## A Synthetic Approach Towards Perhydro-1-azaphenantrenes

Elvira E. Shults, Elvira G. Sutormina and Genrikh A. Tolstikov

Vorozhtsov Novosibirsk Institute of Organic Chemistry, Siberian Branch of the Russian Academy of Sciences, 9 prosp.Akad.Lavrent'eva, 630090 Novosibirsk, Russia . Fax: +7(383 2) 344752. E-mail: benzol@nioh.nsc.ru

Reactions of various dienes with compounds containing C-N double bonds to give six-membered azaheterocycles open up a wide variety of opportunities for construction of alkaloids and analogues thereof.

We found that the reactions of levopimaric acid (**I**) or its ester (**II**) with imines (**IIIa-c**), formed in situ from formaldehyde and amino acid esters [1], results in the formation of cycloaddition products (**IVa-c**, **Va-c**, **III-V** X = CH(COOR`)R``, **a** R`= t-Bu, R``= Bu; **b** R`= Me, R``= i-Pr; **c** R`= Me, R``= CH<sub>2</sub>Ph, **IV** R = H, **V** R = Me) (yield 32-62%). The influence of the reaction conditions and Lewis acid catalyst on the course of the reaction are investigated. By the increasing of the formaldehyde excess (> 6) in the reaction of (**I**) with (**IIIc**) the adduct (**VI**) was also obtained. Hetero-Diels-Alder reactions of (**I**) or (**II**) with imines, being derived from methylamine or 4-methoxy-benzylamine (**VIIa,b**), leads to compounds (**VIIIa,b**) or (**IXa,b**, **VII-IX, a** X = Me, **b** X = 4-MeOC<sub>6</sub>H<sub>4</sub>CH<sub>2</sub>, **VIII** R = H, **IX** R = Me) (yield 48-70%). The interaction of the diene (**II**) with bis-imine (**X**) (formed from hexamethylenediamine and formaldehyde) gave rise to compound (**XI**) in moderate yield.



1. H.Waldmann, M.Braun, J. Org. Chem., 1992. V. 57. N 16. P. 4444.