Perfumes

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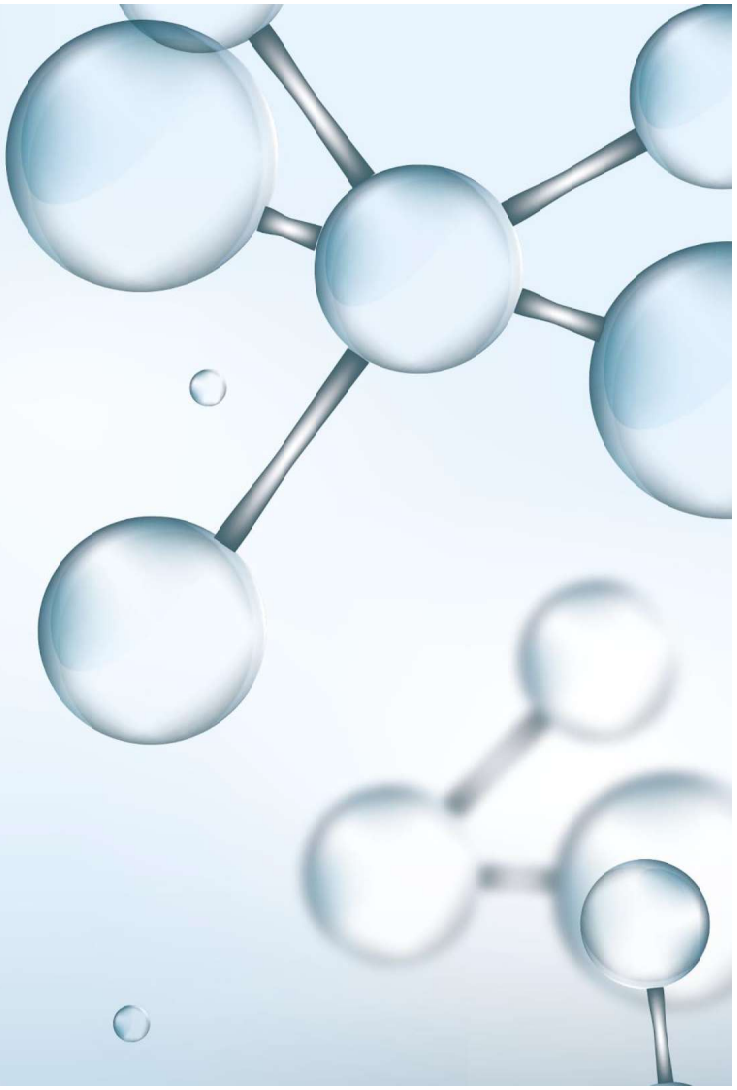
INTRODUCTION

The word perfume in derived from the latin word per means "Through" and fume means "Smoke". Perfume is a mixture of fragrance essential oils and aroma compounds, fixatives and solvents used to give human body objects and living spaces a pleasant smell. The word perfume is of thousand years old.

Perfume is associated in many cultures with the essential sensual of life.



HISTORY

Since the beginning of recorded history, humans have attempted to mask or enhance their own odour by using perfume, which emulates nature's pleasant smells. Many natural and man made materials have been used to make perfume to apply to the skin and clothing, to put in cleaners and cosmetics or to scent the air.

The Egyptians were the first to incorporate perfume into their culture followed by the ancient Chinese, Hindus, Israelites, Arabs, Greeks. Perfume came into wide spread among the monarchy.

France's king Lousis X1V used too much perfume that he was called the 'Perfume king'. His court contained a floral pavilion filled with fragnances, and dried flowers were placed in bowls throughout the palace to freshen the air. Visitors were often doused with perfumes which also was sprayed on clothing, furniture, walls, and tablewear.

Perfume Types

Perfumes are the first use of raw materials. These sources of raw materials is very broad,

- Flowery
- Mixed fruit
- Plant
- Fragrance
- Oriental
- Forest

Animal substances are often used as fixatives that enable perfume to evaporate slowly and emit body odors longer.

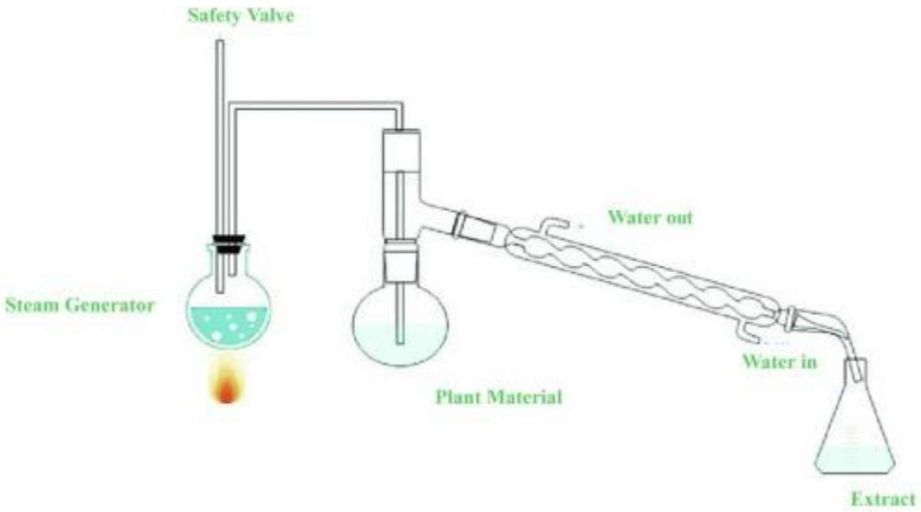
Alcohol and sometimes water are used to dilute ingredients in perfumes.

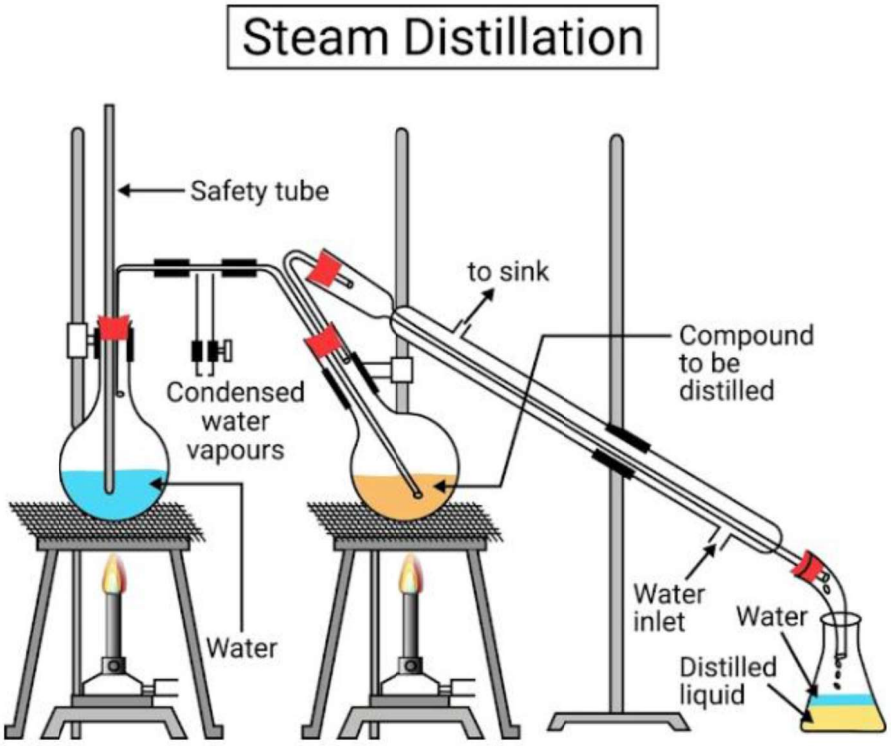
Manufacturing

- Extraction:

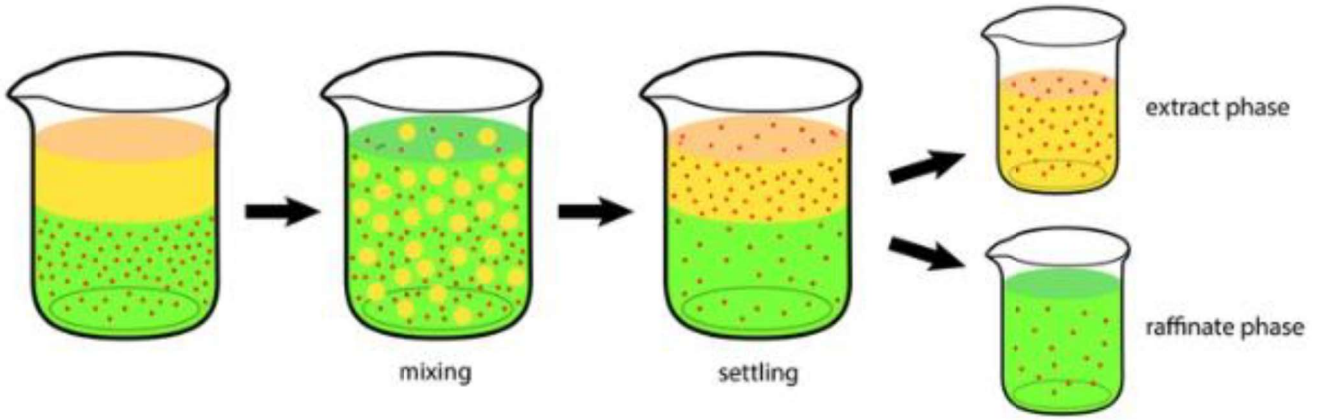
1. **In steam distillation**, steam is passed through plant material held in a still, whereby the essential oil turns to gas. This gas is then passed through tubes, cooled, and liquefied. Oils can also be extracted by boiling plant substances like flower petals in water instead of steaming them.

