Nitrogen-Containing Heterocycles in Agrochemicals

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Introduction

Nitrogen-Containing heterocyclic compounds are the most abundant and integral scaffolds that occur in a variety of synthetic drugs, bioactive natural products, pharmaceuticals and agrochemicals.

Lei Zhou et al. [1] reported the synthesis and the bacterial activity of pyridinium -5- trifluoro-methylpyrazoles (1a-f) bearing 1,3,4 oxadiazole moiety. These thioethers exhibited significant inhibitory activity against pathogenic bacteria Xanthomonas oryzae pv. oryzae (Xoo), Ralstonia solanacearum and Xanthomonas axonopodis pv. citri (Xac).

Benzo[d] imidazolyl tetrahydropyridine carboxylates (2a-c) have been prepared and were evaluated for their antifungal activity against Aspergillus niger (ATCC 16404). These compounds are significantly toxic toward the fungi. Compounds with the electron- donating methoxy group on the phenyl ring are highly toxic [2].

Olyinka O Ajani et al. [3] synthesized benzimidazole derivatives by ecofriendly method and examined their antimicrobial properties for future drug and agrochemical developments. Large zones of inhibition were noticed for compounds (3a-c) and (4a,b) against Bacillus Licheniformis, compounds (3b,d), (4b) and (5a,b) against Proteus Vulgaris and compounds (3a), (4a) and (5b) against Pseudomnas acruginosa.

Gregory Landellea et al. [4] reported the synthesis of imidacloprid and thiacloprid containing either 6- trifluoromethoxy or 6-difluoromethoxy -pyridin-3-yl methyl moieties (6a,b) and (7a,b), respectively. F3HCO-Imidacloprid (6b) is more active in vivo against green-peach aphid (M. persicae) than F3CO derivatives (6a), both derivatives are less active than imidacloprid. F3CO-Thiacloprid (7a) is more active in vivo against M. persicae than (7b). Both derivatives (7a,b) are much less active than thiacloprid.

Compounds (2a,b) inhibit 14-α demethylase in sterol biosynthesis pathway of the fungi 2018.

Stephan et al. [5] synthesized 4-(2,5-dichlorothiophen-3-yl)-1,3-dithiolan-2-ylidene)methyl)-1H-imidazole derivatives (8a-h)
inhibited 14-α-demethylylase in the sterol biosynthesis pathway of the fungi.

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\text{Cl} \quad \text{N} \quad \text{N} \\
\text{Cl} \quad \text{O} \quad \text{F} \\
(8a,b)
\]

The above investigations open the route to a new access to bioactive ingredients and their further evaluation, which could possibly lead to large activity enhancements.

References


