

Effect of several solvents on irritant dermatitis measured by  
non-invasive techniques

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Background : Solvents play an immerse role in the industrial sector.  
Irritant dermatitis which is more common than allergic contact  
dermatitis can be caused by solvents.

Objective : Our purpose was to compare the skin irritancy of several  
solvents using human and guinea pig skin models.

Methods : The skin responses to short contact with ethanol, acetone,  
dimethylsulfoxide (DMSO) and xylene were measured by visual scoring  
of erythema, transepidermal water loss (TEWL) and laser doppler  
flowmetry (LDF).

Results :

The results are summarized as follows :

1. Guinea pig and human skin responses to normal saline, ethanol,  
and acetone were nearly negligible.
2. Guinea pig skin responses to 99.9% DMSO under occlusion for 15  
min were assessed by visual scoring system, TEWL, and LDF. They  
were measured  $3 \pm 0.00$ ,  $71 \pm 21.70$ ,  $45 \pm 12.70$  at 5 min after removal of  
99.9% DMSO, and  $0.83 \pm 0.41$ ,  $10.5 \pm 3.83$ ,  $36 \pm 4.90$  at 120 min after  
removal.
3. Guinea pig skin responses to 97% xylene under occlusion for 15 min  
were assessed by visual scoring system, TEWL and LDF. They were

measured  $3 \pm 0.00$ ,  $19 \pm 5.82$ ,  $77 \pm 11.7$  at 5 min after removal of 97% xylene, and  $1.83 \pm 0.75$ ,  $5.5 \pm 3.21$ ,  $39.17 \pm 11.53$  at 120 min after removal.

4. Human skin responses to 75% DMSO under occlusion for 120 min were assessed by visual scoring system, TEWL and LDF. They were measured  $3 \pm 0.00$ ,  $2.5 \pm 0.55$ ,  $51 \pm 13.70$  at 5 min after removal of 75% DMSO, and  $0.83 \pm 0.41$ ,  $0.17 \pm 0.41$ ,  $21.17 \pm 8.11$  at 120 min after removal.

5. Human skin responses to 97% xylene under occlusion for 120 min were assessed by visual scoring system, TEWL and LDF. They were measured  $3 \pm 0.00$ ,  $63 \pm 25.8$ ,  $76 \pm 14.30$  at 5 min after removal of 97% xylene, and  $1.83 \pm 0.75$ ,  $2.5 \pm 0.55$ ,  $3.17 \pm 0.98$  at 120 min after removal.

Conclusion : Short contact with DMSO and xylene causes visible erythema and increases in TEWL and cutaneous blood flow. The reaction patterns in human and guinea pig skin models were similar.

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Key words : solvent, irritant dermatitis, transepidermal water loss, laser doppler flowmetry