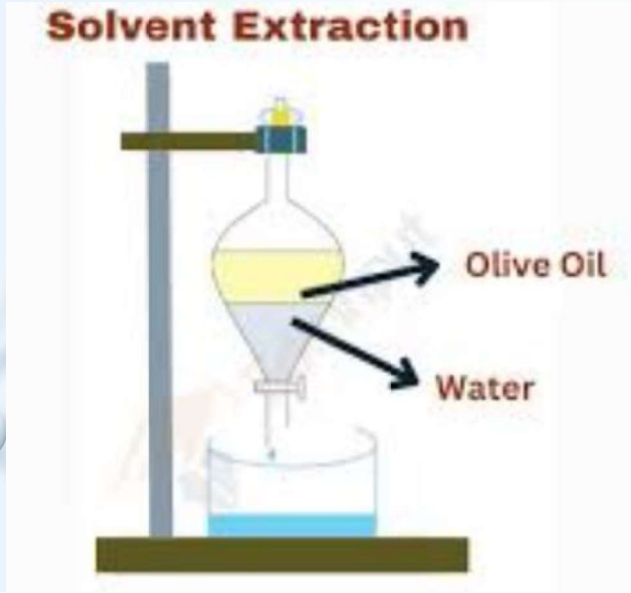
2. **Under solvent extraction,** flowers are put into large rotating tanks or drums and benzene or a petroleum ether is poured over the flowers, extracting the essential oils. The flower parts dissolve in the solvents and leave a waxy material that contains the oil, which is then placed in ethyl alcohol. The oil dissolves in the alcohol and rises. Heat is used to evaporate the alcohol, which once fully burned off, leaves a higher concentration of the perfume oil on the bottom.





Principle of Steam Distillation


extract phase
raffinate phase
mixing
settling


Solvent Extraction
Olive Oil
Water

Manufacturing

3. During **enfleurage**, flowers are spread on glass sheets coated with grease. The glass sheets are placed between wooden frames in tiers. Then the flowers are removed by hand and changed until the grease has absorbed their fragrance.

4. **Maceration** is similar to **enfleurage** except that warmed fats are used to soak up the flower smell. As in solvent extraction, the grease and fats are dissolved in alcohol to obtain the essential oils.

5. **Expression** is the oldest and least complex method of extraction. By this process, now used in obtaining citrus oils from the rind, the fruit or plant is manually or mechanically pressed until all the oil is squeezed out.

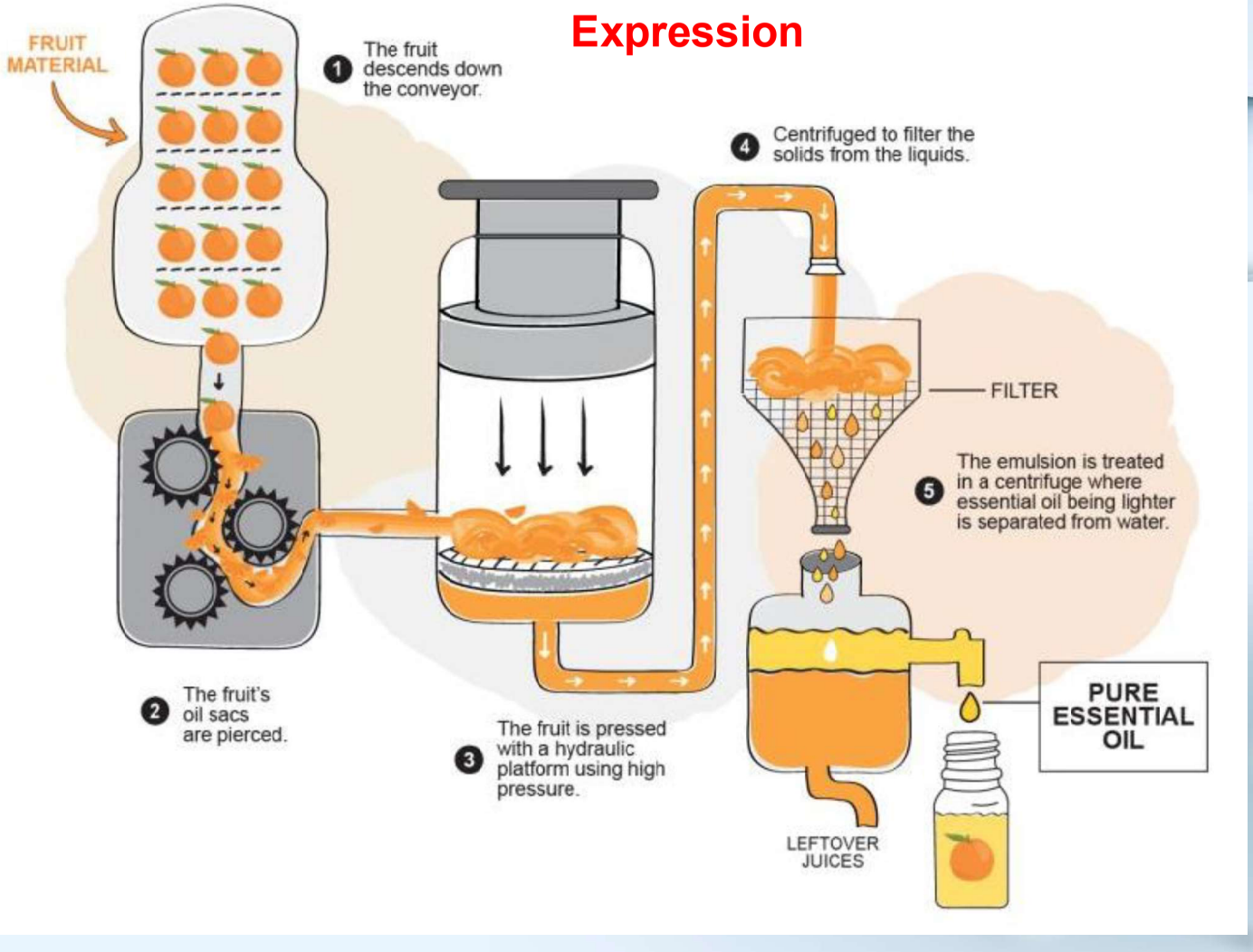
ENFLEURAGE: METHOD

A glass plate is covered with a thin coating of especially prepared and odourless fat (called a chassis).

The freshly cut flowers are individually laid on to the fat which in time becomes saturated with their essential oils. The flowers are renewed with fresh material.

Eventually the fragrance-saturated fat, known as pomade, may be treated with alcohol to extract the oil from the fat.

Expression


FRUIT MATERIAL
1 The fruit descends down the conveyor.
2 The fruit's oil sacs are pierced.
3 The fruit is pressed with a hydraulic platform using high pressure.
4 Centrifuged to filter the solids from the liquids.
FILTER
5 The emulsion is treated in a centrifuge where essential oil being lighter is separated from water.
PURE ESSENTIAL OIL
LEFTOVER JUICES

Manufacturing

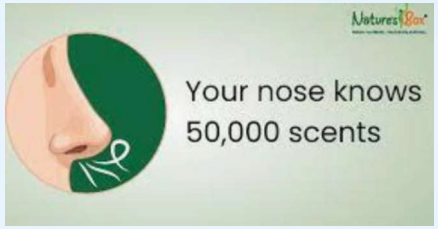
- Blending:

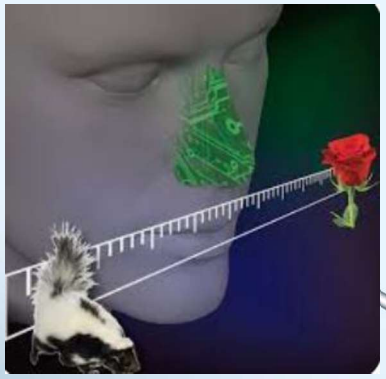
Once the perfume oils are collected, they are ready to be blended together according to a formula determined by a master in the field, known as a "nose."

After the scent has been created, it is mixed with alcohol. The amount of alcohol in a scent can vary greatly. Most full perfumes are made of about 10-20% perfume oils dissolved in alcohol and a trace of water.

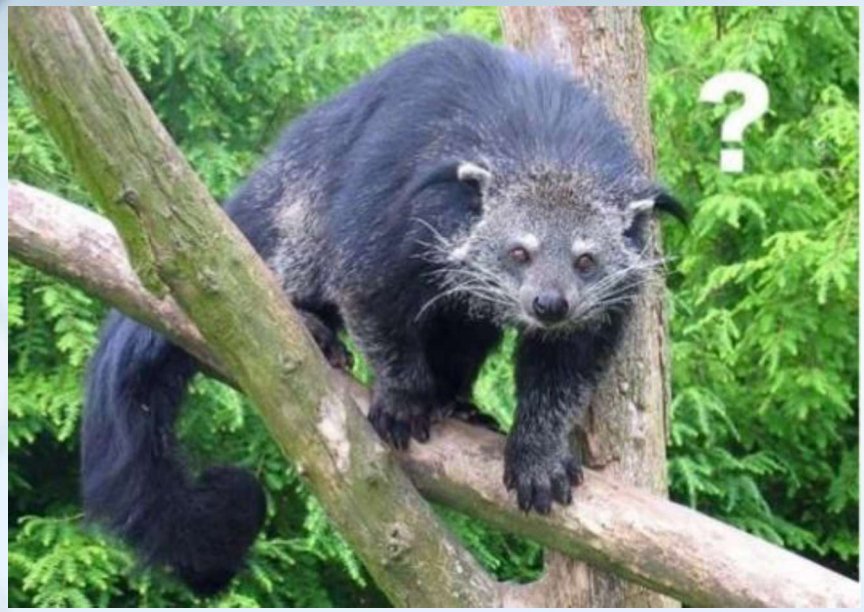
- Aging

Fine perfume is often aged for several months or even years after it is blended. Following this, a "nose" will once again test the perfume to ensure that the correct scent has been achieved.





Perfume Sources



- **Plant sources**: Bark, flowers, leaves, twigs, fruits, seeds, roots, resins, woods.
- **Animal sources**: Honeycomb, Castoreum-North American Beaver, deer musk, Civet, Ambergis-Whale.
- **Other natural sources**: seaweed, etc.
- **Synthetic sources**

Adverse Effects Of Perfume

- Skin problems.
- Lung diseases.
- Affects the brain as well.
- Cause instant headaches, dizziness and neausea.
- Sinus, watery eyes, inability to focus mentally.
- Absorbed by the skin and introduced into the blood stream.
- The widespread use and vast number of fragranced products cause extensive indoor and outdoor pollution.
- They are persistent and accumulate in different compartments of the environment.

