Synthesis, Characterization and Biological Activities of Organotin(IV) Complexes with *l*-Lysine Monohydrate[1]

M. S. Bashir[a], S. Ali[b], S. Shahzadi[b], and M. Shahid[c]

[a] *Department of Chemistry, GC University, Faisalabad, Pakistan*

[b] *Department of Chemistry, Quaid-i-Azam University, Islamabad-45320, Pakistan*
e-mail: drsa54@yahoo.com; sairashahzadi@hotmail.com

[c] *Department of Chemistry and Biochemistry, University of Agriculture, Faisalabad, Pakistan*

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Abstract—The new organotin(IV) complexes have been synthesized by the reaction of *l*-lysine monohydrate with CS_2 and R_2SnCl_2/R_3SnCl**.** The organotin(IV) complexes and the ligand have been characterized by elemental analysis, FT-IR and NMR (^1H and ^{13}C) spectrometry. IR data indicated that complexation proceeded –COO and –CSS sites and the ligand acted as a bidentate one. ^1H and ^{13}C NMR data confirmed the tetrahedral structure of the products in solution. Biological activity of the complexes was tested.

Keywords: *l*-Lysine monohydrate, organotin(IV) complexes, IR, NMR, biological activity

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INTRODUCTION

Organotin(IV) complexes are extensively used as catalysts, stabilizers, biocides, antifouling agents and wood preservatives [1]. Methods of synthesis, structural elucidation and biological activity of organotin(IV) derivatives of carboxylic acids have been studied [2, 3]. Increased attention to organotin carboxylates was based on their antitumor activity determined for some of those [4]. Structural diversity of diorganotin and triorganotin esters attracted considerable attention [5, 6]. Metal thiolates attracted considerable attention due to the processes of metals bounding to cysteine in natural systems [7] and some other biology related phenomena [8–10].

In respect to our interest in synthesis, characterization and biological activity of organotin(IV) complexes [11–14], we have synthesized organotin(IV) complexes with *l*-lysine monohydrate and elucidated their structure by FT-IR and ^1H and ^{13}C NMR methods. The products were tested *in vitro* for their antifungal and antibacterial activity.

EXPERIMENTAL

The chemicals were purchased from Merck and used without further purification. Melting points were measured on Stuart SMP3 melting point apparatus. Solvents were dried before use by the conventional methods [15]. Elemental analysis was performed on CHN elemental analyzer 932 Leco, USA. FT-IR spectra were recorded on a 1000 (FT-IR Perkin-Elmer) spectrophotometer in the range of 4000–250 cm^{-1} as KBr/CsBr discs. ^1H and ^{13}C NMR spectra were measured by a Bruker 300 MHz-FT-NMR spectrometer.

Synthesis of organotin(IV) complexes. *l*-Lysine monohydrate (1 mmol) was dissolved in methanol (25 mL) in a 100 mL round bottom flask and carbon sulfide (2 mmol) was added to it drop wise upon stirring. R_2SnCl_2/R_3SnCl (2 mmol) solution in methanol (25 mL) was added drop wise in the above reaction mixture and refluxed for 6–8 h. The solvent was evaporated in vacuum. The solid product was dried in the air and recrystallized from acetone : *n*-hexane (1 : 1).

Thus synthesized solid compound (1 mmol) was dissolved in methanol (40 mL) in a 100 mL two necked round bottom flask and the solution of R_2SnCl_2/R_3SnCl (1 mmol) in methanol (25 mL) was added drop wise to the above reaction mixture upon stirring and refluxed for 6–8 h. The solvent was evaporated slowly at room temperature and the solid product obtained was dried in the air and recrystallized from acetone : *n*-hexane (1 : 1) (Scheme 1).

[1] The text was submitted by the authors in English.