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Pyrrolizidine alkaloid variation in Jacobaea hybrids : influence on resistance against generalist and specialist insect herbivores

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Citation

Cheng, D. (2012, April 18). *Pyrrolizidine alkaloid variation in Jacobaea hybrids : influence on resistance against generalist and specialist insect herbivores*. Retrieved from <https://hdl.handle.net/1887/18695>

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Cover Page



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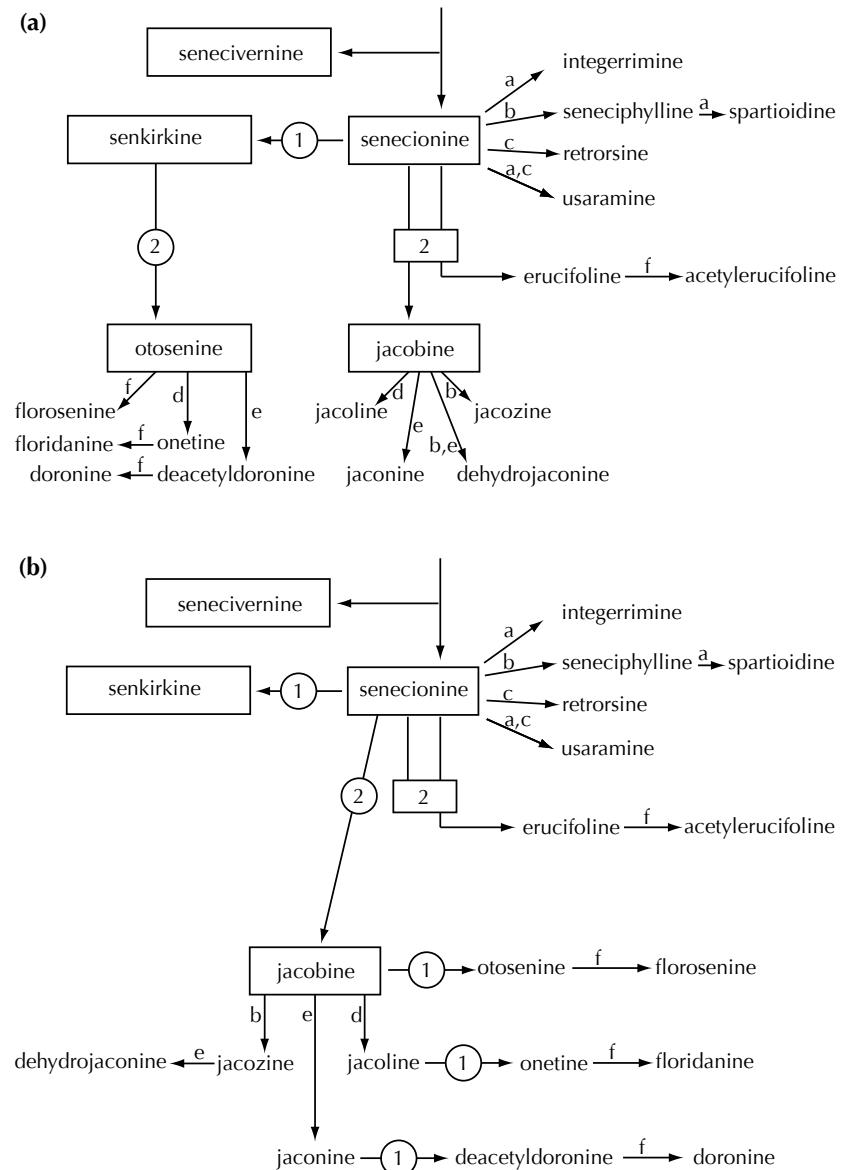


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Author: Cheng, Dandan

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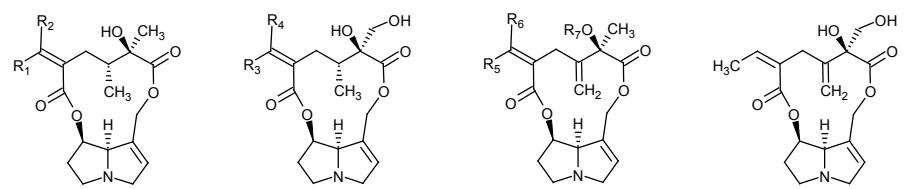
Date: 2012-04-18



Appendix 1 Putative biosynthetic pathways for diversification of PAs in the *Jacobaea* section.