Precautions

- Do not use perfumes internally.
- If you have a highly sensitive skin, please consult with a physician before use.
- Before applying any perfume or the body oils to the skin, always test a small area of skin for any adverse reactions.
- Use caution when using perfumes that contain citrus oil. They can irritate sensitive skin.
- People with asthma should avoid using essential oils.
- Keep perfumes out of the reach of children and pets.
- Check the expiry date of perfumes before buying so that there wont be any side effects later.


THANKS

Incense Sticks

What are incense sticks made of?

The aromatic materials used for making incense are typically plant-based and can include a variety of resins, barks, seeds, roots, and flowers. The specific ingredients used in incense can vary by region and manufacturer. Some specific examples of aromatic ingredients that you may recognize include:

- Musk (gland in the abdomen of a musk deer)
- Myrrh (resin from the tree barks of the genus Commiphora)
- Cinnamon (spice)
- Frankincense (another resin from the bark of certain trees)
- Patchouli oil
- Sandalwood
- The combustible binding material ignites and burns the remaining materials, producing smoke and aroma. Example: Coal, Wood Powder/chips

Musk

Myrrh

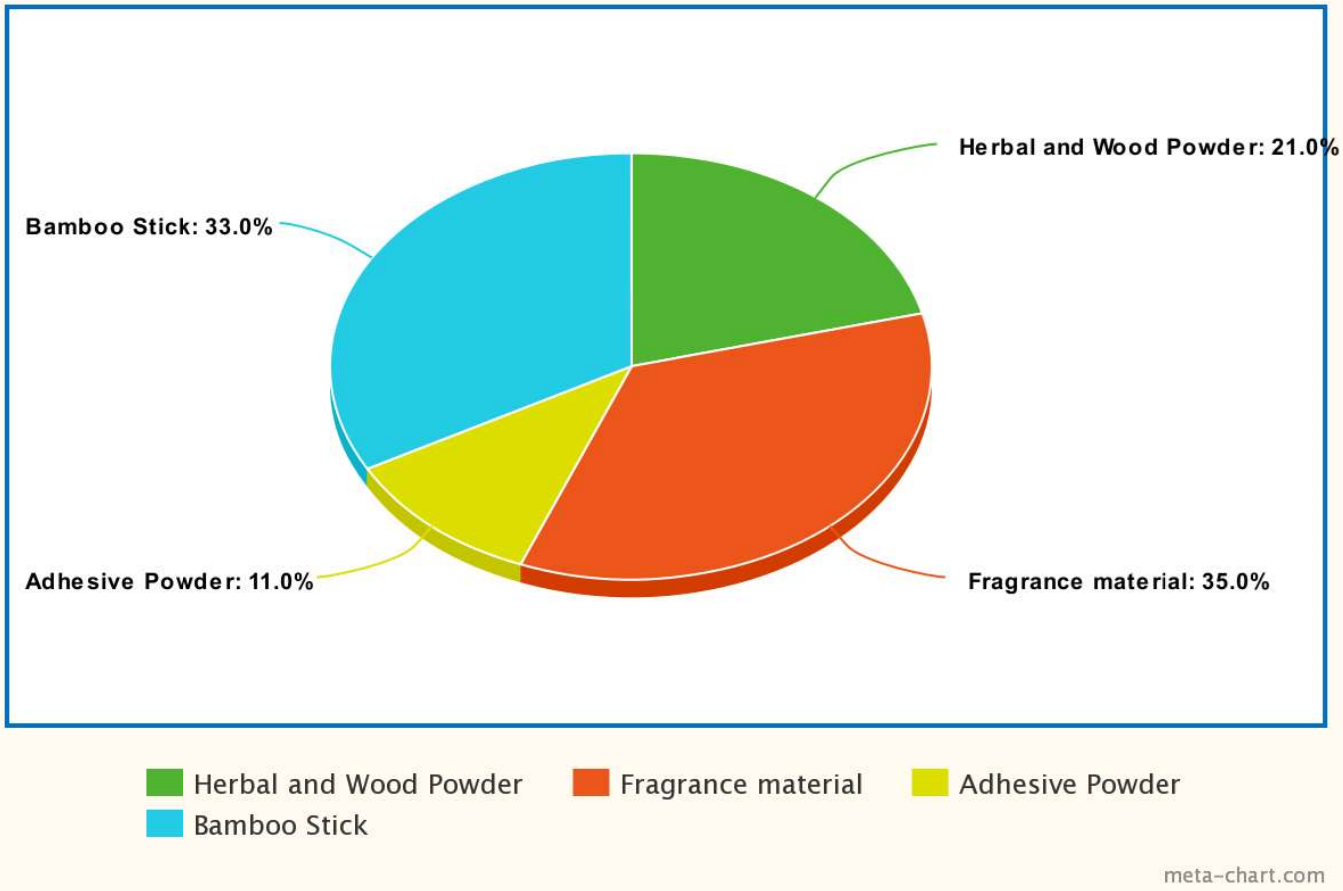
Frankincense

Patchouli

Coal

Wood Powder

Composition of Incense Stick:



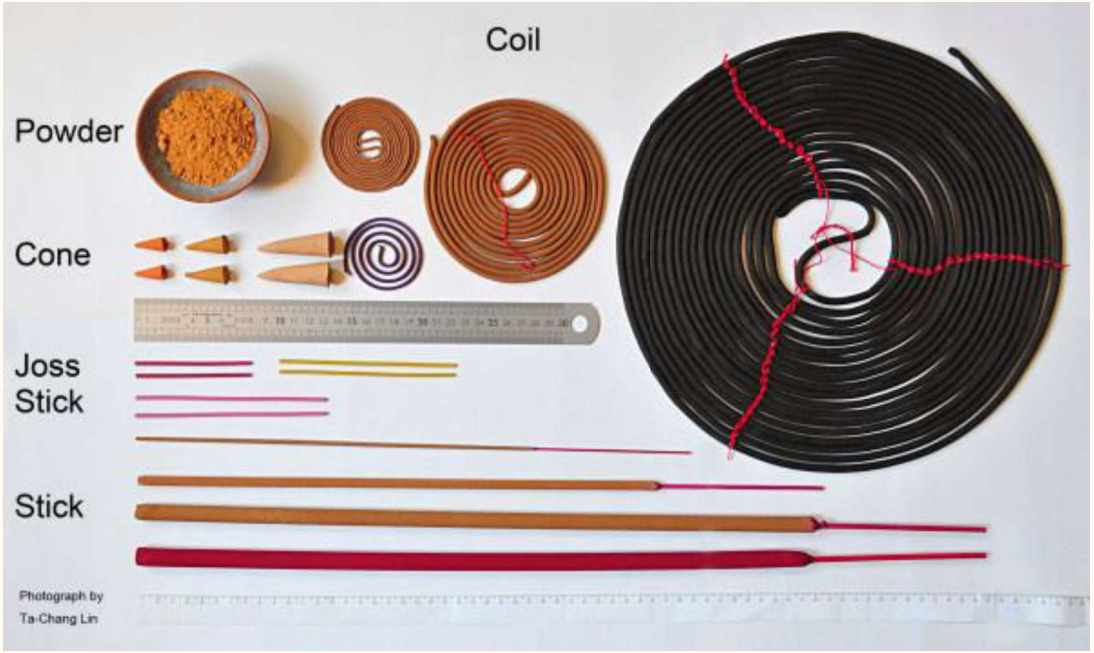
What happens when you burn an incense stick?

- The combustible material added in the composition of the incense ignites.
- It burns and also burns the other materials used in the incense.
- All the materials burn together to give aromatic smoke i.e. Patchouli, Myrrh, Musk, Cinnamon, Frankincense
- The smoke spreads, generating a pleasant smell in the room/premises

Uses of incense sticks

Over the centuries and into the present day, people throughout the world have used incense for a variety of reasons:

- There are various forms of incenses, like sticks, joss sticks, cones, coils, powders, rope, rocks/charcoal, and smudge bundles.



- A 2008 study in mice identified a compound in frankincense that could cause a response similar to an antidepressant.
- This was found in the areas of the brain associated with anxiety and depression.
- It also activated receptors associated with a feeling of warmth.
- Indian incense-based industries add diethyl phthalate (DEP) to the powder paste in order to ensure the reduction of smoke released from the incense sticks burning.
- Component of various religious practices, majorly in India and other South-east countries.
- Tool to counteract bad or disagreeable odors.

What are the side effects of using incense sticks?

Side Effects:

- Incense smoke (fumes) contains particulate matter (PM), gas products and many organic compounds.
- Incense burning produces particulates greater than 45 mg/g burned as compared to 10 mg/g burned for cigarettes.
- Gases like CO, CO_2, NO_2, SO_2, and others are produced from incense burning.
- Inhalation of CO in low concentrations can cause headaches, dizziness, weakness, and nausea, while high concentrations can be fatal.
- Incense burning also generates Volatile Organic Compounds (VOCs) such as benzene, toluene, and xylenes, as well as aldehydes.
- VOC exposure causes cancer, liver damage, kidney damage, central nervous system damage and so on.
- Incense smoke is a risk factor for elevated cord blood IgE levels and has been indicated to cause allergic contact dermatitis.

Side Effects:

- Aldehydes affect nasal mucous membranes and oral passages, producing a burning sensation, bronchial constriction, choking, and coughing.
- Some studies related to diseases correlated to incense smoke inhalation:
  - A 2008 study of adults in Singapore - increased risk for developing squamous cell lung cancer.
  - A 2009 study of children in Oman - triggers wheezing in asthmatic children
  - A 2015 study - incense smoke components toxic to cultured cells at lower concentrations than cigarette smoke.
  - A 2017 study in Chinese adults - increased risk of high blood pressure.
  - Recent research - incense burning associated with worse cognitive performance and decreased brain connectivity.

Alternatives to Incense Sticks

Incense has been used for thousands of years with many benefits. However, studies are showing incense can possibly pose dangers to health. Alternatives for incense are as follows:

- Essential Oil diffusers
- Candles without lead-core wicks
- Natural home deodorizers
- Scented Candles and Fragrance Oils

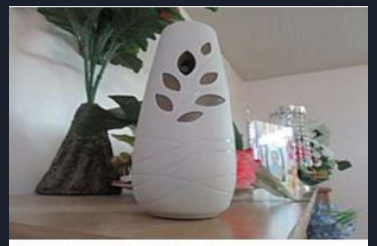
Air Freshener

What are “Air fresheners”?

