

12. Chemistry: Playing a Major Part in Our Everyday Life

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Abstract:

Every day, we encounter chemistry in daily life. However, we may struggle to recognize it in our daily routine. Chemistry is used in daily life for numerous tasks, including eating safe foods, boiling water to kill bacteria, using antibacterial soap etc., Chemistry is playing a major part in our everyday life. We start the day with Chemistry. One can find chemistry in the food we eat, the air we breathe, the water we drink, our emotions and drugs. Our body is made up of chemical compounds, which are combinations of elements. The emotions that we feel are basis in chemistry.

12.1 Introduction:

Chemistry is a platform of central science, underpinning fundamental aspects of range of emerging sciences. On the positive side the knowledge and products contribute by chemistry providing source of energy, a host of material including polymers, plastic, semiconductors and solid state display devices; agents for crop protection and plant growth.



Chemistry¹⁻⁴ plays an important role in the development of industrial, economic growth of every nation. On the planet earth the natural resources are very limited as per need of growing human population rate, due to over exploitation all the natural resources reach to its extinction stage. Innovation is needed to save these resources and improved technology can support efficient use of natural resources and can save resources. Scientific research and development are concerned with sustainable development. Chemistry is an inseparable part of human life. Understanding Chemistry in everyday life is important because:

- The food we eat, the cosmetics we use or the medicines we take, all of these undergo chemical reactions.
- It can help you make decisions related to a wide range of things like watering plants based on seasons, choosing the right medicine for acidity, applying a particular sunscreen, etc.
- It helps you understand which element your body needs more.



Chemistry has its roots well-settled in almost every aspect of our lives. It is so intricately involved in various processes; we fail to notice them at times. So, here are some interesting examples explaining the role of chemistry in everyday life: Chemistry is a significant part in plants. Photosynthesis is one of the initial concepts we caught hold of about plant life. It is nothing but a chemical process through which some plants make their food. The leaves look green is because of the presence of a pigment called Chlorophyll.

Right from chewing to digestion, many chemical reactions take place. Once the food goes down to the stomach, it gets mixed with HCl which is released by the walls of the stomach. This makes it one of the most common examples of chemistry in everyday life⁵⁻⁹.

Sodium Chloride is not only helps in adding flavor to the food but also acts as an excellent preservative and thus is the perfect example to determine the use of chemistry in our lives. There are substances which can be dissolved in water (salt for example), and others that can't (for example oil). Water and oil don't mix together, so if we try to clean an oily stain from a cloth or from the skin, water is not enough. We need soap. Soap cleans by acting as an emulsifier. It allows oil and water to mix so that oily grime can be removed during rinsing. Soap cleans by acting as an emulsifier.



Sunscreen is an important cosmetic that saves us from harmful UV rays and preserves the natural complexion we have. Chemicals like TiO_2 present in the sunscreen block the rays and prevent them from further penetrating the deeper layers of the skin.

Chemicals are the basic building blocks of everything. All food is made of chemical molecules, including carbohydrates, vitamins, fats, proteins and fiber. Chemicals have a significant role in the production and storage of food. Chemicals used in food preservation have greatly benefited in keeping food fresher for longer. We frequently use talcum powder, lotions, fragrances and a variety of other cosmetic goods. All of these products were developed in laboratories using substances. Chemistry is essential for controlling the pH of our skin, keeping it healthy. There are many applications of chemistry in daily life. Chemistry is used all throughout the day, whether we realize it or not.

12.2 Brushing Teeth:

Let's start at the beginning of the day – you wake up, likely have a brush your teeth. Well, not only is your toothpaste made using chemistry and chemicals. Chemistry does a job, eliminating bacteria from your mouth and providing you with a clean, confident and white smile.

12.3 Drugs Are Essential Chemistry in Daily Life:

Often, have you got a headache? Just take ibuprofen and you'll likely be okay. Discovery of many drugs for the treatment of many diseases is the greatest achievement of chemistry for the modern life of human being. Discovery of Quinine for the treatment of Malaria and synthesis antibiotics to kill the germs, for example, discovery of Penicillin and Streptomycin drugs is regarded as greatest achievements of chemistry.

Medicines: Medicines are chemicals, useful in diagnosis, prevention and treatment of diseases. A dose consumed higher than the recommended can cause harm. The interaction between the drug and the target i.e. a part of the body is the major part of the action of a drug. Enzymes-the biological catalyst action serves as the best example for this interaction. These proteins named enzymes hold a major position in the communication system of the body. They are called as receptors which carry polar molecules across the cell membrane. Similarly, nucleic acids have codes for passing on the genetic information across various cells.

When drugs are taken, it either increases or decreases the enzyme catalyzed reactions. Enzyme inhibition is the role of a drug action. The drug is an enzyme inhibitor which inhibits the catalytic activity of enzymes or blocks the binding site which eventually prevents the binding of substrate with enzyme. However, this wouldn't be possible without chemistry in daily life.



