



Detection of Picric Acid: By Fluorescent Chemosens or (Nitro-Aromatic Compound): A Short Review

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Abstract

The most abundant and valuable class of chemicals currently used in industries are referred to as nitroaromatic compounds. These are compounds that include organic molecules and, more importantly, at least one nitro- group in the ring. As we already know, chemistry is currently known for using a variety of fluorescent techniques. Picric acid ($O_2N)_3C_6H_2OH$) is an organic compound also known as 2, 4, 6-trinitrophenol (TNP), according to the IUPAC. It is extensively used in the industries of dyes, leather, fireworks, and matches. In this review, author tried to explain how to detect picric acid through fluorescent Chemosensor. It helps in the synthesis of fluorescent Nanoscopic objects or compounds.



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Picric Acid.

Introduction

The first is that, the nitroaromatic complexes are extremely difficult to find in nature. So, the primary reason for their identification is that we are human.¹ Human activities play a significant role in identifying these compounds, and the main thing is that these are explained in nature.² Nitro- Aromatic compounds played a huge role in an industrial area of chemical sciences due to their explosive nature. These synthesized compounds have a special quality of explosives with huge energy.³ There are so many sensors that we can use but basically, the

fluorescent Chemosensor is the best among the various sensors.⁴ The nature of properties of the fluorescent Chemosensor is highly responsible for the research of picric acid.⁵

Fluorescent chemosensor has an excellent fluorescence intensity at 516nm, making it ideal for profiling anything. The fluorescence sensor possesses high sensitivity toward picric acid. This sensor is specially has been selected for picric acid research.⁶

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We already know that research on nitroaromatic compounds is the most focused topic for chemistry research. Because nitroaromatics are so explosive by nature makes them an interesting research topic.⁷ And picric acid is one of the main nitroaromatic compounds about their detection by fluorescent Chemosensor, applications which we studied in the following paper.⁸ Fluorescent Chemosensor is a better sensor than others for detecting the nitroaromatic compound picric acid.⁹

Area Covered

We have discussed here

- What actually picric acid is
- About fluorescent Chemo sensor
- Detection of picric acid by fluorescent Chemo sensor
- Why it is called as nitro aromatic compound
- Applications of picric acid
- Harmful effects of picric acid

I used all the literature from different books, different review articles, different research study for this article.

Expert Opinion

Picric acid is an extremely hazardous organic acid. Despite its explosive properties, this acid is a chemical reagent commonly utilized in industrial substances that are extensively utilized in the production of pigments, dyes, insecticides, chemical fibers, medicines, pyrotechnics, and rocket propellant.

As a result, it is critical to develop a simple yet effective method for a highly precise sensation of picric acid in both the vapor and solution phases for the sake of both societal safety and environmental health.

Based on this review study, we can conclude that the identification of this acid will be significant in the future. In this study, the author addressed all of the applications, properties, and harmful effects, as well as all of the basic information. During the process of writing this article, I discovered that a fluorescent Chemosensor is a better sensor than others for detecting the nitroaromatic compound picric acid. This field is still untapped because there are numerous methods for detecting picric acid, including latent fingerprint representation colorimetric, plasmon resonance on the surface,

and many others. This field is still untapped because there are numerous methods for detecting picric acid, including latent fingerprint representation colorimetric, plasmon resonance on the surface, and many others. Nonetheless, the aforementioned techniques are not widely available because they require expensive devices and skilled personnel to use.

In the future, research towards detecting picric acid will help in most aspects of lifestyle and the environment, as it is an important factor in the safety of the greenery around us, as well as public health.

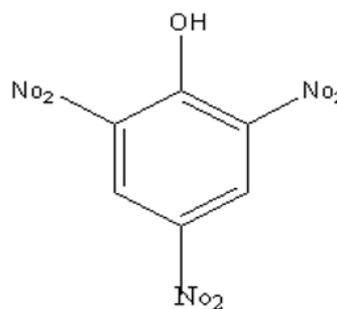
Body

Some basic Classes of Nitroaromatic Compounds

- Nitrobenzene or we can say oil of mirbane¹⁰
- 1- methyl-3-nitrobenzene or nitrotoluene¹¹
- Nitrophenols or we can call picric acid¹²

Picric Acid

The compound is organic and has the formula $(\text{O}_2\text{N})_3\text{C}_6\text{H}_2\text{OH}$, and its IUPAC name is TNP.¹³ It is a member of the amalgam which is nitro-aromatic in nature. As the name picric suggests bitter so its name gives the idea of its nature.¹⁴ Picric acid is used in the formation of explosives, matches, and electric batteries.¹⁵



Structure of picric acid

The very first nitrated organic compound that is explosively involved in military high-ranged weapons for firing or any other work related to it is nitrophenol, also known as picric acid.¹⁶

