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Study of polymorphism in 2, 2'-diseleno bis(3-pyridinol)

Prasad P. Phadnis^{a*}, Amit Kunwar^b, Mukesh Kumar^c, Ratikanta Mishra^a, Amey Wadavale^a,
K. I. Priyadarsini^a and Vimal K. Jain^{a, d}

^a Chemistry Division, Bhabha Atomic Research Centre, Mumbai-400 085, India, Email: phadnisp@barc.gov.in; Tel: +91-22-2559-2943; Fax: +91-22-2550-5151.

^b Radiation and Photochemistry Division, Bhabha Atomic Research Centre, Trombay, Mumbai 400 085, India.

^c Radiation Biology and Health Sciences Division, Bhabha Atomic Research Centre, Trombay, Mumbai 400 085, India.

^d UM-DAE Centre for Excellence in Basic Sciences, University of Mumbai, Kalina Campus, Mumbai-400 098, India.

Abstract

2,2'-Diselenobis(3-pyridinol), [2-C₅H₃N(3-OH)Se]₂ (DISPOL) (**1**) and 3-hydroxypyridine-2-(1H) selone (**2**) were synthesized and characterized by microanalyses, NMR (¹H, ¹³C{¹H}, and ⁷⁷Se{¹H}) spectroscopy. The **1** on recrystallization from various organic and aqueous solutions resulted in different polymorphs which were unambiguously characterized by single crystal X-ray diffraction analyses at room as well as low temperatures. Differential scanning calorimetry (DSC), thermogravimetric analysis (TGA) and differential thermal analysis (DTA) of **1** confirmed the existence of two polymorphs. The bulk **1** and its polymorphs exhibited potent cytotoxicity against A549 human lung carcinoma cells (IC₅₀ values ≈ 10 μM). The compound is thermodynamically stable and is a promising candidate for further pharmacological studies as a cytotoxic agent.

1. Introduction

The chemistry of organoselenium compounds has made a great stride in diverse areas during the last two decades or so. These compounds find numerous applications in organic synthesis [1, 2], coordination chemistry [3-5], materials science [4, 6], pharmacy [7] and biology [8, 9]. Selenium is an essential micronutrient for animals and humans and exists in the form of selenocysteine which constitutes an active site of several selenoenzymes [10]. Glutathione peroxidases (GPx), a sub-family of selenoenzymes, have been recognized as

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