



Journal of Organometallic Chemistry

Volume 774, 15 December 2014, Pages 43–47

Synthesis, characterization and antibacterial activity of some new ferrocenyl selenazoles and 3,5-diferrocenyl-1,2,4-selenadiazole

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<https://doi.org/10.1016/j.jorgchem.2014.10.007>

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Highlights

- A new series of novel ferrocene derivatives containing selenazole-moiety were synthesized.
- Ferrocenyl selenocarboxamide and 3,5-diferrocenyl-1,2,4-selenadiazole were synthesized.
- The new compounds showed potential biological activity against *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa* strains.

Abstract

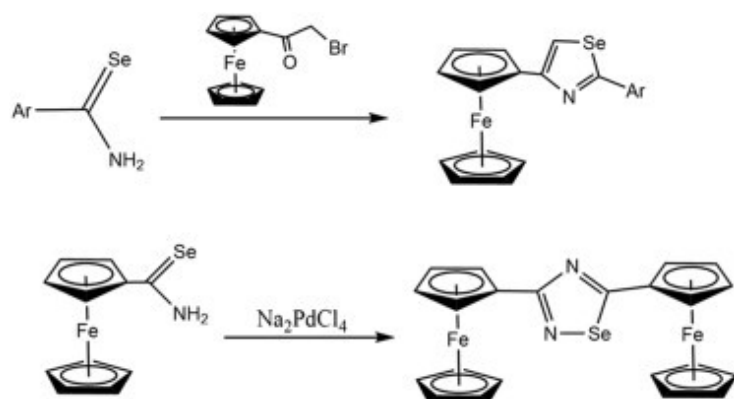
New ferrocenyl containing selenazole derivatives were synthesized from reactions of aryl selenocarboxamide (*i.e.* Ar–C=Se(NH₂); Ar=C₆H₅ (**1**), 4-Br-C₆H₄ (**2**), 4-PhC₆H₄ (**3**), 4-CH₃OC₆H₄ (**4**), 4-CH₃SC₆H₄ (**5**), 6-MeO-naphyl (**6**), 4-MeO-naphthyl (**7**), 4-C₂H₅OC₆H₄ (**8**), 3,4-(CH₃O)₂C₆H₃ (**9**), and 3,5-(CH₃O)₂C₆H₃ (**10**)) with (2-bromoacetyl)ferrocene. The structures of the new compounds were determined by elemental analyses, IR, ¹H and ¹³C NMR and mass spectroscopic data.

Reaction of 1-cyanoferrocene with sodium hydrogen selenide (NaHSe) in methanol gave the new ferrocenyl selenocarboxamide (**11**) in 27% yield. Treatment of compound **11** with a catalytic amount of $\text{Na}_2[\text{PdCl}_4]$ gave 3,5-diferrocenyl-1,2,4-selenadiazole in 35% yield. Both compounds were characterized elemental analyses and spectroscopic techniques.

Compounds **1–10** and **12** were screened as antibacterial agents against *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa* and showed promising properties.

Graphical abstract

New ferrocenyl containing selenazole derivatives, ferrocenyl selenocarboxamide and 3,5-diferrocenyl-1,2,4-selenadiazole were prepared and characterized by several spectroscopic techniques. The new compounds were screened as antibacterial agents against *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa* and showed promising properties.



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Keywords

Ferrocenyl selenazoles; 3,5-Diferrocenyl-1,2,4-selenadiazole; (2-Bromoacetyl) ferrocene; Selenocarboxamide; Sodium hydrogen selenide

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