

Synthesis Characterization and Antibacterial Activity of some Samarium Complexes with Amide Group Containing Ligands

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Abstract: It has been found that electromagnetic radiations have been widely used to synthesis, analysis and determination of the structure of a chemical species and progress of a chemical reaction. In present research microwave radiations have been used to synthesis of some complexes of Samarium metal with some amide group containing drugs. In this research antimicrobial activities of these complexes have also been investigated.

Keywords: Microwave radiations, Samarium, Amide group containing ligands.

1. Introduction

The electro-magnetic radiations (EMR) contain both electric and magnetic fields, which are perpendicular to each other and also to the direction of propagation of light. The area between the 0.3GHz to 300GHz of EMR is known as Microwave region. The Microwave spectroscopy is the study of the interaction of Microwave Rays and matter. Since the absorption of Microwave radiations by a molecule leads transition among rotational energy levels of molecule, it is also known as Rotational Spectroscopy. In present paper we have studied the synthesis of compounds by microwave heating and their biological studies. Synthesis of compound by the help of microwave is known as Microwave Synthesis or Microwave Assisted Synthesis (MAS).

The term Microwave Assisted Synthesis is becoming very popular in these days. Microwave assisted synthesis is based on the principles of Green Chemistry. Green chemistry has twelve principles. Green Chemistry is also known as Sustainable Chemistry. Microwave rays are used in the chemical reactions as a heat source. In the microwave chemistry three mechanisms are involved namely, dipolar polarization, conduction mechanism and interfacial polarization.

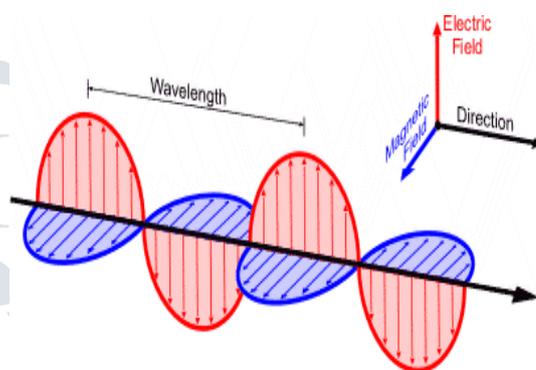


Fig. 1. Electric and Magnetic Field in Electromagnetic Radiations

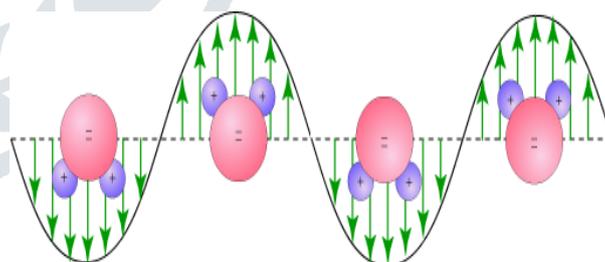


Fig.2. Dipolar Oscillation of water molecules

2. Review of Literature

Microwave assisted synthesis is a non-conventional synthetic method which has been used by various researchers and scientists to complete a number of organic reactions [1-5]. Rakesh R S has been developed an optimization technique for microwave assisted synthesis of Schiff base (6). A review on microwave assisted synthesis has been given by many authors [7-17].

3. Objective

In the present research paper some complexes of Samarium [18] with amide group containing ligands have been prepared by the help of microwave radiations. This type of synthesis is eco-friendly and gives high yield of product. The main objectives of present research have to review the use of microwave assisted synthesis.

4. Research Methodology

AR-grade chemicals have been used in this research. Purity of these chemicals has been checked by thin layer chromatography (TLC). The salt of Samarium has been dissolved in the suitable amount of water and saturated solutions of various drug ligands have been made in water [19-20]. In these research ligands contain amide group and are drugs in nature. These are Salicylamide [$C_6H_7NO_2$], Niacinamide [$C_6H_6N_2O$] and Lidocaine [$C_{14}H_{22}N_2O$]. Then both solutions have mixed together and irradiated by microwave radiations.

