



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

THE MAGIC OF CHEMISTRY

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Chemistry is a significant part of everyday life. All that we come across every day has some form of chemistry deeply entrenched in it. Be it as easy a task as blinking to any complicated, obvious chemical reaction. Chemistry governs us. We humans are, consciously or unknowingly, surrounded by chemistry. Morning to night, life to death, it's a huge part of our day-to-day life. One may think that it is a branch of science that deals only with chemicals in the laboratory, but it is unknowingly implemented in everyday work. We begin each day with Chemistry and you can find chemistry in the things we eat, the air we breathe, the cleaning of chemicals, our emotions and practically anything we can see or touch. Our body is made up of chemical compounds, which are a mixture of components. Thoughts and feelings that you experience are the product of chemical messengers, mainly neurotransmitters. Love, jealousy, resentment, obsession and infidelity all share the foundation of chemistry.

They sit there, looking so innocuous at the kitchen table. But as soon as we slice the onion, the tears roll down. What's in the onion that makes our eyes burn? Everyday chemistry is the guilty party here. Soap is a chemical that humans have been producing for a very long time. You can make a raw soap by combining ash and animal fat. How can such a poor thing possibly make you a cleansing product? The answer has to do with how soap deals with oil-based grease and grime.

In order for all living creatures to work and survive, their bodies undergo different chemical processes. Most of these include: respiration, digestion, the development of new cells, the filtration and release of toxic wastes from their bodies, reproduction, etc., so basically all living organisms rely on chemical reactions to work and thrive.

Now let's see how chemistry is around us in our everyday lives:

• THE MORNING CHEMISTRY:

Toothpaste: Have you ever wondered where toothpaste and mouthwash came from? Or what chemicals are in the paste that cleans and shines our teeth and preserves them from germs? So, the thing we use as soon as we wake up is a big contribution to chemistry, toothpaste consists of Fluoride, Triclosan or zinc chloride, Chlorohexidine, Saccharin, Carrageenan, Aspartame, Parabens, Sodium Lauryl Sulfate & Sodium Laureth Sulfate, a foaming agent and Propylene Glycol.

Soap/detergent: There are substances that can be dissolved in water (salt, for example) and those that cannot be dissolved (for example oil). Water and oil don't match, even if we try to clean the oily stain from the fabric or the skin, it's not enough. We need some soap. Because of this dualism, soap molecules behave like negotiators, strengthening the bond between oil and water. How is that? When soap is introduced to the water, the hydrophilic heads of its molecules remain in the water, while the long hydrophobic chains are joined by the oil particles and remain within. In this way, they form circular groups called micelles, with oily material absorbed inside and trapped throughout. Soap cleanses by serving as an emulsifier. It also allows oil and water to blend in such a way that the oily grime can be separated during the rinsing process.

- CHEMISTRY ON THE BREAKFAST TABLE:

We've all used raising agents for cooking and baking, but do you know the chemistry involved? There are two raising agents used in most products, yeast and baking powder. Yeast is a micro-organism that produces the enzyme zymase that transforms the sugars in the bread to carbon dioxide and ethanol. Gluten in bread is a fibrous substance that spreads up the bread and traps carbon dioxide in an elastic structure. Yeast grows in a warm setting, so that the bread is kept warm before it rises. When put in a hot oven, the yeast initially increases the output of carbon dioxide, and then dies as the temperature rises. The carbon dioxide trapped in the bread extends, and the bread grows even more. The taste comes in part from the ethanol developed by the yeast.

Coffee makes the morning fresh and energetic. The explanation for that? Caffeine. Caffeine is a central nervous system (CNS) stimulant, the heart muscle stimulates the heart rate, and the respiratory system calms air passages allowing better inhalation and making it easier for certain muscles to expand. It functions as a diuretic, raising the rate of excretion of the body's urine and delaying exhaustion by avoiding sleepiness and enhancing wakefulness.

- THE KITCHEN CHEMISTRY:

Why do onions make us cry? There are certain chemical compounds within the cells of the onion that contain sulphur. As we slice the onion, its cells are split and the chemical compounds undergo a reaction that turns them into more toxic sulphur-free substances that are released into the air. These sulphur-treated compounds react with the moisture in our eyes forming sulphonic acid, which causes a stinging pain. The nerve endings in our eyes are very sensitive, so they pick up the discomfort. The brain responds by asking our tear ducts to make more water, to dissolve the unpleasant acid.

We all love cooked food and a lot of us cook every day, but have we ever thought about the chemistry of cooking? Cooking makes food easier to digest and better to consume because it kills microorganisms in food. However, certain nutrients in food, such as vitamin C, can also be lost, so it is important to balance making food easier to digest and taste better, without losing the essential nutrients that we need.

Sugars that we use are carbohydrates, table salt is NaCl, water is dihydrogen oxide. The essential needs of our body are carbohydrates, proteins, fats and lipids, which are chemicals. Artificial sweeteners Aspartame and sucrose are again chemicals.

Foods have both an acidic and a basic substance. Citrus fruits, lemons, apples, soft aerated beverages are all acidic, while eggs, cakes and biscuits are basic in nature.

- CHEMISTRY IN SMOKING:

Smokers don't care about the chemistry in cigarettes. They're just thinking about how cigarettes help them cope with the stress of their everyday lives, how cigarettes calm them when they're upset, help them cope at the end of a long day, and comfort them when they're bored or lonely. But do they know there's a toxic chemical in the cigarette? When one smokes, nicotine is absorbed through the skin and mucosal lining of the mouth and nose or through inhalation in the lungs. Nicotine raises the amount of the neurotransmitter dopamine in the brain, a hormone responsible for feelings of joy. The harmful effects of nicotine subside within minutes, meaning that people have to take repeated doses during the day to retain the satisfying effects of nicotine and to avoid symptoms of withdrawal.

- Let's see the chemistry involved in a drink to celebrate joy or to overcome sorrow:

There are three types of alcoholic beverages, beer, wine and spirits. All of these alcoholic beverages contain ethanol, C₂H₅OH, which is one form of alcohol. Alcohol's direct effect on the brain is like a depressant. It reduces the operation of the nervous system. Alcohol can induce dysregulation, i.e. inhibit cells and brain circuits that are normally inhibitory. Over 90% of the ethyl alcohol that enters the body is completely oxidised to acetic acid. This process occurs predominantly in the liver. The majority of the alcohol is not metabolised and absorbed either in the sweat, in the urine or in the breath. There are several mechanisms of ethyl alcohol metabolism in the body. The main pathways are the liver and, in particular, the oxidation of ethyl alcohol by alcohol.

- CHEMISTRY WHILE ENDING YOUR DAY:

There is a chemical in our brain called adenosine that binds to certain molecules and slows down the activity of the nerve cells as we sleep. And when it comes to love, there is an attraction. Non-verbal communication plays a large part in the initial attraction, and some of this communication can take place.

It also involves a pheromone as a form of chemical communication. Raw lust is marked by a high level of testosterone. Sweaty palms and a beating heart of love are caused by higher-than-normal levels of norepinephrine. In the meantime, the 'high' of falling in love is attributed to a surge of phenylethylamine and dopamine.

As a whole, one can see that chemistry is everywhere in daily life. Existence is not possible without chemistry. Chemistry, therefore, is a perfect way to know life better. If anyone thinks about chemistry before they do anything, it will be beneficial to everyone. Chemistry, thus, can be pleasing to everyone.

