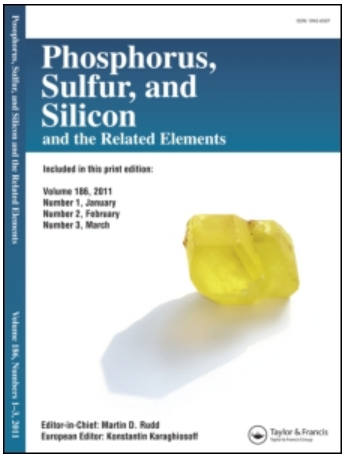

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Syntheses of 2-(1-Methyl-4-Nitro-2-Pyrrolyl)-5-Substituted-1,3,4-Thiadiazoles and 1,3,4-Oxadiazoles

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SYNTHESES OF 2-(1-METHYL-4-NITRO-2-PYRROLYL)-5-SUBSTITUTED-1,3,4-THIADIAZOLES AND 1,3,4-OXADIAZOLES

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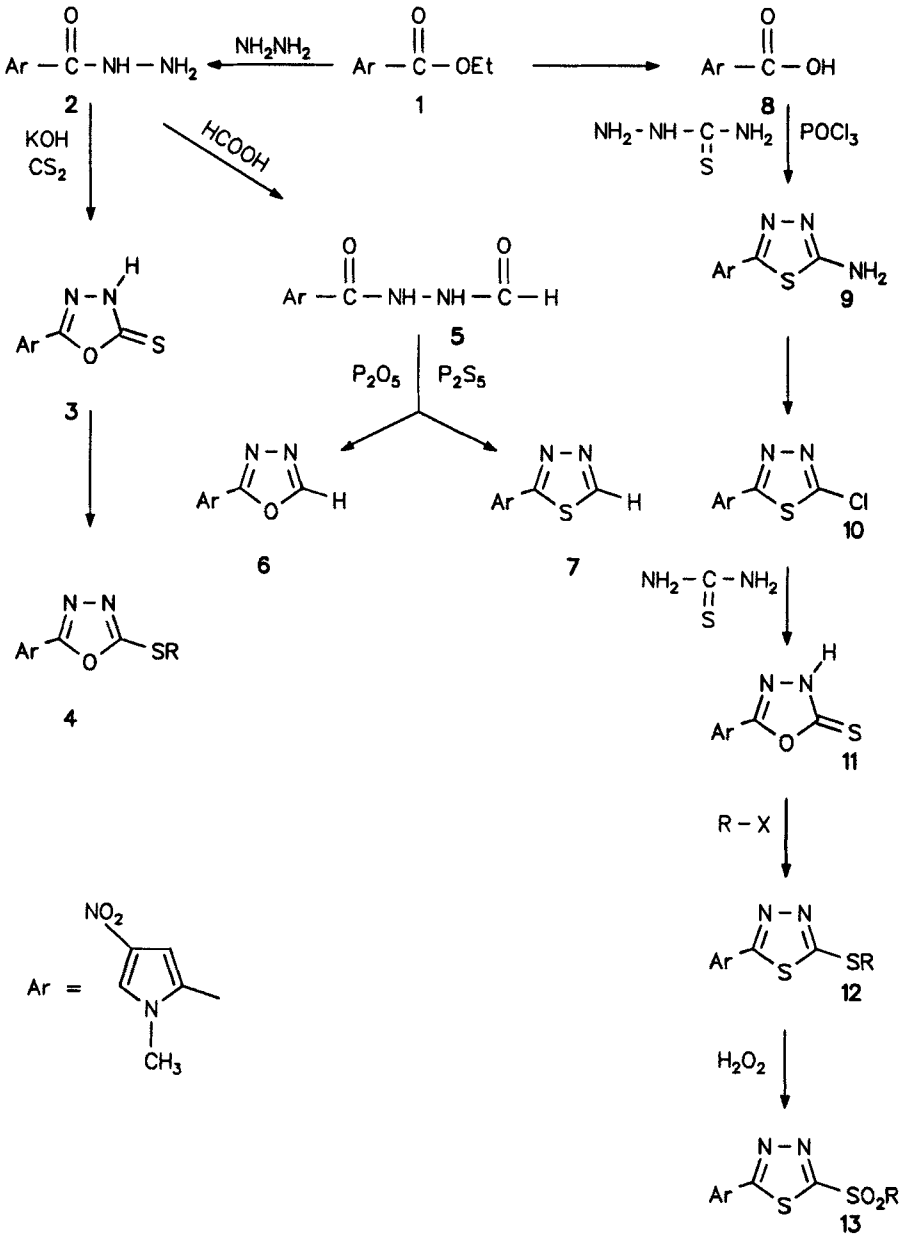
Starting from readily available ethyl 1-methyl-4-nitropyrrole-2-carboxylate (**1**), the title compounds were prepared. Reaction of compound **1** with hydrazine hydrate afforded the corresponding hydrazide **2**. The reaction of **2** with formic acid yielded 1-(1-methyl-4-nitropyrrole-2-carboxyl)-2-(formyl)hydrazine (**5**). Refluxing of the latter with phosphorus pentasulfide in xylene yielded compound **7** in 40% yield. Reaction of compound **5** with phosphorus pentoxide afforded compound **7**.

Compound **3** could be obtained through the reaction of compound **2** with carbon disulfide in basic medium. Alkylation of compound **3** afforded the corresponding alkylthio derivative **4**. Reaction of 1-methyl-4-nitropyrrole-2-carboxylic acid (**8**) with thiosemicarbazide and phosphorus oxychloride gave 2-amino-5-(1-methyl-4-nitro-2-pyrrolyl)1,3,4-thiadiazole (**9**). Sandmeyer reaction of compound **9** yielded 2-chloro-5-(1-methyl-4-nitro-2-pyrrolyl)1,3,4-thiadiazole (**10**). Refluxing of the latter with thiourea afforded 2-(1-methyl-4-nitro-2-pyrrolyl)1,3,4-thiadiazoline-4(H)-5-thione (**11**). Alkylation of compound **11** gave the corresponding alkylthio derivative **12**. Oxidation of the latter with hydrogen peroxide in acetic acid yielded 2-(1-methyl-4-nitro-2-pyrrolyl)-5-methylsulfonyl-1,3,4-thiadiazole (**13**) (Scheme 1).

The structure of all compounds were confirmed by spectroscopic methods (UV, IR, NMR and MS).,



Scheme 1