



**FIGURE 15.13** Percutaneous absorption of phenols in humans under occluded and protected conditions as a function of penetrant octanol/water partition coefficient ( $K_{o/w}$ ). (Redrawn from References 34 and 35.)

absorption as a function of the penetrant  $K_{o/w}$  is shown in Figure 15.13. Phenol percutaneous absorption is summarized in Table 15.9. The methodology permitted excellent dose accountability (Tables 15.10 and 15.11). The studies indicate that:

1. Occlusion significantly increased (unpaired  $t$ -test,  $p < 0.05$ ) the absorption of phenol, heptyloxyphenol, and pentyloxyphenol.
2. Occlusion did not statistically enhance the absorption of aminophenol, acetaminophen, propionylamidophenol, cyanophenol, nitrophenol, and iodophenol.
3. The methodology employed again permitted excellent dose accountability.
4. In general, the two compounds with the lowest  $K_{o/w}$  values of this series of compounds showed the least enhancement in absorption afforded by occlusion.

**TABLE 15.9**  
**Percutaneous Absorption of Phenols<sup>a</sup> in Humans**

Compound	Log $K_{o/w}$	Mean % Dose Absorbed (SD)	
		Occluded	Protected
Aminophenol	0.04	8(3)	6(3)
Acetaminophen	0.32	3(2)	4(3)
Propionylamidophenol	0.86	19(9)	11 (7)
Phenol <sup>b</sup>	1.46	34(4)	24 (6) <sup>c</sup>
Cyanophenol	1.60	46 (6)	31 (16) 38 (11)
Nitrophenol	1.91	37 (18)	
Iodophenol	2.91	28 (6)	24 (6)
Heptyloxyphenol	3.16	36 (9)	23 (10) <sup>d</sup>
Pentyloxyphenol	3.51	29 (8)	13 (4) <sup>c</sup>

Source: Data from References 34 and 35.

<sup>a</sup> Single-dose application from 95% ETOH ( $N = 6$ ) at 2–4  $\mu\text{g}/\text{cm}^2$  to the ventral forearm; 24 hours exposure prior to soap and water washing.

<sup>b</sup> Data analysis accounts for 27.2% of applied dose evaporating off the skin surface during application.

<sup>c</sup> Significant difference at  $p < 0.01$ .

<sup>d</sup> Significant difference at  $p < 0.05$ .