



**INTERNATIONAL CONFERENCE ON  
RESEARCH INITIATIVES IN CHEMISTRY  
FOR SUSTAINABLE DEVELOPMENT**



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OP-7	Study of Inclusion Behaviour of Per-6-amino- $\beta$ -cyclodextrin with Ferulic acid	32
	<i>S. Sukumari and K. Pitchumani</i>	
OP-8	Ultrasonication mediated synthesis, characterization, pharmacological and catalytic studies of gold nanoparticles	35
	<i>T.K. Saravanan N. Muniyappan</i>	
OP-9	Adsorption of Methyl Orange dye from aqueous solution by Laplap purpureus (Dolichos Bean) plant stems used as biosorbent	39
	<i>G. Bharathidasan, N. Mani, G. Vishnuvardhanaraj, K. Mohamed Faizal</i>	
OP-10	Neutral and ion-pair silver(I) complexes of Schiff bases derived from methyl and ethyl carbazates with glyoxylic acid: Synthesis, structure, thermal behavior and cytotoxic activity	40
	<i>S. Poornima, S. Govindarajan</i>	
OP-11	An Elegant & Efficient Synthesis of Bis N-Acyl Pyrazolonyl-1, 2, 3-Triazolyl hydrides via. A Novel Greener Synthetic Methodology	44
	<i>Archana Vellingiri, Ponnuswamy Alagusundaram, and Gnana Kumar Georgepeter</i>	
OP-12	Tyrosinase incorporated zein nanofibers for effectual degradation of azo dyes	46
	<i>Mathiazhagan Suryamathi, Periasamy Viswanathamurthi</i>	
OP-13	A highly selective and sensitive turn-on fluorescent probe for the detection of Fe <sup>2+</sup> and Fe <sup>3+</sup> and its bioimaging	49
	<i>Rajasekaran Dhivyaa, Asaithambi Gomathi, Periasamy Viswanthamurthi</i>	
OP-14	Simple and selective optical biosensor using (E)-5-((anthracen-9-ylmethylene)amino)-2,3-dihydrophthalazine-1,4-dione for direct detection of ascorbic acid	51
	<i>Shenbagavalli Kathiravan, Vairathevar Sivasamy Vasantha</i>	
OP-15	Nickel oxide nanoparticles catalyzed C-N coupling of Indole	53
	<i>Krishnaveni T, M.V. Kaveri and Lakshmi K</i>	
OP-16	Abatement of Congo Red Dye by Adsorption Using Activated <i>Punica Granatum</i> Peel	56
	<i>P. Pandian, A. Kasthuri, P. Johnraj &amp; B. Gokulakrishnan</i>	
OP-17	Recovery of manganese from spent alkaline battery cathodes for energy storage applications	58
	<i>Thomas Nesakumar Jebakumar Immanuel Edison, Raji Atchudan, Namachiwayam Karthik, Xiong Dangsheng, Yong Rok Lee</i>	
OP-18	Isolation, Characterization, Molecular Docking AND In-Vitro Studies of Inhibitory Effect on the Growth of Struvite Crystal of Bioactive Principle from <i>Melia Dubia</i> Leaf Extract	71
	<i>G. Dayana Jeyaleela, Dr. R. Senthil, Dr. K. Manjula, J. Rosaline Vimala</i>	

## Study of Inclusion Behaviour of Per-6-amino- $\beta$ -cyclodextrin with Ferulic acid

**S. Sukumari and K. Pitchumani**

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**Keywords:** Ferulic acid, Per-6-amino- $\beta$ -cyclodextrin, Inclusion complex, Binding constant

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### INTRODUCTION

Ferulic acid exerts several biological effects like anticancer,<sup>1</sup> antimicrobial and anti-inflammatory activities<sup>2</sup> and plays a role in the prevention of thrombosis and atherosclerosis.<sup>3</sup> But its application on the skin is limited due to the poor stability of the molecule. The problem may be overcome by the use of native and modified cyclodextrins (CDs), which form stable inclusion complexes with a variety of guest molecules. The host-guest inclusion complexes between guest molecules and CDs usually express increased solubility in aqueous solutions, improved stability and bio-availability of the guest molecule.<sup>4</sup>

The aim of this study is to investigate the interaction of ferulic acid with per-6-amino- $\beta$ -cyclodextrin (per-6-ABCD) in detail based on Fourier-transform infrared spectroscopy (FT-IR), UV-Visible absorption (UV-Vis.) and fluorescence measurements.

### MATERIALS AND METHODS

$\beta$ -CD and ferulic acid are purchased from Sigma-Aldrich. Native  $\beta$ -CD is converted to per-6-ABCD according to the procedure described in the literature.<sup>5</sup> The inclusion complex formation at pH=7 is characterised by recording FTIR spectra using JASCO FT/IR-410 spectrometer, UV-Vis. Absorption spectra using JASCO V-550 double beam spectrophotometer and emission spectra using Fluorox-4 spectrofluorometer.

### RESULTS & DISCUSSIONS

The inclusion behaviour of per-6-ABCD with ferulic acid at pH= 7 is studied by spectral techniques such as FT-IR, UV-Visible and Fluorescence. At pH 7, ferulic acid exists as COO<sup>-</sup> ion and per-6-ABCD exists in the partly protonated form.

### FT-IR SPECTRAL STUDIES

FT-IR spectrum of pure acid and its 1:1 per-6-ABCD complex is recorded and the details are given in table 1.

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