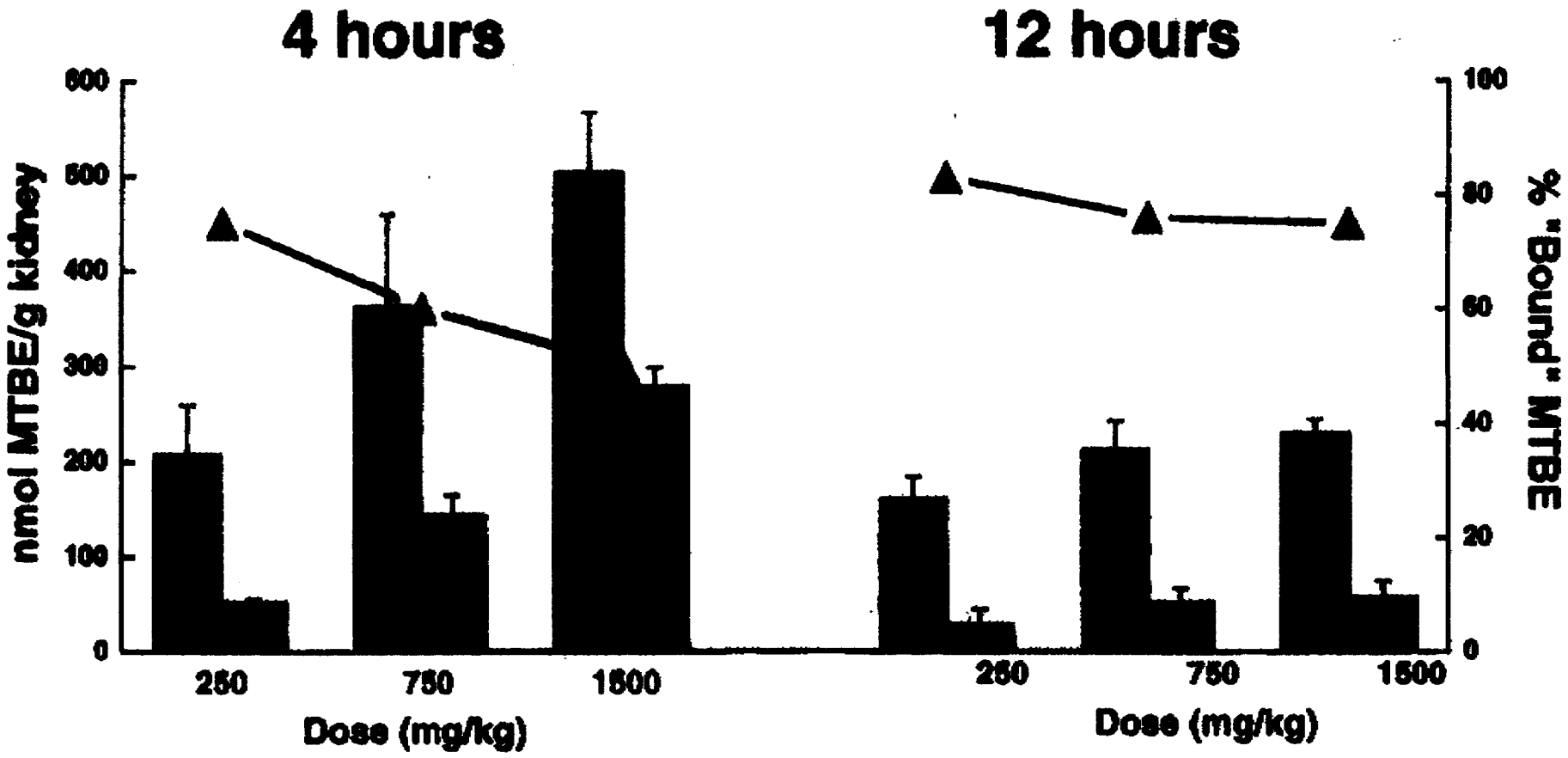
Affinity and Volatility of Selected Chemicals that Bind α2u-Globulin

Chemical	Apparent Kd (M)	Vapor Pressure (mm Hg)*** 25°C	50°C
d-Limonene	1.0×10^{-4}**	0.26	1.07
d-Limonene-1,2-oxide	5.1×10^{-7}**	–	–
2,4,4-Trimethyl-2-pentanol	7.6×10^{-7}**	–	15.2
1,4-Dichlorobenzene	5.2×10^{-4}**	1.76	–
Methyl *t*-butyl ether	2.2×10^{-4}**	245	640

*Borghoff et al., 1991
**Poet and Borghoff, 1997
***CRC Handbook of Chemistry and Physics

Influence of d-Limonene-Oxide on Renal Headspace MTBE Concentration in Male F-344 Rats



With d-Limonene-oxide (Bound + Free MTBE)

Without d-Limonene-oxide (Free MTBE)

% "Bound" MTBE

EPA's Criteria for Male Rat Kidney Carcinogens Operating Through the α2u-Globulin Mechanism

Criteria	MTBE	TBA
Increased number and size of protein droplets	Yes	Yes
Aspects of the pathological sequence of lesions associated with α2u-nephropathy are present	Yes	Yes
Accumulating protein is α2u	Yes	Yes
Increase in renal concentration of α2u	Yes	Yes
Chemical binding to α2u	Yes	ND
Increased cell proliferation	Yes	Yes
Renal tumors	Yes	Yes