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# Study of Growth and Characterization of Cobalt Tartrate Crystals

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**Abstract** — In present investigation, single crystals of cobalt tartrate were grown by using silica gel as a growth medium. These single crystals were grown by simple gel technique using diffusion method. The optimum growth conditions for these crystals were optimized by varying various parameters. The circular shaped, opaque and brown colored crystals were observed. The crystalline nature of grown crystal was confirmed by using powder X-ray diffraction technique which shows that cobalt tartrate hydrate has crystallized in orthorhombic structure. The functional groups present in the crystals were identified by using Fourier Transform Infrared Spectroscopy (FTIR) analysis which shows that the presence of O-H bond, C-H bond and metal-oxygen bond. The SEM study reveals that the crystals having flat, rectangular and orthorhombic shapes of different sizes and structures embedded in rock like structure. The analysis of EDAX has shown the presence of Cobalt and Oxygen. The values of energy gap and band gap energy were calculated from UV-visible absorption spectra and these values were determined as 8.45 eV and 5.27 eV respectively. The Differential Scanning Calorimetry (DSC) was done to find the thermal properties of the crystal which manifest the water of hydration in the crystal.

**Keywords** — Gel growth; Cobalt Tartrate; XRD; FTIR; SEM; EDAX; UV-Visible; DSC

## 1. Introduction

Several researchers have grown materials of great interest by gel technique [1]. They have modified such materials by suitable substitution for determination of the effect of modification of the composition. They have focus on the characteristics of the modification of the composition [2-5]. This growth process is free from convection, a systematic study of crystallization in gels begins with Lissegang's famous discovery of periodic crystallization in gel. This method has received a lot of attention because of its simplicity and efficiency in growing a single crystal of a particular compound. This process is one way to address growth through controlled distribution. This growth process has no convection [6-9].

Crystal habit of various crystals, grown under different conditions and also by different methods such as, melt growth, vapour phase growth, solution growth and gel growth were described by H.E. Buckley [10], P. Hartman [11], K. Kern [12], A. A. Chernov [13], W. K. Burton [14] and J. Mullin [15]. A number of factors such as concentration of reactants, pH of gel, impurities in the solvent, gel setting time, gel aging time etc. have considerable effect on growth rate. Growth and Characterization of some tartrate crystals were reported by Henisch and Henisch et al [16], Patel and Rao [17]. Growth of some crystals of tartrate compounds like calcium tartrate [18], barium tartrate [19], ammonium tartrate [20], zinc tartrate [21], sodium tartrate [22], and cadmium tartrate [23] were reported by earlier researchers. The compounds of tartaric acid find numerous applications in semiconductor and optics industries with the invention of lasers. The

tartrates find many applications in science and technology such as ferroelectric applications, ferroelectric-Ferro elastic applications and dielectric applications. Some tartrate compounds are used as tracers for military purposes [24-27]. They are also used for construction of transducers. many linear and non-linear mechanical devices [28, 29].

In the present investigation, single crystals of cobalt tartrate were grown by a simple gel technique using diffusion method. The optimum conditions were established by varying various parameters such as pH, concentration gel solution, setting time of the gel solution and concentration of the reactance. The optimum growth conditions for these crystals were determined. These crystals were characterized by using XRD, FTIR, SEM, EDAX, UV-visible and DSC.

## 2. Experimental Analysis

Cobalt tartrate crystals were grown by single diffusion method in silica gel medium at room temperature. The Sodium Meta Silicate ( $\text{Na}_2\text{SiO}_3$ ) solution and acetic acid ( $\text{CH}_3\text{COOH}$ ) was prepared by dissolving 22gm ( $\text{Na}_2\text{SiO}_3$ ) into the 250ml distilled water and 15ml ( $\text{CH}_3\text{COOH}$ ) dissolving into 250ml distilled water respectively. Then ( $\text{Na}_2\text{SiO}_3$ ) was added into 6ml ( $\text{CH}_3\text{COOH}$ ) drop by drop by maintaining the pH 4.2 with continues till the solution becomes milky. After that 15ml solution of Cobalt chloride ( $\text{CoCl}_2$ ) with 1M added into the gel solution. This mixture was then transferred to the test tube of 15 cm  $\times$  2.5 cm dimension. The open end of the tub was sealed with cotton, preventing evaporation and contamination of the exposed area and stored tubes at room temperature.