Figure 12.1: Medicines

A. Analgesics:

- Analgesics are used as pain-killers. Aspirin is an important analgesic. Many hypnotic and anesthetic medicines also have analgesic properties, e.g. Morphine.
- Aspirin should not be taken in empty stomach, because it increases acidity in the stomach, due to which inner membrane can get wounded and starts bleeding.

B. Antipyretics:

- Antipyretics are used to prevent fever. Aspirin has antipyretic property along with analgesic property. Other antipyretic medicines are phenacetin and paracetamol.

C. Tranquillizers: These medicines give relief from tension. They are main components of hypnotics.

D. Antibiotics:

- Antibiotics are the compounds which are prepared by microorganisms and which restrict growth of the other microorganisms. In the year 1929, Alexander Fleming first discovered the antibiotic medicine penicillin from *Penicillium notatum* fungi.

Drugs work mainly because of chemistry contained in these drugs bind to the receptors in our body, changing our perception of pain and acting to block these transmitters.

12.4 Waste Management:

Waste management is global challenge because of significant fraction of greenhouse emissions generated by improper waste disposal, and a priority to be addressed to ensure sustainable treatment and consumption of the waste. The usage and reproduction of the chemicals produces reduced waste products, non-toxic components and improved quality. Green chemistry is a highly effective motivation in pollution prevention because it applies innovative scientific approaches in real-world environmental situations. Non-biodegradable but recyclable waste: The predominant non-biodegradable waste is plastic. The raw material for the manufacture of plastic items constitutes resins. These resins consist of thousands of particles which melt into syrupy liquid then heated and can be shaped into almost any form. Although various types of plastic may look same, they are quite distinct groups of material of different molecular structure. The plastic garbage collected from the cities, villages, factories are brought to plastic recycled unit and make the product of different use. The other recyclable but non-biodegradable garbage are nonferrous metal. Lead is one of the toxic wastes all over the world. Lead storage batteries are used to provide power for electrical system of automobiles electronic instruments, computers, etc. The waste cells are sent to the places where disposal and processing cost are lower from the lead scrap. Lead plates are generated by heating with coal. These new lead plates so produced are used to make new storage cells. Phasing out is the best solution to eliminate the risk of lead pollution in environment. The alternative medium of KOH with Ni-Cd electrodes or Ag-Zn electrodes, Ni/Nickel Hydroxide as anode and finally divided iron as cathode called Ni-Fe cell have been introduced. Silver- zinc cell and Ni-Fe cell are being used in aero plane all over the world. The most promising use of waste paper is the conversion of material to energy.



Figure 12.2: Waste Management

12.5 Conclusion:

Without chemistry life is not possible. Therefore, chemistry is the great way to know the life in a better way. If anyone think chemistry before doing something, it would be helpful to anyone. The Nobel prize in chemistry 2019 was awarded John B. Goodenough, the university of Texas at Austin, USA, M. Stanley Whittingham Binghamton University, State University of New York, USA and Akira Yoshino of Asahi Kasei

Corporation, Tokyo, Japan Meijo University, Nagoya, Japan for the development of Lithium-ion batteries which are used globally to power the portable electronics that we use to communicate, work, study, listen to music and search for knowledge. Lithium-ion batteries have also enabled the development of long-range electric cars and the storage of energy from renewable sources, such as solar power. The Royal Swedish academy of science declared the Nobel Prize of 2020 in chemistry to the scientist Emmanuelle Carpenter of France and Jennifer a Doudna of the U. S for the development of DNA snipping scissors a method for genome editing, (rewriting the code of life). This technique can have used to change the DNA of animals, plants and microorganism with extremely high precision. This technology can revolutionarily impact on the life sciences and contributing to new cancer therapies and curing inherited diseases. The Nobel prize in chemistry 2021 was awarded jointly to Benjamin list and David W.C Mac Millan for the development of asymmetric organ catalysis this catalyst is an ingenious tool for building molecule. This research can greatly impact on pharmaceutical field and made chemistry greener. This means that these catalysts are both environmentally friendly and cheap to produce, it can be used to drive multitudes of chemical reactions, using these reactions researchers can construct more efficiently anything from new pharmaceuticals to molecule that can capture light in solar cells. The Nobel Prize in Chemistry 2022 was awarded jointly to Carolyn R. Bertozzi, Morten Medal and K. Barry Sharpless for the development of click chemistry and their research is particularly important for the simplification and removal of waste during chemical reactions. They brought foundations of click chemistry. They share the prize with Carolyn Bertozzi, who took click chemistry to a new dimension and began using it to map cells contributing to more targeted cancer treatments. All the above-described research in chemistry has greater importance and it can help humans to solve a number of existing problems in all the fields of science, technology and innovations in Chemistry which has a greater influence on human life that can change the world.



Figure 12.3: Chemistrys

12.6 References:

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