SYNTHESES OF HETEROCYCLIC COMPOUNDS BY INTRAMOLECULAR OXYPALLADATION

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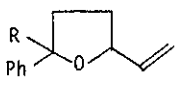
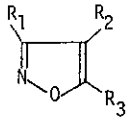
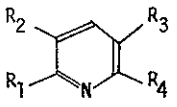
Novel syntheses of heterocyclic compounds by intramolecular oxypalladation of 1-phenyl-4-hexene-1-ol (1) derivatives and unsaturated ketoximes are reported. Thus, treatment of 1 with a catalytic amount of $Pd(OAc)_2$ in the presence of $Cu(OAc)_2$ at r.t. under an oxygen atomosphere gave 2-phenyl-5-vinyltetrahydrofuran (2a) in 32% yield. Similarly, introduction of substituents (Me, Et, and Ph) into 1-position of the compound 1 led to the formation of corresponding vinyltetrahydrofurans 2b-d in 15-38% yield. Formation of isoxazoles 3a-f from α,β-unsaturated ketoximes can be accomplished in relatively high yield by either treatment with $PdCl_2(PPh_3)_2$ in the presence of PhONa in benzene at reflux for 8 hr (Method A) or with $PdCl_2$ in the presence of Na_2CO_3 in CH_2Cl_2 at r.t. for 20 hr (Method B). Isoxazole 3g or 3h were also obtained by the treatment of oximes of 4-hexene-2-one (β,γ-unsaturated ketoxime) or 1-phenyl-4-pentene-1-one (γ,δ-unsaturated ketoxime) with Method B, respectively, while the treatments of these oximes with Method A gave pyridine derivatives (4b or 4c). 4-Methyl-1-phenyl-3-pentene-1-one oxime (β,γ-unsaturated ketoxime) gave also 3-methyl-6-phenylpyridine (4a) in 43% yield. Pyridine derivatives 4c-f were quite generally produced by the treatment of γ,δ-unsaturated ketoximes, but in poor yields. However, utilization of conjugated ketoximes gave rize to an improvement of pyridine synthesis (4g-k).



2	R
a	H
b	Me
c	Et
d	Ph



3	R_1	R_2	R_3
a	t-Bu	H	Ph
b	i-Pr	H	Ph
c	Me	H	Ph
d	Ph	H	Et
e	Ph	H	Ph
f	Ph	Me	i-Pr
g	Me	H	Et
h	Ph	H	n-Pr



4	R_1	R_2	R_3	R_4
a	Ph	H	Me	H
b	Me	H	H	H
c	Ph	H	H	H
d	Me	H	Me	H
e	Ph	H	H	Me
f	$-(CH_2)_4-$		H	H
g	Me	H	H	Me
h	Me	H	Me	Ph
i	Me	Me	H	Ph
j	t-Bu	H	H	Ph
k	Et	H	H	Ph