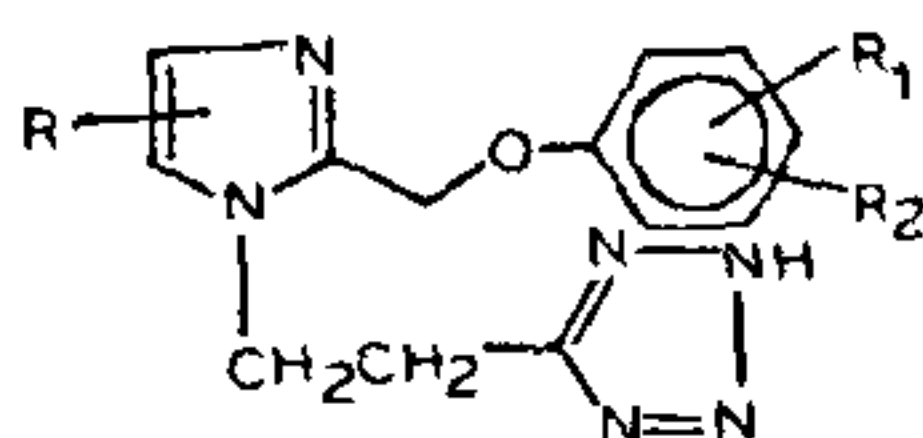


Table 1 5- β -[N-(2-substituted phenoxy methyl benzimidazolyl)imidazolyl] tetrazoles (6-19)



Sl. No	R ₁	M.P. °C	Molecular formula*	Yield	Anti-inflammatory activity (P.O.) % inhibition
	R = C ₄ H ₄				
6.	<i>o</i> -chloro	259	C ₁₇ H ₁₅ ClN ₆ O	60	20
7.	<i>m</i> -methyl	228	C ₁₈ H ₁₈ N ₆ O	65	44
8.	<i>p</i> -methyl	210	C ₁₈ H ₁₈ N ₆ O	55	50
9.	<i>o</i> -methyl	250	C ₁₈ H ₁₈ N ₆ O	58	40
10.	<i>p</i> -nitro	234	C ₁₇ H ₁₅ N ₇ O ₃	60	35
11.	H	270	C ₁₇ H ₁₆ N ₆ O	58	39
12.	<i>p</i> -chloro	280	C ₁₈ H ₁₇ ClN ₆ O	62	33.5
	R = H				
13.	<i>o</i> -chloro	110	C ₁₃ H ₁₃ ClN ₆ O	55	22.5
14.	<i>m</i> -methyl	140	C ₁₄ H ₁₆ N ₆ O	48	45
15.	<i>p</i> -methyl	160	C ₁₄ H ₁₆ N ₆ O	50	47
16.	<i>o</i> -methyl	120-123	C ₁₄ H ₁₆ N ₆ O	42	42
17.	<i>p</i> -nitro	173	C ₁₃ H ₁₃ N ₇ O ₃	40	30
18.	H	132	C ₁₃ H ₁₄ N ₆ O	45	37
19.	<i>p</i> -chloro	198	C ₁₄ H ₁₅ ClN ₆ O	58	31

R₂ = *o*-methyl (12 and 19); R = C₄H₄ (8-14); R = H (1-7); *Satisfactory analysis for C, N and H was obtained.

rogen atom on tetrazole nucleus is also responsible for anti-inflammatory activity¹⁰.

The authors thank Dr R. C. Srimal, CDRI, Lucknow for facilities. One of the authors (RM) is grateful to UGC, New Delhi for a fellowship.

19 March 1986; Revised 7 March 1987

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EFFECT OF POLYCHLORINATED DIBENZOFURANS (PCDFs) ON GLUTATHIONE, GLUTATHIONE PEROXIDASE AND LIPID PEROXIDATION IN RAT LIVER

P. S. DEVAMANOHARAN, R. SANKAR and C. S. SHYAMALA DEVI

Department of Biochemistry, University of Madras, Madras 600 025, India.

