Acaricidal Activity of *Cocholearia armoracia* Essential Oil-derived Glucosinolates and Their Congeners against Two *Dermatophagoides* spp. (Acari: Pyroglyphidae)

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The acaricidal activity of materials derived from horseradish (*Cocholearia armoracia* L.) oil against adults of *Dermatophagoides farinae* and *D. pteronyssinus* was examined using fabric diffusion method and compared with that of seven commercial isothiocyanate congeners, and benzyl benzoate and DEET. The biologically active constituents of the *Cocholearia* oil were identified as allyl isothiocyanate (AITC) and butyl isothiocyanate (BITC). Responses varied with compound and dose rather than the mite species. After 24-h exposure, AITC and BITC at 5.1 $\mu g/cm^2$ exhibited >96% mortality against both mite species. Isothiocyanic acid β-phenyl ethyl ester gave >92% mortality against both mite species at 0.64 $\mu g/cm^2$. Isothiocyanic acid benzyl ester produced 95% activity against 100% mortality against *D. farinae* adults at 1.27 $\mu g/cm^2$ and *D. pteronyssinus* adults at 0.64 $\mu g/cm^2$. Isothiocyanic acid 4-penten-1-yl ester was active against *D. farinae* adults at 12.7 $\mu g/cm^2$ and *D. pteronyssinus* adults at 10.2 $\mu g/cm^2$. At 20.4 $\mu g/cm^2$, little or no acaricidal activity was achieved from isothiocyanic acid isobutyl ester, isothiocyanic acid 3-beten-1-yl ester, isopropyl isothiocyanate, and *tert*-butyl isothiocyanate. These results indicate that phenyl moiety in isothiocyanate molecules plays a crucial role in dust mite toxicity. In a fumigation test with both mite species, AITC and BITC were much more effective in closed containers than open ones, indicating that the mode of delivery of these compounds was largely due to action in the vapor phase, as a fumigant. Naturally occurring *Cocholearia* essential oil-derived materials and their congeners merit further study as potential house dust mite control agents or as lead compounds.