With the exception of senecivernine, senecionine is the common precursor of all other PAs. Since the substrate specificity of the enzymes involved is not known, two scenarios are illustrated: (a) = senkirkine is assumed to be a common precursor of all otonecine derivatives; (b) = the otonecine derivatives originate independently from the respective retronecine derivatives. Two main reactions exist: conversion of retronecine to otonecine (reaction 1) and site-specific epoxide formation (reaction 2). Further structural diversification requires six simple one-step-reactions marked by letters a-f: a = Z/E-isomerization at C20; b = 13, 19-dehydrogenation; c = site-specific hydroxylations; d = hydrolysis of 15,20-epoxide; e = chlorolysis of 15,20-epoxide; f = site-specific O-acetylations. Adapted from Pelser et al (2005).

Senecionine - like PAs



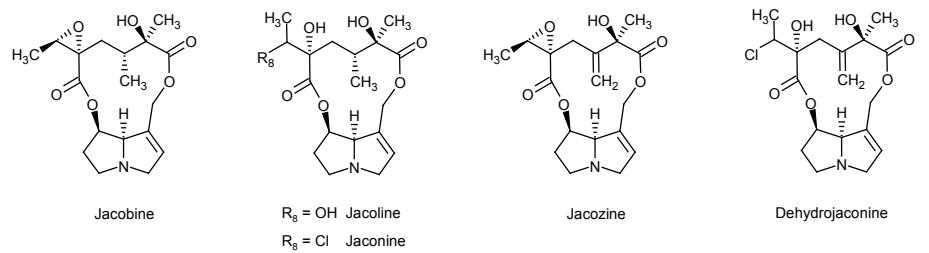
R₁ = CH₃, R₂ = H Senecionine
R₁ = H, R₂ = CH₃ Integerrimine

R₃ = CH₃, R₄ = H Retrosine
R₃ = H, R₄ = CH₃ Usaramine

R₅ = CH₃, R₆ = H, R₇ = H Seneciphylline
R₅ = CH₃, R₆ = H, R₇ = Ac Acetylseneciphylline

R₅ = H, R₆ = CH₃, R₇ = H Spartiodine

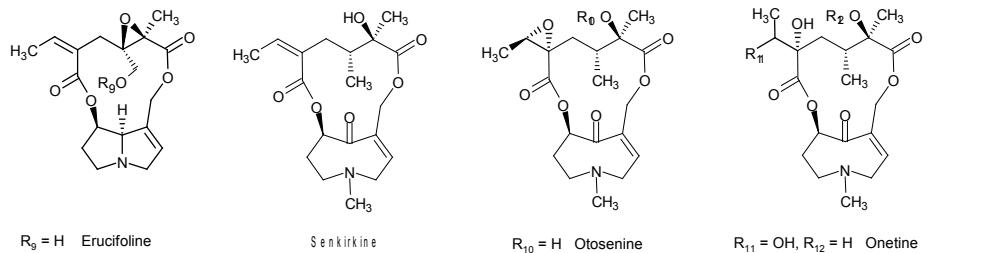
Jacobine - like PAs



Jacobine

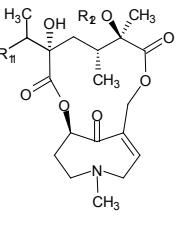
R₈ = OH Jacoline
R₈ = Cl Jaconine

Erucifoline - like PAs



R₉ = H Erucifoline
R₉ = Ac Acetylerucifoline

Otosenine - like PAs



R₁₀ = H Otosenine
R₁₀ = Ac Florosenine

R₁₁ = OH, R₁₂ = H Onetine
R₁₁ = OH, R₁₂ = Ac Floridanine
R₁₁ = Cl, R₁₂ = H Desacetylodonine
R₁₁ = Cl, R₁₂ = Ac Doronine

Appendix 2 Chemical structures of the pyrrolizidine alkaloids (PAs) found in shoots and roots of *J. aquatica*, *J. vulgaris*, F₁ and F₂ hybrids.