HALOGENATED aromatic hydrocarbons such as polychlorinated dibenzofurans (PCDFs), dibenzodioxins (PCDDs) and biphenyls (PCBs) are a class of widespread and persistent environmental pollutants¹. PCDFs are found as contaminants in commercial PCBs², as well as in certain widely used

pesticides^{3,4}. They accumulate mainly in the liver, where they are metabolized and excreted through the faeces⁵. The liver injury induced by chlorinated hydrocarbons and other xenobiotics has been postulated to be related with lipid peroxidation⁶. However, so far no evidence has been documented regarding lipid peroxidation as a result of PCDFs administration. Hence, in the present investigation an attempt has been made to find out the effect of PCDFs on lipid peroxide levels in subcellular fractions of rat liver. In addition, the levels of glutathione (GSH) and glutathione peroxidase have also been monitored.

PCDF mixture used in the present study was a gift from Professor Yoshito Masuda, Daiichi College of Pharmaceutical Sciences, Fukuoka, Japan. Its composition is given elsewhere⁷.

Weanling albino male rats derived from Wistar strain were fed with commercial pelleted rat chow with paired feeding and water *ad libitum* along with 100 mcg of PCDF mixture/kg body weight/day orally for 30 days. The dosage was selected based on the report of Oishi *et al*⁸. The animals were then sacrificed by cervical decapitation and the liver was dissected out immediately, washed with chilled 150 mM potassium chloride. Homogenate (20% wt/vol) was prepared in 150 mM potassium chloride by using a Potter-Elvehjem homogenizer at 4°C. Mitochondrial and microsomal fractions were prepared according to the method of Hogeboom⁹ and were finally suspended in 150 mM potassium chloride, so as to contain approximately 1 mg protein per 0.1 ml suspension.

Lipid peroxide levels in the subcellular fractions were determined by the method of Ohkawa *et al*¹⁰. Reduced glutathione was determined as described by Moron *et al*¹¹. Glutathione peroxidase was assayed according to Necheles *et al*¹². The protein

Table 1 Effect of polychlorinated dibenzofurans on lipid peroxides level in rat liver. Values are expressed as mean \pm S.D. from 6 animals in each group

	Lipid peroxide level	
	Control	Test
Whole homogenate	112.0 \pm 8.5	322.9 \pm 12.2*
Mitochondrial fraction	67.8 \pm 3.1	105.3 \pm 5.0*
Microsomal fraction	408.3 \pm 14.7	780.8 \pm 21.4*

The level of lipid peroxides is expressed in terms of nmol of Malonaldehyde/100 mg protein. 1,1,3,3-tetra methoxy propane (TMP) was used as an external standard. * $P < 0.001$.

Table 2 Effect of polychlorinated dibenzofurans on reduced glutathione and glutathione peroxidase levels in rat liver. Values are mean \pm S.D. from 6 animals in each group

	Glutathione (mc mol/g liver)	Glutathione peroxidase (nmol of GSH oxidized per min per mg protein)
Control	5.77 \pm 0.44	82.18 \pm 5.5
Test	3.80 \pm 0.53*	23.87 \pm 2.7*

* $P < 0.001$.

content of different subcellular fractions was determined by Lowry's method¹³.

The level of lipid peroxides in various subcellular fractions of liver isolated from control and PCDF mixture fed rats is shown in table 1. It is clear that the lipid peroxide levels were increased significantly in all the fractions in rats fed with PCDF mixture.

The levels of reduced glutathione and glutathione peroxidase are given in table 2. A significant decrease in glutathione and glutathione peroxidase levels in rats fed PCDF mixture was noticed.