Applications of Picric Acid

Picric acid is commonly used in dyeing, pharmaceutical, and other industries. It has the advantage of being easily soluble in water and

capable of contaminating both groundwater and soil.¹⁷ Picric acid is also used in the synthesis of some reactions and can be used as a contrasting reagent. It can produce salts when it comes into contact with certain metals.¹⁸ This acid is also used in electric batteries. It can also be used for making pf glasses or other materials through glasses. It can also be used in the lab as a chemical agent.¹⁹

Facts of Picric Acid

Now we will discuss Picric acid briefly by stating some basic facts such as

Picric acid is a strong acid and has a properties of blasting explosive. It is harmful to the environment and public safety.²⁰ Picric acid is a much more powerful acid than phenol. The main feature of this acid and the region behind its strongest nature is that it is an electron donor group.²¹ It can break down carbonates and participates in basic titration, which means it is good at titrating with bases.

Another important fact about 2,4-trinitrophenol is that it can be absorbed through the skin or the respiratory tract.²² Another fact is that in order to limit dryness, we must seal it in a place that is not hot or cold.²³

The next fact is that in order to prohibit its explosive nature, we must place it in a fully ventilated location because it easily comes into contact with a material that has not been reduced or oxidized.²⁴

Harmful Effects of Picric Acid

Picric acid's first major harmful hazardous effect is itching in the eyes, which causes vision to become yellowish and the eyes to become riddled with colors.²⁵ It also causes a sour throat, headache, diarrhea, and other symptoms.²⁶

The main effect of 2,4-trinitrophenol is that it degrades RBC and harms the kidney.²⁷ It has a very negative effect on plants and animals, which means that it is extremely harmful to all living things in an environment. Not only that, but it has a negative impact on our health by eating something related to our consuming items.²⁸

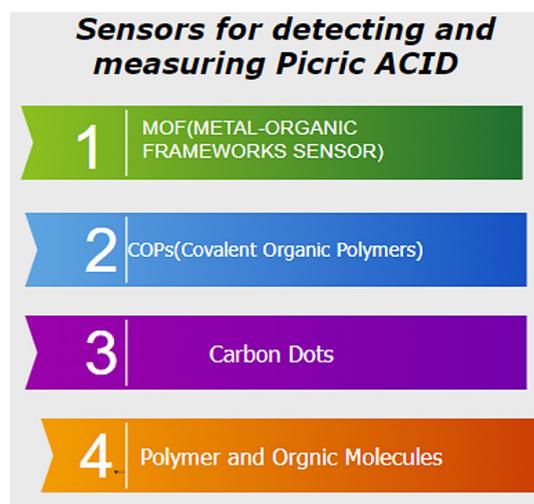
Why Do We Need to Detect this Nitroaromatic Compound (Picric Acid)

As we all know, nitroaromatic compounds (picric acid) have a negative impact on the environment.²⁹

Because nitroaromatic compounds are extremely hazardous to the environment. Nitroaromatic compound, including picric acid are known for hepatotoxic and haematotoxic effect. Picric acid is a strong acid.³⁰ Picric acid has the most negative effects compared to any nitroaromatic compound. And we must detect it in order to determine the cause of its explosive nature, because detection necessitates extensive research into specific topics or compounds.³¹

So, for finding explosiveness or we can say a hazardous thing about this compound firstly we need to detect this compound and the main thing is that it is very difficult to detect this acid that's.³² And lastly, we know its detection is still observed for all researchers who take this topic and I just want to know what the main trouble is which comes in way of its detection.³³

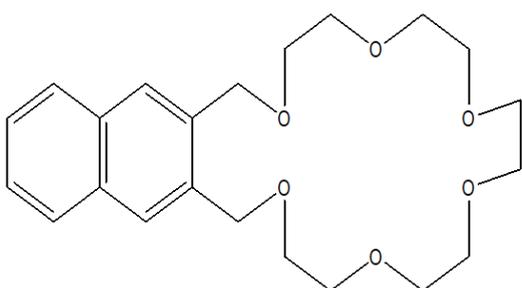
The above all are the regions for why we need to detect this nitroaromatic compound or 2,4-trinitrophenol.



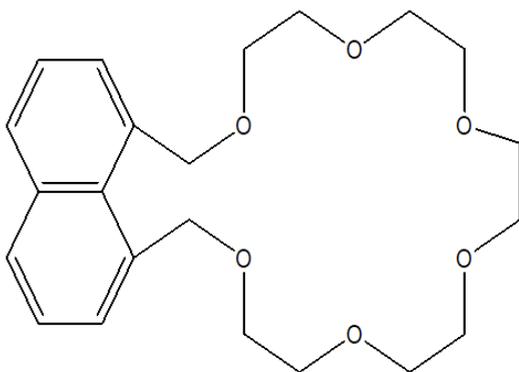
Fluorescent Chemosensor

The molecule or compound which builds up a compulsory site or a chromophore and process for connection between any two sites are called a fluorescent chemosensor. This chemosensor field primarily enters the living process after approximately 153 years³¹ If it has the ability, we can apply it to various branches of chemistry such as biological science, pharmaceutical sciences, environmental sciences, and so on. Currently, a very broad range of this chemosensor has been