## १. मीर शुक्रुल्ला यांचे खिलाफत चळवळ व हिंदू-मुस्लिम ऐक्यासाठी दिलेले योगदान

प्रा. डॉ. दिनेश रामदास महाजन

इतिहास विभागप्रमुख, कला व विज्ञान महाविद्यालय, मालोद, जि. जळगाव.

महात्मा गांधींनी १९२० मध्ये असहकार चळवळ सुरु केली ही चळवळ अतिशय आगळी वेगळी अशी होती. जगावर सत्ता असलेल्या ब्रिटीशांशी लढण्यासाठी गांधीजींनी सत्य, अहिंसा व असहकाराचा मार्ग निवडला. यातून ब्रिटिश सरकारला गांधीजींनी मोठा धक्का दिला. ब्रिटिशांशी लढण्यासाठी असहकारासोबत राष्ट्रीय शिक्षण, सरकारी नोकऱ्या, पदव्या, मानसन्मानाच्या जागा यांचा त्याग करायचा होता. तसेच असहकार चळवळीला मुस्लिम लिंगाचे सहकार्य मिळाले असल्याने खिलाफत चळवळीला महात्मा गांधींनी पाठींबा दिलेला होता. एवढेच नव्हे तर काँग्रेसने खिलाफत चळवळ आपली मानून गावागावांमध्ये खिलाफत कमिट्या स्थापन करून हिंदू-मुस्लिम ऐक्यासाठी प्रयत्न सुरु केले होते. पूर्वजानदेश जिल्ह्यातील जळगाव येथील मीर शुक्रुल्ला हे खिलाफत चळवळीपासून काँग्रेस पक्षात सक्रिय होऊन त्यांनी खानदेशात खिलाफत चळवळीचा मोठा प्रचार-प्रसार केला. एवढेच नव्हे तर आयुष्यभर त्यांनी काँग्रेस पक्षात राहून स्वातंत्र्याच्या विविध चळवळींमध्ये झोकून दिलेले आपल्याला दिसून येते.

मीर फर्जत अली १८५७ च्या स्वातंत्र्य युद्धाच्या वेळी इंग्रजांशी लढा देतांना अत्याचार सहन करीत कुटूंबीयांना नेपाळच्या बस्ती जिल्ह्यातून कसेबसे धरण्याव येथे आणले. त्यानंतर जळगावला स्थायिक झाले. आपल्या पूर्वजांचे बलिदान व देशप्रेमाणे प्रभावित मीर शुक्रुल्ला जीवनभर देशाच्या स्वातंत्र्यासाठी लढले.<sup>१</sup>

आपल्या पूर्वजांचे बलिदान व देशप्रेमाणे प्रभावित मीर शुक्रुल्ला जीवनभर देशाच्या स्वातंत्र्या करीता लढले. महात्मा गांधीजींची खिलाफत चळवळ फोफावत असतांना जळगावलाही तिचा प्रसार झाला. मीर शुक्रुल्ला १९२० पासून महात्मा गांधींसोबत खिलाफत चळवळीसह स्वातंत्र्य चळवळीत सहभागी राहिले. या आंदोलनामुळे मीर शुक्रुल्ला यांचे सोबत सर्वसामान्य मुस्लिम समाजही राष्ट्रीय प्रवाहात उतरून असहयोग आंदोलनात सहभागी झाले. मीर शुक्रुल्ला यांच्या प्रयत्नाने हिंदू-मुसलमानांमध्ये अभूतपूर्व असे ऐक्य घडून आले. खिलाफत चळवळीत सहभाग असल्याने मौलाना शौकत अली जोहर, हकीम अजमल खान, मौलाना अब्दुलबारी, अब्दुल्ला बरेलवी, बी. अम्मा, मौलाना हसरत मुहानी यांच्याशी मीर शुक्रुल्ला यांचे जवळचे संबंध होते.<sup>२</sup>