Salicylamide is used in treating mild to moderate aches and pains associated with headache, muscle and joint soreness, backache, menstrual cramps, colds and flu, sinusitis, toothache, and minor pain from arthritis, and to reduce fever. It may also be used for other conditions as determined by your doctor. Salicylamide is an analgesic and antipyretic combination.

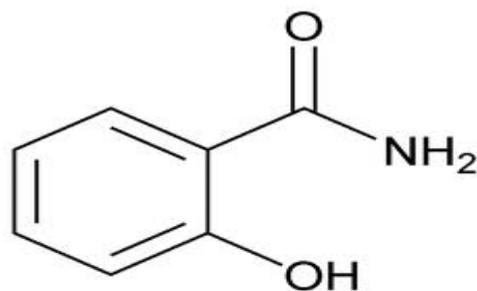


Fig. 3. Chemical Structure of Salicylamide

Niacinamide is a vitamin B-complex supplement. Vitamin B3 is found in many foods including yeast, meat, fish, milk, eggs, green vegetables, beans and cereal grains. It works by replacing vitamin B3 in the body. Niacinamide is used for treating or preventing low levels of niacin (vitamin B3). Niacin is used for high cholesterol. It is also used along with other treatments for circulation problems, migraine headache, dizziness, and to reduce the diarrhea associated with cholera. Niacin is also used for preventing positive urine drug screens in people who take illegal drugs.

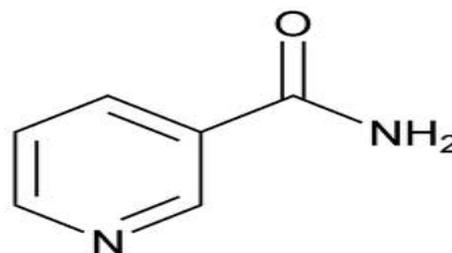


Fig. 4. Chemical Structure of Niacinamide

Lidocaine topical jelly or ointment is used on different parts of the body to cause numbness or loss of feeling for patients having certain medical procedures. It is also used to relieve pain and itching caused by conditions such as sunburn or other minor burns, insect bites or stings, poison ivy, poison oak, poison sumac, minor cuts, or scratches.

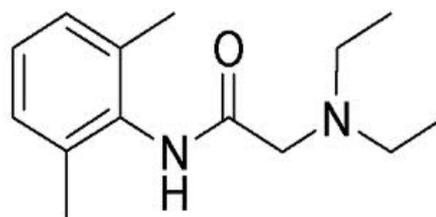


Fig. 5. Chemical Structure of Lidocaine

5. Result and Discussion

Antimicrobial activity of various ligands, Sm(III) salt and various complexes has been carried out on *E. coli* and *S. aureus*. The results of antimicrobial activity have been given in the table.

Table 1. Data of Antimicrobial Activity

Various Systems	Zone of Inhibition in mm			
	<i>E. coli</i>		<i>E. aureus</i>	
	100ppm	200ppm	100ppm	200ppm
Sm(III) Salt	Nil	1	Nil	0.5
L-I	2	2	2	2
L-II	4	7	2	2
L-III	2	8	2	4

C-I	4	4	4	4
C-II	12	13	4	6
C-III	4	4	4	4

Where, L-I, L-II and L-III are Salicylamide, Niacinamide and Lidocaine ligands respectively whereas, C-I, C-II and C-III are the complexes of Sm(III) with ligands L-I, L-II and L-III respectively.

6. Conclusion

Three complexes of Samarium (III) have been synthesized by the microwave irradiation. It has been found that a very large amount of product is formed as compared to conventional heating method. Conventional heating methods are very slow and non-uniform but on the other hand microwave irradiation make efficient internal heating by direct coupling of microwave energy with polar molecules. Great antimicrobial activities have also been observed for complexes as compared to drug ligands.

7. References

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