It is well known that glutathione and glutathione peroxidase play a protective role in tissues against peroxidation^{14,15}. Furans are reported to deplete glutathione in erythrocytes¹⁶. Stohs *et al*¹⁷ reported that rats administered with 2,3,7,8-tetrachloro dibenzodioxin showed a reduction in glutathione peroxidase activity associated with an increased lipid peroxidation. Hence, the decreased level of glutathione and glutathione peroxidase observed in the experimental rats may be the probable cause for the increased lipid peroxidation as indicated by the malonaldehyde levels.

It is therefore suggested that the prooxidant effect of PCDFs is due to the impairment of protective mechanism against peroxidation.

Financial assistance provided by the CSIR, New Delhi to PSD and RS is gratefully acknowledged.

1 December 1986

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ON THE ULTRAPOTASSIC RHYOLITES FROM GURAPRATAP SINGH AND DIRI AREA, PALI DISTRICT, RAJASTHAN

ANIL MAHESHWARI

Department of Geology, University of Rajasthan,
Jaipur 302 004, India.

THE present area belonging to the Malani volcanic suite of southwestern Rajasthan is situated to the west of Aravalli range (latitudes 25°35'–25°40' N and longitudes 73°–73°10' E). The main rock types occurring in the area are dacites and rhyolites. The rhyolites are most abundant in the area and on the basis of chemistry and petrography, these may be further classified into high silica rhyolite and ultrapotassic rhyolite.

The ultrapotassic rhyolites are generally fine-grained, aphyric and tuffaceous in nature. The phenocrysts, whenever present are of altered orthoclase. The chemical analysis of the present ultrapotassic rhyolites (table 1) differ from the other rhyolites in high K₂O (nearly 7%) and low Na₂O

content (below 1%). When these rocks are plotted in the Harker diagram, they do not follow the general trend of rhyolitic rocks for K₂O and Na₂O. The Or-Ab-An diagram also reveals that the normative feldspar composition of ultrapotassic rhyolites is entirely different from other rhyolitic rocks of the present area. They have orthoclase ranging from Or_{K3} to Or₉₀; such high Or is similar to the composition of highly potassic sanidines of trachytes or orthoclase phenocrysts of many granites.

The ultrapotassic rhyolites are similar in chemistry and petrography to the potassic rhyolites of Karara¹ and Manihari area² (table 1). When the ultrapotassic rhyolites of the present area, as well as those of the adjoining areas, are plotted in the Harker diagram, all of them fall on a common trend for K₂O and Na₂O which is different from the trend of other rhyolitic rocks of the area. The ultrapotassic rhyolites are characterized by high K₂O/Na₂O ratio. The systematic variation in K₂O/Na₂O ratio with increase in SiO₂ indicates the comagmatic nature of these rocks. The occurrence of similar ultrapotassic rhyolites in such wide apart localities points to the fact that they may be marking a particular igneous cycle in the southwestern Rajasthan.

The field relationship of the ultrapotassic rhyolites with the other rhyolitic rocks of the present area is obscure. However, the absence of rock fragments of ultrapotassic rhyolites in the other

Table 1 Composition of the ultrapotassic rhyolites

	1	2	3
SiO ₂	73.85	76.46	80.38
TiO ₂	0.46	0.15	0.05
Al ₂ O ₃	12.27	13.17	10.72
Fe ₂ O ₃	2.98	1.16	0.82
FeO	0.42	0.19	0.20
MnO	0.01	0.02	0.03
MgO	0.17	0.14	0.08
CaO	0.72	0.47	0.20
Na ₂ O	1.94	0.52	0.42
K ₂ O	6.36	6.90	6.70
P ₂ O ₅	0.05	0.08	0.05
L.O I	0.58	0.45	—
Total	99.81	99.71	99.65
K ₂ O/Na ₂ O	3	13	16

1. Potassic rhyolites from Karara, Jalore District; averages 12 analyses¹; 2. Ultrapotassic rhyolites from the present area; averages of 4 analyses; 3. Ultrapotassic rhyolites from Manihari, Pali District; averages of 10 analyses².