खिलाफत चळवळीच्या काळात वासुदेव दास्ताने यांनी हिंदू-मुस्लिम ऐक्याचा प्रचार करीत असताना अनेक मुस्लीम कार्यकर्ते मिळविले. त्यात जळगावचे मीर शुक्रुल्ला कट्टर इस्लाम धर्मीय, परंतु सालस नृत्तीचे गृहस्थ. वासुदेव दास्ताने यांच्या



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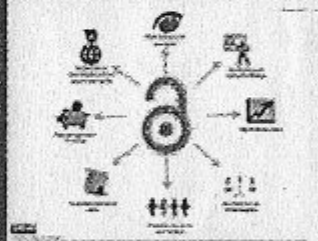
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## Institutional Repositories of Pharmacy Colleges Affiliated to Savitribai Phule Pune University, Pune: A Study

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**Abstract:** *This research paper deals with analysis of Institutional Repositories of Pharmacy Colleges affiliated to Savitribai Phule Pune University, Pune. Detail study of institutional repositories analyzed & findings are exposed. Different criteria's formed & used for the analyses of data. The study of this research paper focused on different aspects of contents of IR. Data Collected from total 29 Pharmacy Colleges affiliated to Savitribai Phule Pune University has been analyzed on the basis of different criteria's. Outcome of this research study exposed very strange & unexpected picture of institutional Repositories service. Findings of study compel to think on improvement of IR according to modern age & establish new platform to design IR*

**Key words:** Savitribai Phule Pune University, Pharmacy Colleges, Institutional Repository, Information & Communication Technology

**(Abbreviations:** IR – Institutional Repository, ICT –Information & Communication Technology)

### 1 Introduction:

Savitribai Phule Pune University, Pune one of the premier universities in India, is positioned in the North-western part of Pune city. It was established on 10th February, 1949 under the Poona University Act. The university houses 46 academic departments. It has about 307 recognized research institutes and 612 affiliated colleges offering graduate and under-graduate courses. There are 29 Pharmacy colleges. The Institutional repositories in the library of that college will be studied.

This is an electronic era & information & communication technology occupied all the fields of knowledge. Everyone is using computer, laptop, tab or mobile & involved to get knowledge on his fingertips. User want to information without wasting time & money. As an adaption with current generation every educational institutes is changing their services to user with the help of ICT. These institutions using different web technologies to retrieve information.

As a results institutions using to providing their institutional repositories for users to show their prosperity of knowledge. IR playing a vital role to provide information resources to user & display richness of institutions in the field of knowledge. So it is important to study about existence of this IR service status. IR enable researchers to self – archive their research output & can improve the visibility, usage & impact of research conducted at institution.

### 2. Repository:

A place where or receptacle in which things are or may be stored.

A place where something's especially a natural resource is found in significant quantities.

A central location in which data is stored & managed the metadata will be aggregated in a repository.

### 3. Institutional Repository:

An institutional repository is an archive for collecting, preserving & disseminating digital copies of the intellectual output of an institution, particularly research institution

### 4. Contents of Institutional Repository:

An institutional repository can be viewed a set of services that a university offers to members of its community for the managements & dissemination of digital materials created by the institution & its community members.

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COUPLING REACTIONS OF ARYLDIAZONIUM SALT. PART-XII: REVIEW ON  
COUPLING OF ARYLDIAZONIUM SALT OF AMINOBENZOTHIAZOLES WITH  
AROMATIC OR HETEROAROMATIC MOFITS

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**ABSTRACT:** The Aminobenzothiazole-azo compounds are industrially very important for technical purposes. Azo group compounds are commonly used in preparation of or as synthetic colour molecules. They are prepared beginning with primary aromatic amines by diazotization and coupling on aromatic moieties. The compounds were studied to arrive at their skeleton using different type of data (spectroscopic and the analytical) using spectroscopies such as UV-Vis., FT-IR, <sup>1</sup>H-NMR. Azo compounds of amino benzothiazole have varied applications in pigments, many used in food, cosmetics and drug industry as well.