- Odour, something that makes everyone turn on on each other. It drives our noses crazy to the point that we are searching for the culprit of the foul smell. But no matter who dragged their hockey bag through the kitchen or whichever dog had an accident on the carpet or even if someone tried to cook . It’s not their fault-it’s the molecules.
- Air fresheners are consumer products that typically emit fragrance and are used in homes, restrooms hallways, medical facilities, public arenas, and other large interior spaces.
- Car fresheners are used in automobiles. As a source of odors, specific deodorizing blocks are made for toilets and urinals.

Air fresheners from Febreze

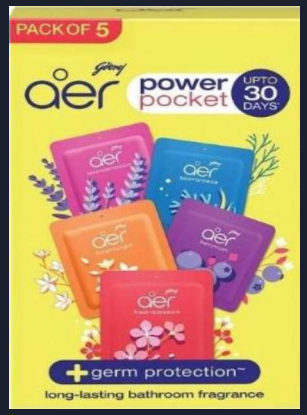

A basic gel fragrance air freshener


An automatic air freshener

History

- ✓ The first modern air freshener was introduced in 1948. Its function was based on a military technology for dispensing insecticides and adapted into a pressurized spray using a chlorofluorocarbon (CFC) propellant.
- ✓ The product delivered a fine mist of aroma compounds that would remain suspended in the air for an extended period of time.
- ✓ This type of product became the industry standard and air freshener sales experienced tremendous growth during the 1950s.
- ✓ In the 1980s, the air freshener market shifted away from aerosols, due to concerns over the destruction of the ozone layer by chlorofluorocarbons (CFCs).
- ✓ Many other air freshener delivery methods have become popular since, including under the seat wafer air fresheners, scented candles, reed diffusers, and heat release products.

- **What are the best room freshener brands in India ?**
  Godrej, Odonil, Airwick, Ambi Pur, Febreze, and Ru Baru are some of the best selling room fresheners in India.
  Valued to be $11.9 Billion by 2026, Air Fresheners Slated for Steady Growth Worldwide.



General Mechanisms for Odour Control

- Adsorption: Adsorbents like zeolite, activated charcoal or silica gel may be use to remove odours.
- Oxidation: Ozone, hydrogen peroxide, peroxide, chlorine, chlorate and other oxidizing agents can be used to oxidize and remove organic sources of odors from surfaces and, in the case of ozone, from the air as well
- Air sanitizer: Odors cause by airborne bacterial activity can be removed by air sanitizers that inactive bacteria.
- Surfactants and Soaps
- Masking: Overwhelming an odor with another odor by any of the means described above.

Delivery of Mechanisms Classification

Continuous action

- devices which use a candleflame or some other **heat source** to heat and vaporize a fragrance formulation
- wall plug-ins which either use **piezoelectric technology** to aerosolize fragrance or heat to vaporize it
- gels which release fragrance as **the gel evaporates** sometimes with the help of an electric fan.
- floor wax, paper, plastics, wood which release fragrance by off gassing.
- nebulization systems which convert liquid fragrances into a vapor in a cold process without the use of heat.

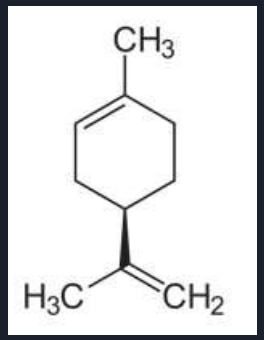
Instant action

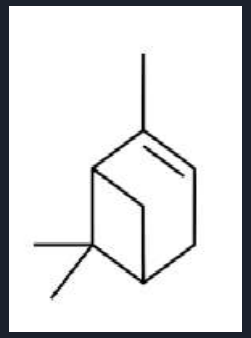
- aerosol sprays, or atomizers
- The **aerosol spray** uses a propellant and fragrance packaged under pressure in a sealed metal or glass container with a valve
- These droplets are 30 to 50 micro meters in diameter
- The **atomizer** is a glass, metal or plastic container of fragrance which operates in a similar fashion except that the actuator is a pump
- The mist created contains droplets 50 to 150 micro meters in diameter
- "bag-on-valve" technology

Chemistry Behind Air Fresheners

Fragrances

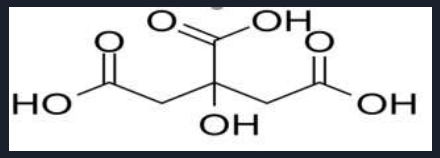
- ✓ Air Freshener aroma compounds mask the bad smell.
- ✓ Includes Terpenes such as limonene and α-pinene



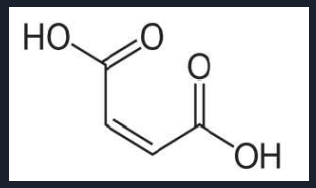


Odor Neutralizing

- ✓ Uses organic acids to break them to benign compounds
- ✓ Citric acid

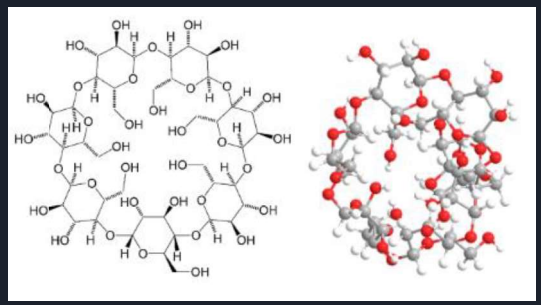


- ✓ Maleic Acid



Odor Trapping

- ✓ Cyclodextrins are ring shaped molecules.
- ✓ Odor molecules caged within cyclodextrins cavity.

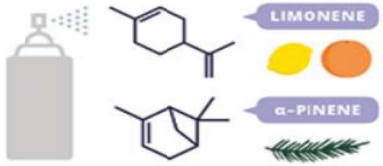


HOW AIR FRESHENERS WORK

Some air fresheners just mask bad smells, while others claim to eliminate odors completely. Here, we review the different types of compounds found in air fresheners and how they combat stench.

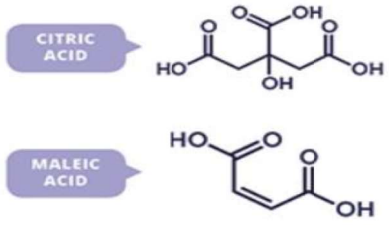
FRAGRANCES

Air freshener aroma compounds mask bad smells. They include terpenes such as limonene and α-pinene. Some people have expressed concern that these can react with ozone to produce formaldehyde, a carcinogen.



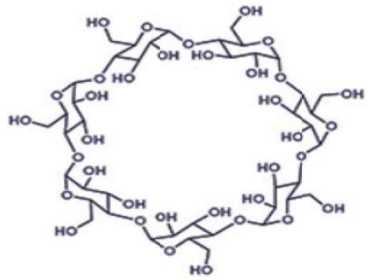
ODOR NEUTRALIZING

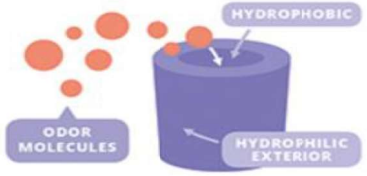
Some air fresheners use organic acids, which can react with smelly compounds to break them down to more benign molecules.



ODOR TRAPPING

Cyclodextrins are ring-shaped molecules made from cornstarch. Odor molecules get caged within cyclodextrin's cavity, stopping them from reaching your nose.





Hydrophobic odor molecules get trapped in cyclodextrin's hydrophobic center.

PERIODIC GRAPHICS

Toxicity

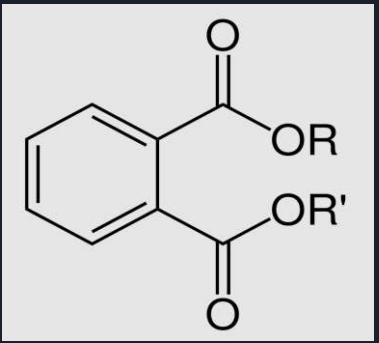
- ✓ Many air fresheners employ carcinogens, volatile organic compounds and known toxins such as phthalate esters .
- ✓ The Natural Resources Defense Council (NRDC) called for supervision of the manufacturers and their products, which are widely assumed to be safe: The study assessed scented sprays, gels, and plug-in air fresheners.
- ✓ Independent lab testing confirmed the presence of phthalates, or hormone-disrupting chemicals that may pose a particular health risk to babies and young children, in 12 of the 14 products—including those marked 'all natural.'
- ✓ Chemicals included acetone, the active ingredient in paint thinner and nail-polish remover; chloromethane, a neurotoxicant and respiratory toxicant; and acetaldehyde and 1,4-dioxane, both carcinogens.
- ✓ A plug-in air freshener contained more than 20 different volatile organic compounds, with more than one-third classified as toxic or hazardous under federal laws. Even air fresheners called "organic," "green," or with "essential oils" emitted hazardous chemicals, including carcinogens.

- ✓ In 2008, Anne C. Steinemann of the University of Washington published a study of top-selling air fresheners and laundry products. She found that all products tested gave off chemicals regulated as toxic or hazardous under federal laws, including carcinogens with no safe exposure level.

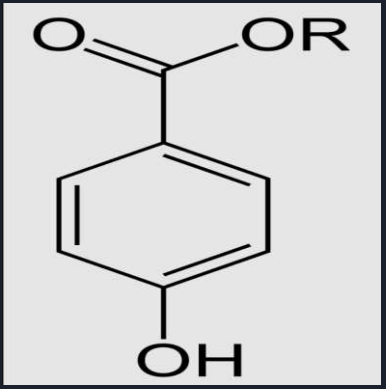
- ✓ In 2009, Stanley M. Caress of the University of West Georgia, found that nearly 20 percent of the general population and 34 percent of asthmatics report headaches, breathing difficulties, or other health problems when exposed to air fresheners or deodorizers.

- ✓ Research at the University of Colorado at Boulder revealed a probable mechanism for the carcinogenic effects of some types of air fresheners.