established for the research of biological or other field-related species.³⁴ There are various kinds of chemosensors, such as absorbance, redox potential, nmr relaxation, and fluorescence. however, in this review we discussed about fluorescent chemosensors.³⁵ Fluorescent based sensors are frequently used for the detection of nitroaromatic compounds due to their excellent sensitivity, high precision, and immunity to light scattering.³⁶ They are widely used for ions and neutral biological molecules. in a variety of disciplines, including biology and environmental sciences.³⁷



(1)



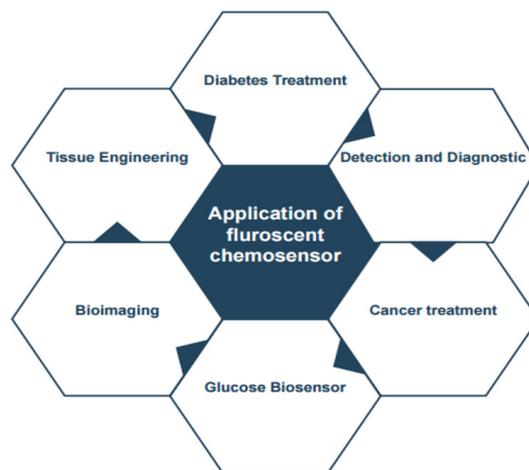
(2)

Structures of Fluorescent chem sensor (1-2)¹⁰

Detection of Picric Acid Through Fluorescent Chemosensor

There are numerous methods for identifying the majority of the nitroaromatic components in nature. Like here we need to identify the picric acid. So, among those methods, we discussed the identification of picric acid using a fluorescent chemosensor.²¹

Because of properties such as explosive nature, the detection of nitroaromatic compounds is critical. Picric acid is also a nitroaromatic compound, and its detection is still a problem.³⁸ There are several processes that can be used to detect molecules of picric acid-like gas chromatography resonance-ray diffraction and so on. However, the fluorescent chemosensor is the best technique for detecting it.³⁹



Now, some examples show how to detect picric acid, such as using an aqueous solution of palladium macrocycle. DCM (CH_2Cl_2) can be used for extraction in this type of detection.⁴⁰ Through a fluorescence procedure, this sensor pretends to have a good connection with 2,4-trinitrophenol.⁴¹ Fluorescent polymer is primarily involved in the detection of highly hazardous nitroaromatic compounds, and as we know, picric acid is also included in this nitroaromatic compound, so fluorescent polymer can also be used to detect picric acid.⁴²

Picric acid, as we already know, has the highest dissolving power or solubility, which makes its breakdown much more difficult in the environment, resulting in soil pollution and water pollution that is insufficient for drinking or any other good purpose.⁴³ Along with that, the anion of 2,4,6-trinitrophenol is used in areas where wars have occurred, causing soil damage and affecting our daily lives through crops, fruits on soil, and so on.⁴⁴ As a result, research into nitroaromatic compounds, particularly picric acid, is critical in today's world, which makes fluorescent chemosensors the best method to

identify or research.⁴⁵ Because this chemosensor seems easy and delicate to detect picric acid and it is advanced in many phases that's why I have chosen this.⁴⁶

Understanding the origins of picric acid is advantageous because fluorescent chemosensors have a high ability for detection.⁴⁷

The presence of a liquid agent known as DA colouring agent in fluorescent chemosensors makes them ideal for detecting picric acid because this coloring agent has a large dedicating property in the field of detecting various nacs, particularly 2,4,6-trinitrophenol⁴⁸ Specifically, the fluorescent chemosensor test paper was designed for the perfect research of picric acid because it provides an advanced understanding of the concept of rapid and widely permitted research of nitroaromatic compounds.⁴⁹ Previously, a fluorescent chemosensor selected for identification of 2,4,6-trinitrophenol was reported, in which the double hydrogen bond with pi-pi interaction in picric acid and fluorescent sensor produces rapid receptor fluorescence and achieves picric acid specific recognition.⁵⁰

Conclusion

In this paper, author discussed picric acid detection techniques. Picric acid's harmful effects, as well as

its benefits, are discussed. By reading this paper, we can easily conclude that picric acid is directly correlated to nitroaromatic compounds, implying that nitroaromatic compounds have explosive, clustering, and other properties. Not only that, but it concludes that picric acid is the most important nitroaromatic compound that should be detected first. Based on the data presented above, the conclusion is that the fluorescent chemosensor is the best technique for studying picric acid.

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Conflict of Interest

The authors do not have any conflict of interest.

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