**KEYWORDS:** Aminobenzothiazole, azo, diazotization, dyes, Antibacterial and Antioxidant Activity

**INTRODUCTION:**

The compounds of azo class or dyes are analyzed by occurrence of the azo (-N=N-) moiety in their skeleton, conjugated with different or identical, mono or dicyclic aromatic, polycyclic aromatic or hetero-aromatic systems. Due to their precise physio-chemical properties and biological activities, they have found a broad application viz. in cosmetic, pharmaceutical, dyeing or textile, food industry and also in analytical field.

The diazonium compounds, epitomize a main group of organic compounds having functional formula  $R-N \equiv N^{\oplus}X^{\ominus}$  in which R = alkyl or aryl and X = organic or inorganic anion such as a F, Cl, Br and or I group. Diazonium salts, where R is an aryl group, are precious intermediates and have many applications in organic chemistry synthesis. Since, their discovery in 1858<sup>1</sup> many protruding named reactions associated with diazonium salts of arene moiety and have evolved throughout development of one century plus. In 1884, Sandmeyer found out that by treating with copper chloride, benzene diazonium salt was converted into







# Study of Mycoflora, Aflatoxigenic Fungi and Aflatoxin in Fish Feeds.

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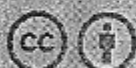
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### ABSTRACT

Sample of fish feeds were collected from Mumbai, agar-plate methods were used for isolation of mycoflora associated with collected samples. All isolates of *Aspergillus flavus* obtained from collected samples were screened for their aflatoxigenic potential in SMKY liquid medium. In all seventeen different fungi were isolated from fish feeds. *Aspergillus flavus*, *A. niger*, *A. ochraceus*, *Aspergillus sp.*, *Fusarium sp.* and *Penicillium sp.* were stand out common seed infesting fungi. *A. flavus* was dominant in all fungi and its 76% strains were aflatoxigenic. Highest percentage of aflatoxigenic fungi was recorded in Feed Ingredients (86.2%). Analysis of fish feeds for its natural aflatoxin contamination revealed that 26.67% samples were naturally contaminated with aflatoxin. Maximum concentration of aflatoxin B<sub>1</sub> was detected in Local fish feed (93.67 ppb) followed by Feed Ingredients (92.89 ppb) and Commercial fish feed (84.38 ppb). Oil seeds contaminated with aflatoxin has poses a potential threat for the life of aquaculture animals.

**Keywords** – fish feeds, Mycoflora, *Aspergillus flavus*, aflatoxin.

### INTRODUCTION

Aflatoxicosis is a disease that can affect many species of fish, and results when feed contaminated with aflatoxins is eaten by the fish (Ashley, 1970). Aflatoxins are one of the most potent toxic substances that occur naturally. These are a group of closely related mycotoxins produced by fungal species such as *Aspergillus flavus* and *Aspergillus parasiticus*. Which commonly grow on human foods and animal feeds( Dwarkanath *et al.*, 1969; Kolhe, (2016); Nagarajan and Bhat,1973; Basappa *et al.*, 1977; Kolhe, *et al.*,1994; Verma *et al.*, 1996, Kolhe and Chaudhari, 2011, Chaudhari and Kolhe, 2017). Oilseed crops are primarily soybeans, sunflower seed, canola, rapeseed, safflower, flaxseed, mustard seed, peanuts and cottonseed, Wheat and Maize. After extraction of the oil the residue is a valuable source of protein, especially for animal feeding stuffs, as in oil seed cake or press cake.