- ✓ 1,4-Diclorobenzene (1,4 DB): a VOC that may impair lung function. Impairment of lung function is of special concern for those who have asthma or other respiratory illnesses, especially children.
- ✓ Acetaldehyde: a probable carcinogen.
- ✓ Benzene: a known carcinogen and reproductive toxin.
- ✓ d-Limonene: associated with skin and eye irritation. This substance is a sensitizer, which means it's likely to increase the odds of a future allergic reaction.
- ✓ Formaldehyde: a known carcinogen.
- ✓ Parabens: linked to breast cancer and effects associated with hormone disruption.
- ✓ Phthalates: associated with effects from endocrine disruption, including damage to the female reproductive system, birth defects, and lower sperm counts.
- ✓ Styrene: associated with cancer and neurotoxicity.
- ✓ Toluene: linked to developmental and reproductive toxicity.
- ✓ Xylene: linked to the effects of central nervous system depression, like headache, dizziness, depression, and impaired short-term memory.



Phthalates



Parabens


DIY: Air Freshener Sprays
with Essential Oils
Basic Ingredients: 1 cup water; 8-10 drops essential oils
Deodorizing Room Spray
• 6 drops bergamot essential oils
• 1 drop eucalyptus essential oils
• 2 drops lemon essential oils
Pet Deodorizing Room Spray
• 6 drops cedarwood essential oils
• 3 drops tea tree essential oils
Apple Pie Spice Room Spray
• 6 drops cinnamon essential oils
• 3 drops clove essential oils
Orange Spice Room Spray
• 5 drops orange essential oils
• 2 drops cinnamon essential oils
Mood Lifter Air Freshner Spray
• 4 drops chamomile essential oils
• 3 drops orange essential oils
• 2 drops ylang ylang essential oils
Stress Reliever Air Freshner Spray
• 4 drops lavender essential oils
• 3 drops rose essential oils
• 2 drops clary sage essential oils (optional)
Bedtime Air Freshner Spray
• 4 drops lavender essential oils
• 3 drops chamomile essential oils
Directions:
1. Pour the cup of water into a spray bottle.
2. Add the drops of essential oils and shake well.
3. Cap the bottle, and allow to sit for a few hours before using.

The End

CHEMISTRY OF ANESTHESIA AND ITS WORKING PRINCIPLES

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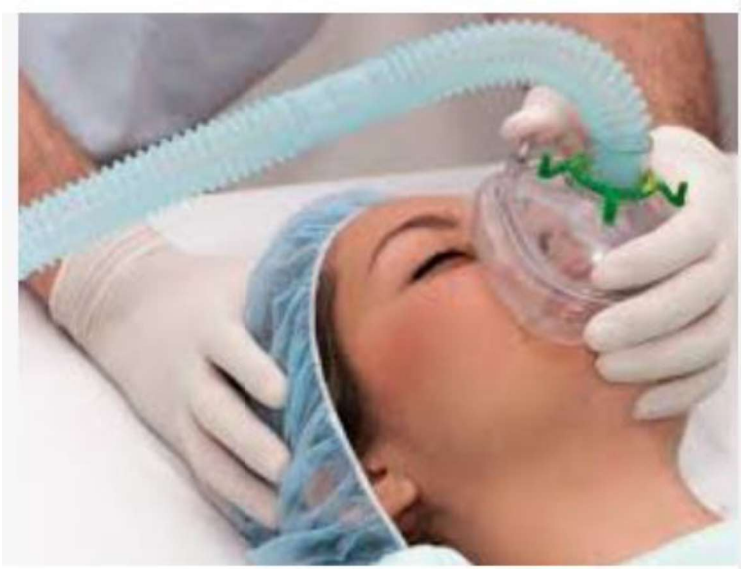
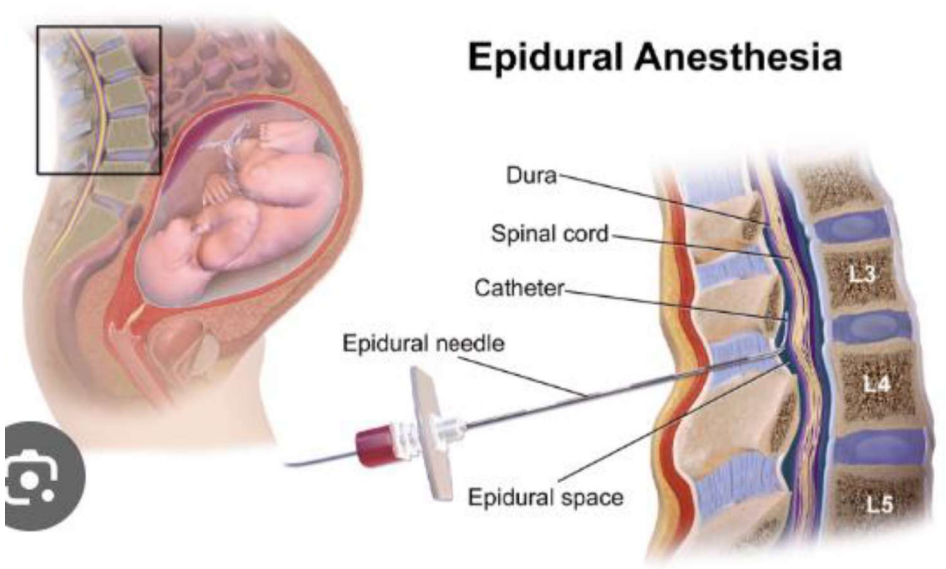
INTRODUCTION TO ANESTHESIA

- **Definition of anesthesia**: Anesthesia is a state of controlled unconsciousness or loss of sensation induced for medical purposes, including surgery and medical procedures.
- **Importance in medical procedures**: Anesthesia allows for painless surgeries, reduces patient discomfort, and enables surgical teams to perform procedures safely and effectively.
- **Brief history**: The use of anesthesia dates back to ancient civilizations, with early methods including herbal remedies and alcohol-induced unconsciousness. Modern anesthesia techniques have evolved significantly, leading to improved patient outcomes.

TYPES TO ANESTHESIA

- **General Anesthesia**: Induces unconsciousness and loss of sensation throughout the entire body, allowing for complex surgical procedures to be performed without pain or awareness.
- **Regional Anesthesia**: Blocks sensation in a specific region of the body, such as epidural anesthesia for childbirth or nerve blocks for orthopedic procedures.
- **Local Anesthesia**: Temporarily numbs a small, specific area of the body, often used for minor surgical procedures or dental work.

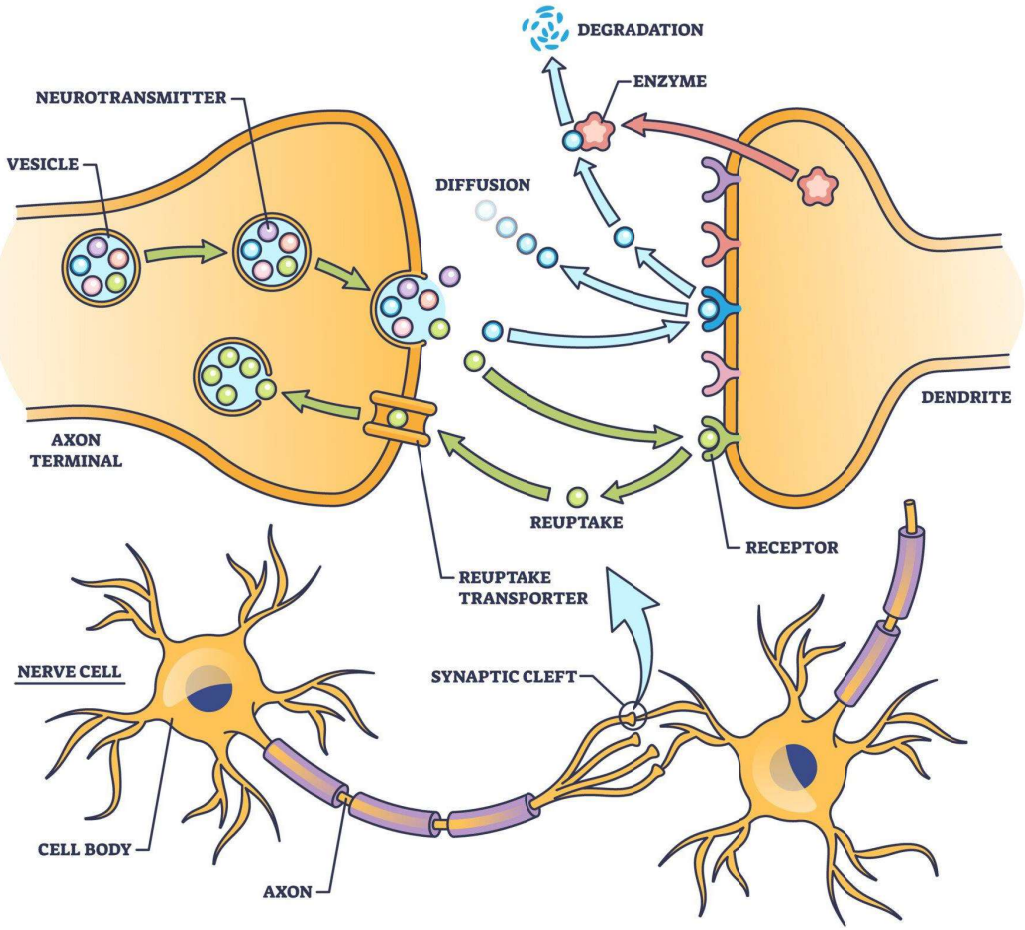



Epidural Anesthesia
Dura
Spinal cord
Catheter
Epidural needle
Epidural space
L3
L4
L5

CHEMISTRY OF ANESTHETIC AGENTS

- **Molecular structure of anesthetic agents**: Anesthetic agents vary in chemical structure, including ethers, halogenated hydrocarbons, and intravenous agents such as propofol.
- **Lipid solubility and potency**: The lipid solubility of anesthetic agents influences their potency and onset of action, with more lipid-soluble agents generally producing faster induction and recovery.
- **Receptor interactions**: Anesthetic agents primarily interact with **neurotransmitter** receptors in the central nervous system, including gamma-aminobutyric acid (GABA) receptors, N-methyl-D-aspartate (NMDA) receptors, and voltage-gated ion channels.

