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2-(2-Hydroxyphenyl)imidazolidines and Their O-Phosphorylated Derivatives

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Abstract—2-(2-Hydroxyaryl)imidazolidines were synthesized by reaction of aromatic carbonyl compounds with *N*,*N*′-dialkylethylenediamines. The title compounds were also prepared using the corresponding Schiff bases instead of carbonyl compounds. Phosphorylation of 2-(2-hydroxyphenyl)imidazolidines with phosphoryl and phosphorothioyl chlorides and phosphorochloridites was accomplished. The reaction of *O*-phosphoryl-salicylaldehyde with *N*,*N*′-dialkylethylenediamines also afforded 2-(2-hydroxyphenyl)imidazolidines.

Keywords: phosphorylated salicylaldehyde, azomethines, 2-(2-hydroxyaryl)imidazolidines, phosphorylation

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Imidazolidines are nitrogen-containing heterocyclic compounds exhibiting a broad spectrum of biological activity, in particular anti-inflammatory, analgesic, antimicrobial, antiparasitic, and anticonvulsant [1–5]. They also attract interest as intermediate products and building blocks for the preparation of drugs, cyclooxygenase-2 inhibitor analogs [6]. Photodynamic chemosensors based on imidazolidine derivatives can be used to detect metal cations and biologically important mono- and polybasic organic acids [7, 8]. Cyclic aminals are widely used as protecting groups in organic synthesis; they also constitute structural fragments of some biologically active compounds [9–11].

With the goal of obtaining new functionally substituted imidazolidines and studying their properties, in the present work we have synthesized 2-(2-hydroxyaryl)imidazolidines and some their derivatives. The reactions of 2-hydroxyacetophenone (**1**) and 2-hydroxy-1-naphthaldehyde (**4**) with *N*,*N*′-dimethylethane-1,2-diamine (**2a**) and *N*,*N*′-dibenzylethane-1,2-diamine (**2b**) gave 2-(2-hydroxyaryl)imidazolidines **3** and **5** (Scheme 1). 2-(2-Hydroxyphenyl)imidazolidines can also be synthesized by reaction of diamines with the corresponding Schiff bases. For example, imine **6** reacted with diamine **2b** on prolonged keeping of the reactants at room temperature to produce imidazolidine **7** (Scheme 2).

Due to the presence of a phenolic moiety, compound **7** can be converted to various O-phosphorylated derivatives. The phosphorylation of **7** with diphenyl chlorophosphate (**8a**) or diphenylphosphoryl chloride (**8b**) in benzene in the presence of triethylamine readily afforded phosphorylated 2-(2-hydroxyphenyl)-

Scheme 1.