# Assessment of Aflatoxins, Aflatoxigenic Fungi and Mycoflora Associated with Cereals

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**ABSTRACT**

Aflatoxins are one of the most potent toxic substances that occur naturally. These are a group of closely related mycotoxins produced by fungal species such as *Aspergillus flavus* and *Aspergillus parasiticus*. Which commonly grow on foods and feeds. Sample of cereal seeds viz., Bajra, Jowar, Maize and Wheat were collected. Dilution plate and agar-plate methods were used for isolation of mycoflora associated with collected samples. All isolates of *Aspergillus flavus* obtained from collected samples were screened for their aflatoxigenic potential in SMKY liquid medium. In all fourteen different fungi were isolated from cereal seeds. *Aspergillus flavus*, *A. niger*, *A. ochraceus*, *Aspergillus* sp., *Fusarium* sp. and *Penicillium* sp. were stand out common seed infesting fungi. *A. flavus* was dominant in all fungi and its 70.1 % strains were aflatoxigenic. Highest percentage of aflatoxigenic fungi was recorded in Maize seeds (86.20%). Aflatoxin producing potentials of *Aspergillus flavus* obtained from Maize (14.38 ppm) followed by Bajra (11.94 ppm), Wheat (11.63 ppm), and Jowar (11.11 ppm). Analysis of cereal grain seeds for its natural aflatoxin contamination revealed that 26.25 % samples were naturally contaminated with aflatoxin. Maximum concentration of aflatoxin B<sub>1</sub> was detected in Maize seeds (27.87 ppb) followed by Jowar seeds (8.38 ppb), Wheat seeds (5.61 ppb) and Bajra seeds (5.25 ppb). Cereals contaminated with aflatoxin has poses a potential threat for the life of human and animal beings.

**Keywords** – Cereals, Mycoflora, *Aspergillus flavus*, aflatoxins.**INTRODUCTION**

Aflatoxins are one of the most potent toxic substances that occur naturally. These are a group of closely related mycotoxins produced by fungal species such as *Aspergillus flavus* and *Aspergillus parasiticus*. Which commonly grow on foods and feeds (Chaudhary and Kolhe, 2022; Kolhe, 2016). The cereals are common and important staple food crops for the people of the Jalgaon District of Maharashtra State. Most of the cereal crops are mainly grown as rained in the queer weather conditions during Kharif (rainy) season.



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## ADVANCES AND PERSPECTIVES OF FE METAL NANOPARTICLES SYNTHESIZED IN IONIC LIQUID AND THEIR APPLICATIONS

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### ABSTRACT:

Green chemistry and Sustainable development in the field of synthetic organic chemistry is central in the advancement of environmentally friendly strategies towards the synthesis of molecules of commercial and biological relevance. There are large numbers of efficient methodologies have already been disclosed under the guidelines of green and sustainable chemistry. However, as a novel catalytic system i.e metal nano-particles in ionic liquids have recently been gaining popularity as a state-of-the-art solution for organic transformations. Metal nano-particles in ionic liquids offers miraculous promises as it is an exceptional catalytic system that have a potential to replace the conventional methods of organic synthesis, and besides that are found labile in the field of pharmaceuticals, biochemistry, molecular biology, and process and technology as well. In this review, our aim is to investigate the recent developments in the synthesis of fe metal nanoparticles synthesized in ionic liquid which refers to the catalytic system, of choice, and offers exceptional functional group tolerance as well as delivers highly specific organic transformations which provides considerably improved eco-friendly, cost effective and sustainable alternatives to the conventional catalytic processes.

**Keywords:** Metal nanoparticles, ionic liquids, green and sustainable development, catalytic system.

### 1. INTRODUCTION

The myriad applications of nanomaterials have led to increasing demand in the chemical industry. Hence, quite a large number of chemicals, for instance solvents, raw materials, reagents, and template materials, have successfully been utilized for the production of nanomaterials. In addition, it has been evidenced that the creation of toxic or hazardous intermediates and products, as well as chemical wastes has increased through the chemical transformation which are aiming to prepare desirable chemicals. In order to control or reduce or eliminate the generation of undesirable products and to minimize the use of hazardous materials in chemical processes, the concept of green and sustainable development in chemistry was introduced to chemical science and industry. <sup>i-ii</sup>