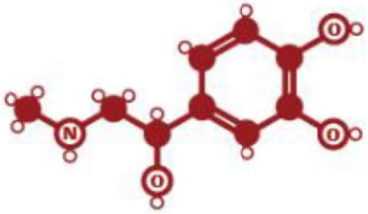
NEUROTRANSMITTER



THE STRUCTURES OF NEUROTRANSMITTERS

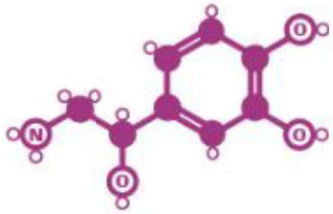
STRUCTURE KEY: ● Carbon atom ○ Hydrogen atom (O) Oxygen atom (N) Nitrogen atom (R) Rest of molecule

ADRENALINE
Fight or flight neurotransmitter



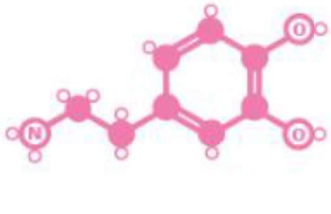
Produced in stressful or exciting situations. Increases heart rate & blood flow, leading to a physical boost & heightened awareness.

NORADRENALINE
Concentration neurotransmitter



Affects attention & responding actions in the brain, & involved in fight or flight response. Contracts blood vessels, increasing blood flow.

DOPAMINE
Pleasure neurotransmitter

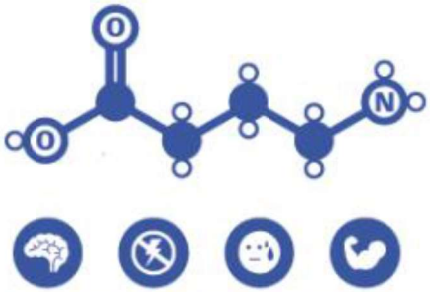


Feelings of pleasure, and also addiction, movement, and motivation. People repeat behaviours that lead to dopamine release.

SEROTONIN
Mood neurotransmitter

Contributes to well-being & happiness; helps sleep cycle & digestive system regulation. Affected by exercise & light exposure.

GABA
Calming neurotransmitter

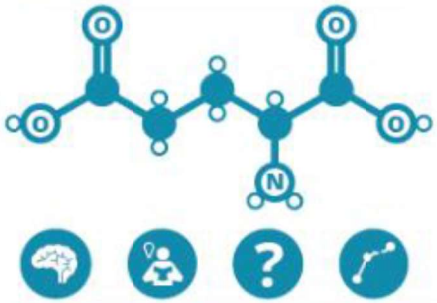


Calms firing nerves in CNS. High levels improve focus; low levels cause anxiety. Also contributes to motor control & vision.

ACETYLCHOLINE
Learning neurotransmitter

Involved in thought, learning, & memory. Activates muscle action in the body. Also associated with attention and awakening.

GLUTAMATE
Memory neurotransmitter

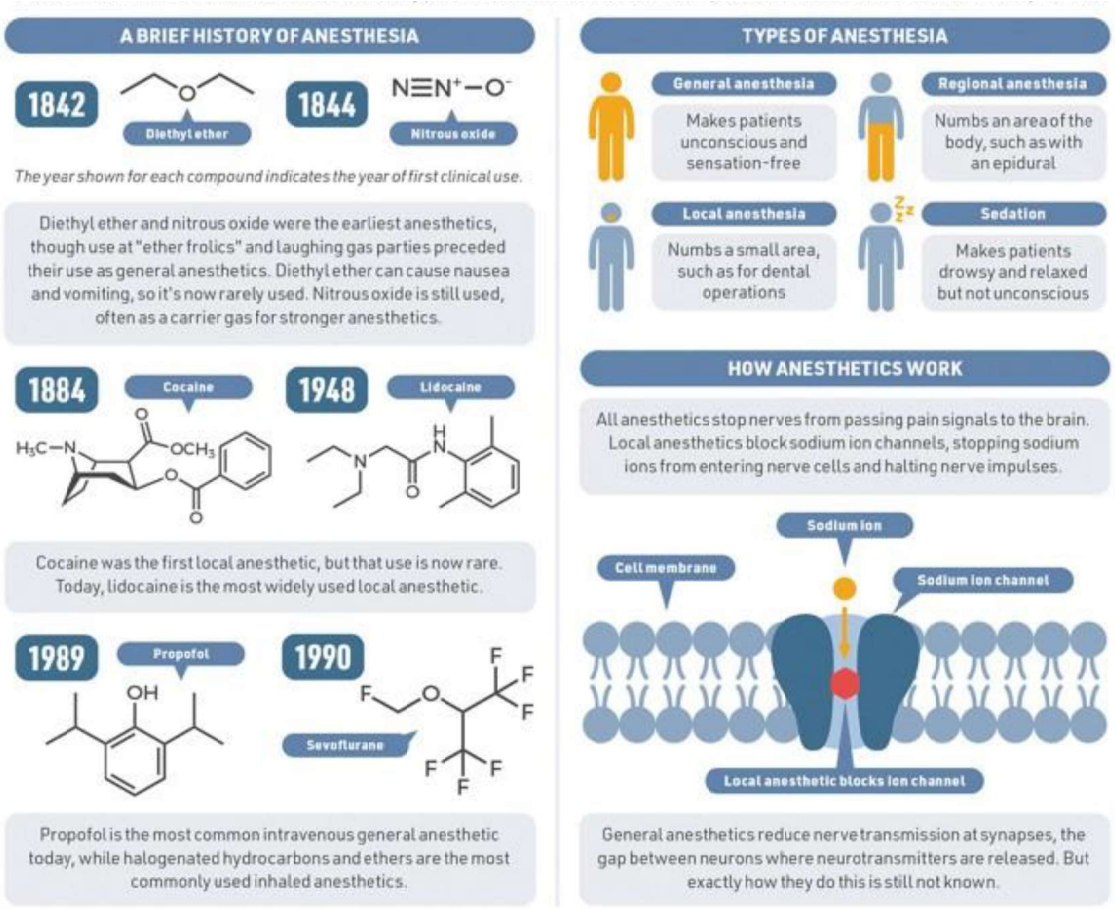


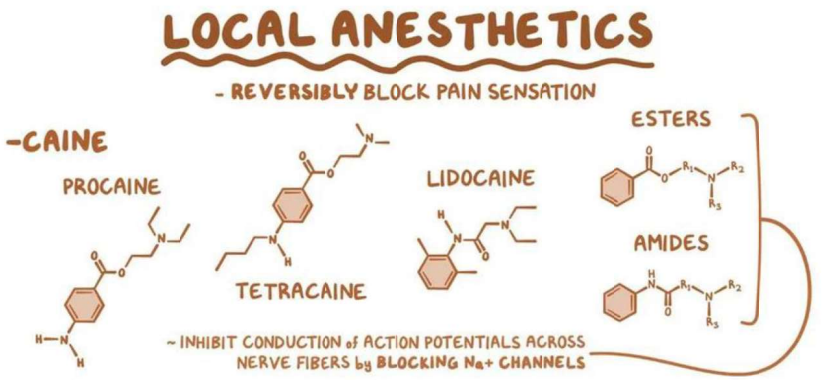
Most common brain neurotransmitter. Involved in learning & memory, regulates development & creation of nerve contacts.

ENDORPHINS
Euphoria neurotransmitters

Released during exercise, excitement, & sex, producing well-being & euphoria, reducing pain. Biologically active section shown.

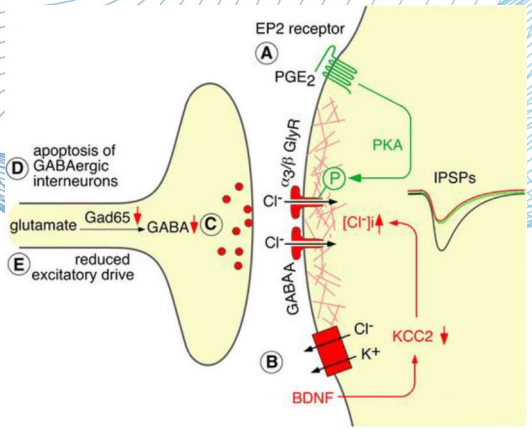
CHEMISTRY OF ANESTHETICS

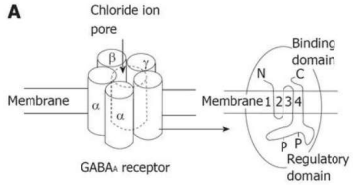


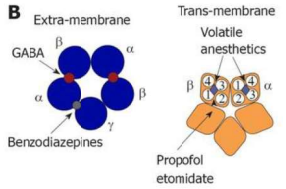


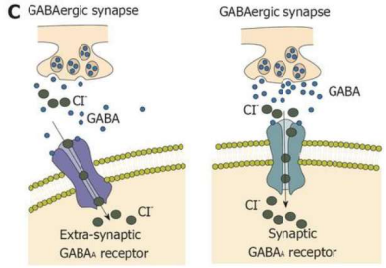
MECHANISMS OF ACTION

- **Enhancement of inhibitory neurotransmission**: Many anesthetic agents potentiate the activity of inhibitory neurotransmitters such as GABA, leading to CNS (central nervous system) depression and anesthesia.
- **Inhibition of excitatory neurotransmission:** Some anesthetic agents also inhibit excitatory neurotransmitter systems, such as glutamate receptors, reducing neuronal excitability and contributing to anesthesia.
- **Modulation of ion channels**: Anesthetic agents can directly interact with ion channels in neuronal membranes, altering ion conductance and neuronal excitability.



