the present investigation, the effect of orthene an organophosphorus water soluble insecticide, which has been field tested in major growing regions for rice, vegetables, tobacco, cotton, oil palm and citrus, was investigated in tissue riboflavin contents and SDH activity in albino rats, injected with this insecticide.

EXPERIMENTAL

Male albino rats weighing 120 to 150 g were employed in the present investigation. They were divided into three groups.

Group I: Control.

Group II: Orthene injected subcutaneously (25 mg/100 g body wt./day).

Group III: Riboflavin (250 µg/100 g body wt./day) along with orthene (25 mg/100 g body wt./day) injected subcutaneously.

Control and experimental rats were kept on stock Laboratory diet for 4 weeks and 8 weeks. The composition of stock diet is as follows:

Percent composition of stock diet: wheat flour (65), casein (20), groundnut oil (10), Hawk oser salt mixture (4), vitamin mixture (1*).

*1g of vitamin mixture contains: Thiamine 0.6 mg, riboflavin 1.2 mg, pyridoxine 0.4 mg, niacin 5.0 mg, calcium pantothenate 4.0 mg, para-aminobenzoic acid 2.5 mg, inositol 100 mg, choline chloride 200 mg, biotin 1 µg, folic acid 1 µg, cyanocobalamine 1 µg, vitamin A 200 units, vitamin D 20 units, α-tocopherol 12 mg, menadione 12 mg.

Riboflavin Estimation

Rats were killed by decapitation after 4 and 8 weeks respectively and the blood was collected, brain, liver, kidney, and heart were rapidly removed, chilled, weighed and homogenized in cold water. Extraction was followed by Wiley's method¹². Riboflavin was determined by fluorometric method¹³. Results are shown in Table I.

Succinic Dehydrogenase Estimation

Rats were killed by decapitation after 8 weeks and blood was collected. Brain, liver, kidney and heart were rapidly removed, chilled, weighed and homogenized in phosphate buffer. SDH activity was determined by colorimetric method of Kuhn-Abood *et al.*¹⁴. Results are shown in Table II.

RESULTS AND DISCUSSION

It is evident from Table I that there is depletion of riboflavin in tissues after 4 weeks and 8 weeks of orthene injection. Depletion was more after 8 weeks as compared to 4 weeks. When riboflavin was given along with orthene, riboflavin deficit was restored. SDH activity of various tissues is decreased after 8 weeks of orthene injection and nearly normal activity was found after riboflavin injection along with orthene.

Riboflavin is the basic constituent of the biologically active forms of flavoproteins. The evidence furnished in support of an inter-relationship between riboflavin and its coenzymes with toxic agents, is indirect. That

TABLE I
Riboflavin content in various tissues in normal and orthene injected rats

Group	No. of animals	Experimental period of weeks	Riboflavin content mg/100 g of wet tissue				
			Liver	Heart	Kidney	Brain	Serum µg/100 ml
I	8	0	2.86±0.15	1.35±0.12	2.89±0.10	0.35±0.05	2.34±0.02
II	10	4	1.98±0.08	0.99±0.04	1.99±0.04	0.27±0.03*	1.90±0.08
III	10	4	2.83±0.12	1.38±0.10	2.90±0.11	0.34±0.01	2.31±0.01
I	8	0	2.87±0.01	1.32±0.03	2.88±0.09	0.34±0.08	2.42±0.02
II	10	8	1.82±0.07	0.90±0.01	1.83±0.01	0.22±0.01*	1.81±0.01
III	10	8	2.88±0.10	1.34±0.08	2.89±0.12	0.35±0.03	2.44±0.40

*P < 0.01.

TABLE II
Succinic dehydrogenase activity in various tissues in normal and orthene injected rats

Groups	No. of animals	Experimental period of weeks	μg of dye reduced/mg of tissue/10 min.			
			Liver	Heart	Kidney	Brain
I	8	0	1.58 ± 0.002	0.76 ± 0.001	1.75 ± 0.003	1.02 ± 0.002
II	10	8	0.99 ± 0.001	$0.50 \pm 0.001^*$	1.01 ± 0.002	0.72 ± 0.004
III	10	8	1.59 ± 0.010	0.79 ± 0.002	1.78 ± 0.101	1.08 ± 0.050

* $P < 0.01$.

toxicity influences the bodily requirements of the vitamin may be inferred from the protection offered by extra riboflavin administration against the poisonous effects of selenium¹⁵ and lead¹⁶. In our present investigation the animals injected with orthene showed depletion of riboflavin and lower activity of SDH in different tissues. The animals receiving riboflavin injection along with orthene showed nearly normal level riboflavin and SDH activity in tissues indicating thereby that orthene increases the requirement of riboflavin of albino rats.

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5-COORDINATE OXOVANADIUM(IV) COMPLEXES WITH MONOFUNCTIONAL TRIDENTATE SCHIFF BASES CONTAINING -O, N, O- SEQUENCES

V. H. KULKARNI, B. R. PATIL AND
B. K. PRABHAKAR

Department of Chemistry, Gulbarga University
Gulbarga 585 105, Karnataka, India

THE transition metal complexes with tridentate Schiff bases have been well investigated during the past two decades¹⁻⁵. However, only recently the attention has been directed to the complexes of the transition metals with monofunctional tridentate Schiff bases containing -O,N,O- and -O,N,S- sequences⁶⁻⁸. In this communication, we describe the synthesis and spectral studies of oxovanadium(IV) complexes with the Schiff bases I-IV.