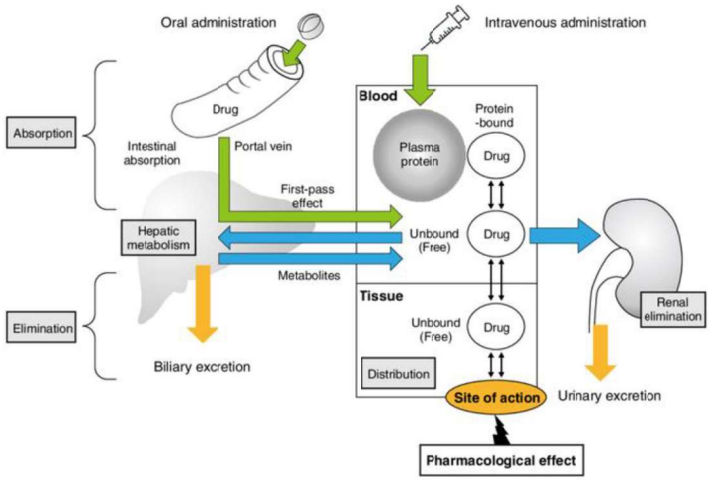






PHARMACOKINETICS OF ANESTHESIA

- **Absorption**: Inhalational anesthetics are absorbed through the lungs, while intravenous agents are rapidly distributed through the bloodstream.
- **Distribution**: Anesthetic agents distribute throughout the body, with higher concentrations in highly perfused tissues such as the brain, heart, and kidneys.
- **Metabolism**: Many anesthetic agents are metabolized in the liver by cytochrome P450 enzymes, leading to the formation of active metabolites or inactive metabolites that are excreted from the body.
- **Excretion:** Metabolites and unchanged drug molecules are excreted primarily through renal clearance via the kidneys, with some volatile anesthetics also eliminated through exhalation via the lungs.



PHARMACODYNAMICS OF ANESTHESIA

- **Absorption**:- Central nervous system depression: Anesthetic agents produce dose-dependent depression of neuronal activity in the central nervous system, leading to loss of consciousness, analgesia, and amnesia.
- **Minimum alveolar concentration (MAC)**: MAC is the minimum concentration of an inhaled anesthetic required to prevent movement in response to a surgical stimulus in 50% of patients. It is a measure of anesthetic potency.

BASIC PRINCIPLES OF ANESTHESIA DELIVERY

- **Vaporization:** Volatile anesthetic agents are vaporized and mixed with oxygen or air to create an inhalational anesthetic gas mixture delivered to the patient via a specialized anesthesia delivery system.
- **Inhalation:** Inhalational anesthetics are administered through a face mask or endotracheal tube, allowing for rapid induction and titration of anesthesia depth.
- **Intravenous administration**: Injectable anesthetic agents such as propofol and etomidate are administered directly into the bloodstream, producing rapid onset of anesthesia and precise control over drug levels.

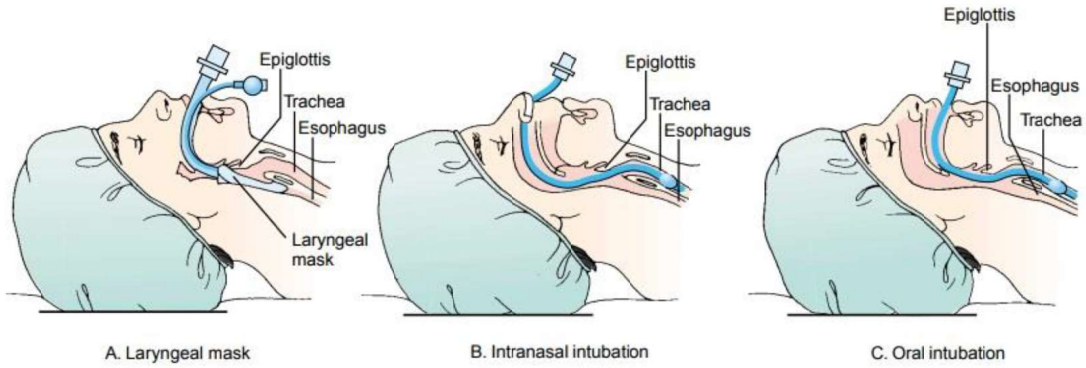
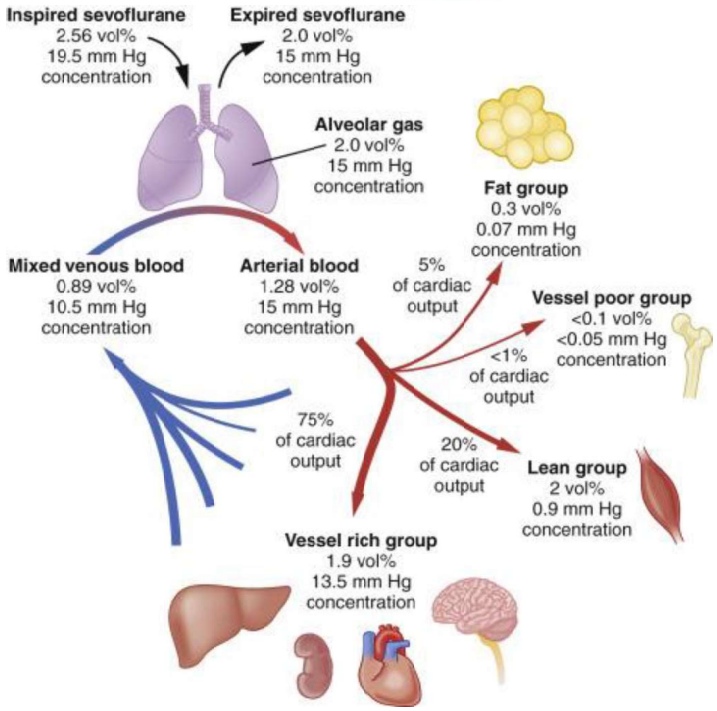


FIGURE 19-1 Anesthetic delivery methods: (**A**) laryngeal mask, (**B**) nasal endotracheal catheter (in position), and (**C**) oral endotracheal intubation (tube is in position with cuff inflated).



COMPLICATIONS AND SIDE EFFECTS

- **Respiratory depression**: Anesthetic agents can depress respiratory drive and impair gas exchange, leading to hypoventilation, hypoxemia, and respiratory acidosis, particularly in patients with compromised pulmonary function or airway anatomy.

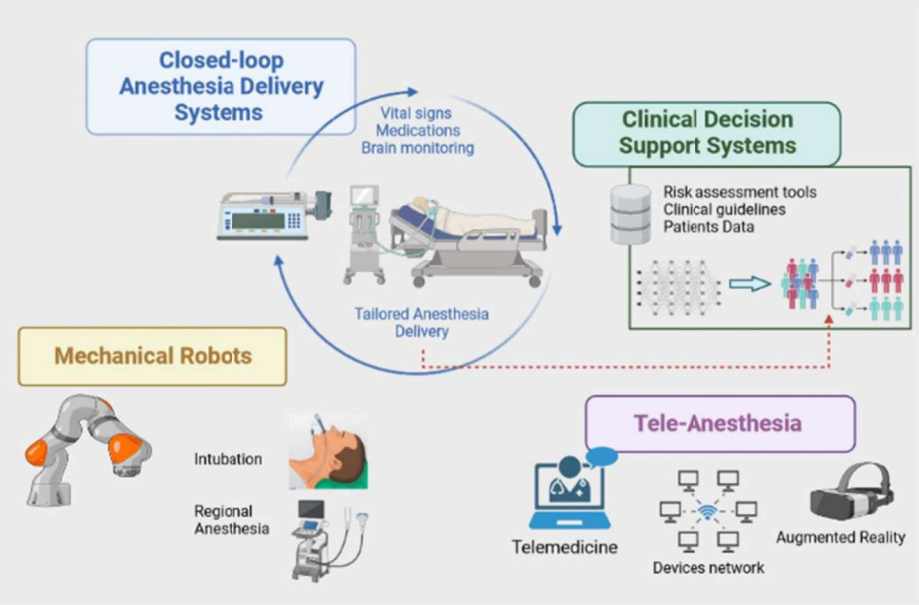
- **Nausea and vomiting**: Postoperative nausea and vomiting (PONV) are common side effects of anesthesia, resulting from a combination of factors including anesthetic agents, surgical stimulation, and patient-related factors such as gender, age, and history of motion sickness.

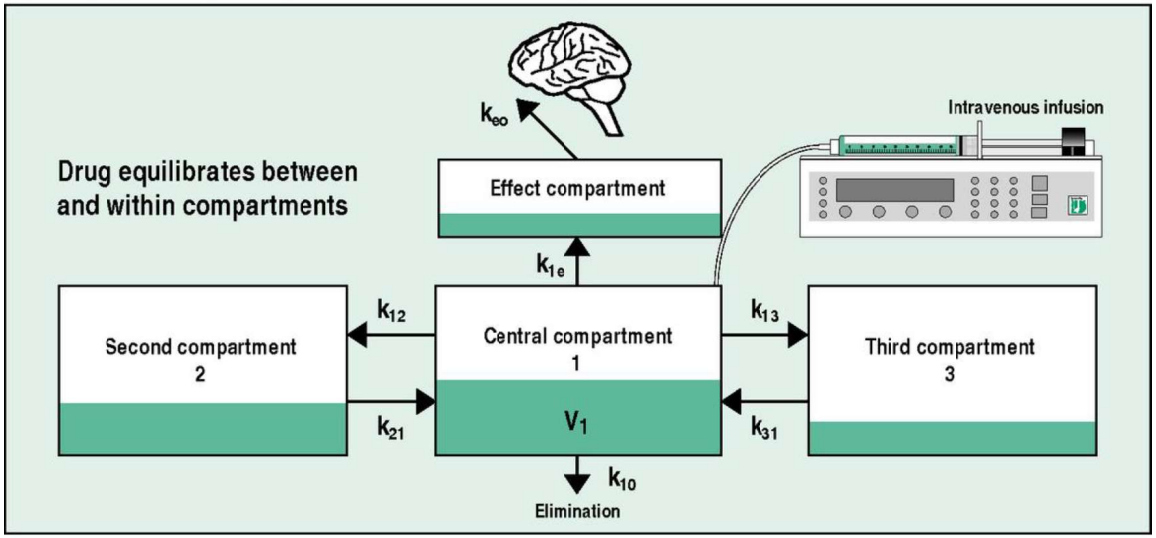
- **Allergic reactions:** While rare, allergic reactions to anesthetic agents can occur and manifest as skin rashes, bronchospasm, or anaphylaxis (type of allergic reaction), requiring prompt recognition and treatment with supportive measures and administration of alternative agents

MODERN ANESTHESIA TECHNIQUES

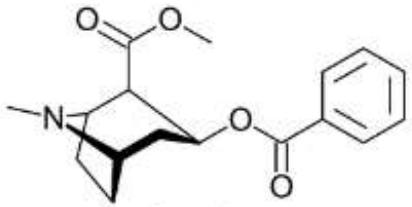
- **Balanced anesthesia**: Combines multiple classes of anesthetic agents, including inhalational and intravenous agents, muscle relaxants, and analgesics, to achieve optimal anesthesia while minimizing side effects and complications.
- **Target-controlled infusion (TCI)**: Uses computer-controlled infusion pumps to maintain a desired plasma or effect-site concentration of intravenous anesthetic agents, allowing for precise titration of anesthesia depth.
- **Total intravenous anesthesia (TIVA)**: Administers anesthesia solely via intravenous infusion, avoiding the use of inhalational agents and minimizing the risk of adverse effects such as postoperative nausea and vomiting.

MODERN ANESTHESIA TECHNIQUES

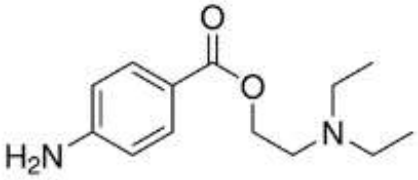




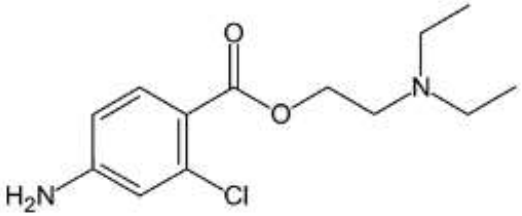
Esters



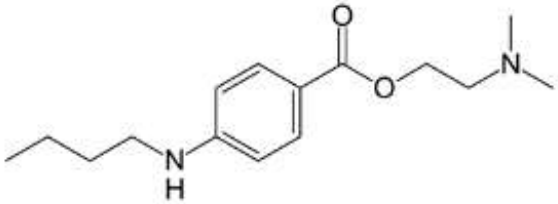
Cocaine



Procaine

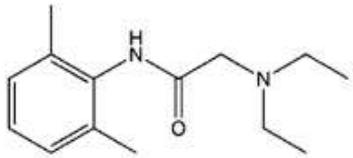


Chloroprocaine

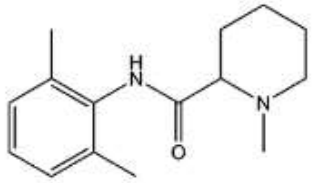


Tetracaine

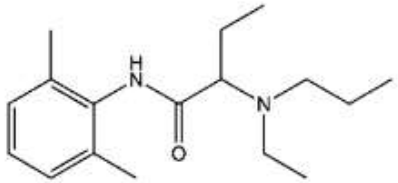
Amides



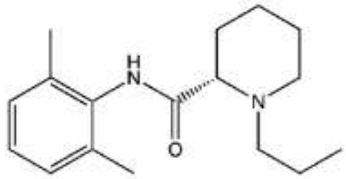
Lidocaine



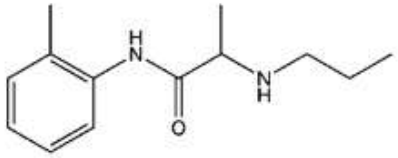
Mepivacaine



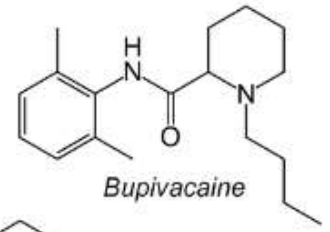
Etidocaine



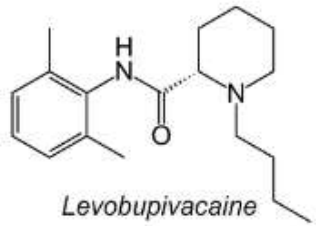
Ropivacaine



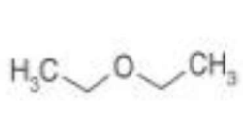
Prilocaine



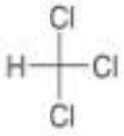
Bupivacaine



Levobupivacaine

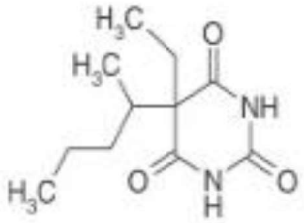


Diethyl ether

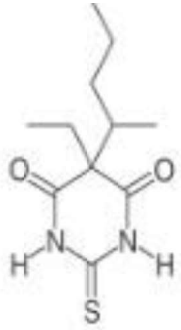


Chloroform

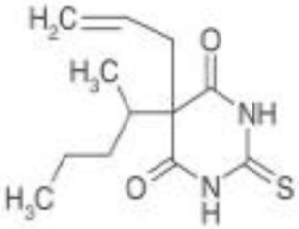
Nitrous oxide



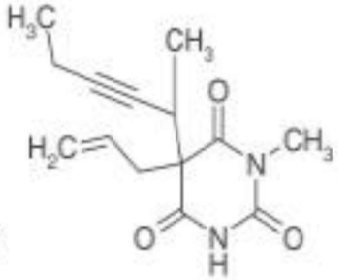
Pentobarbital



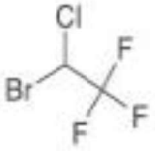
Thiopental



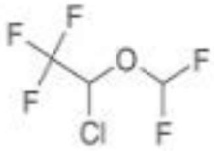
Thiamylal



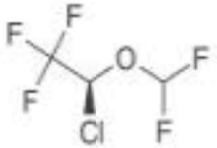
Methohexital



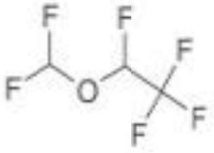
Halothane



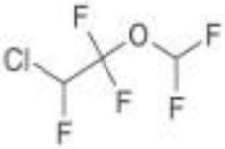
Isoflurane



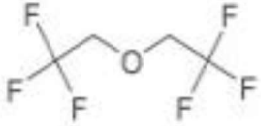
S-Isoflurane



Desflurane



Enflurane



HFE

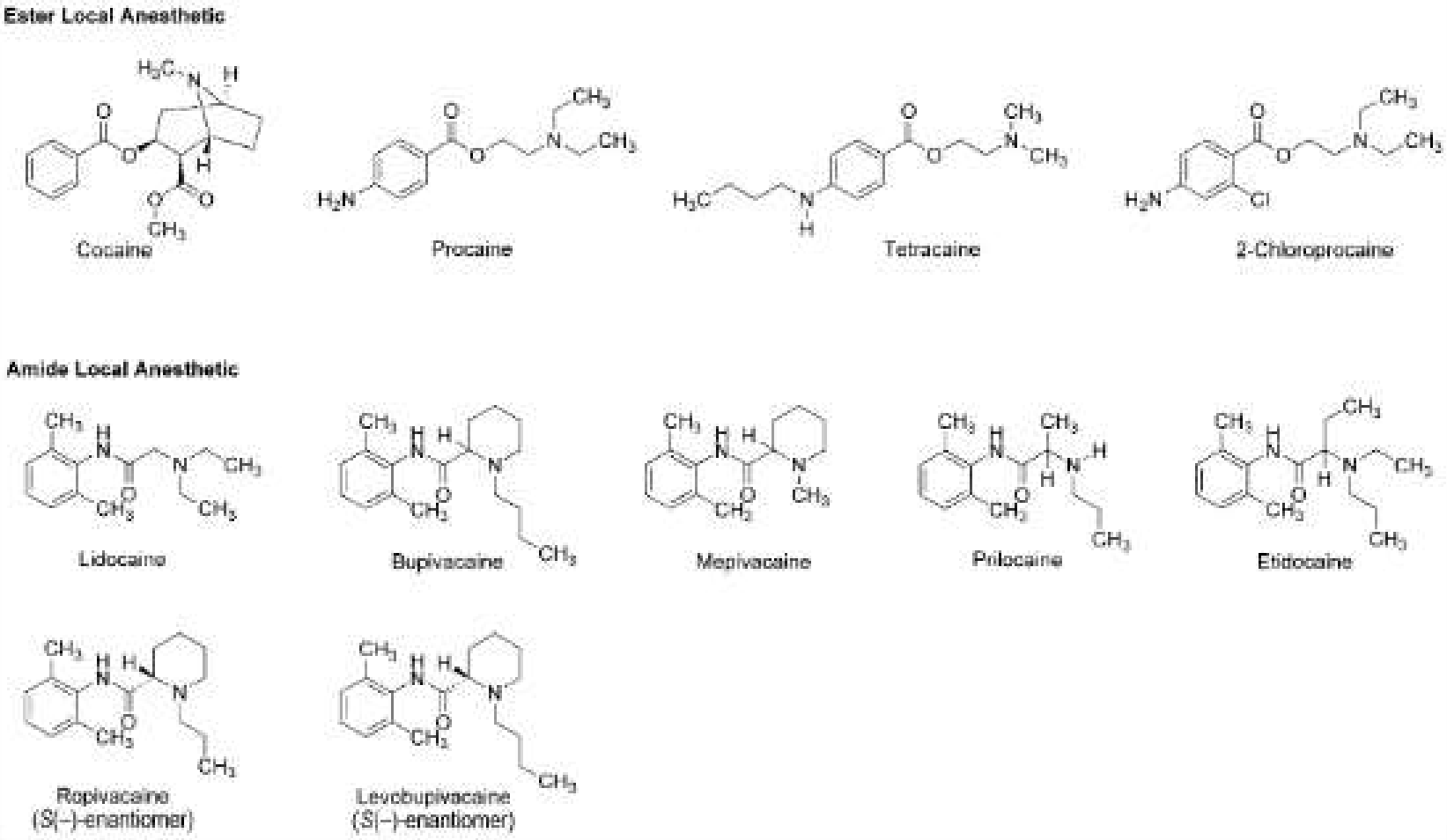
Sevoflurane

Xe

Xenon

Cyclopropane

Figure 1. Local anesthetics derived from the plant alkaloid cocaine.



THANK YOU.

Presented by:

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Food Fraud

Consumer Chemistry (CH419)

Presented By,

KARAN RABIDAS : 210107040

SURAJ KUMAR YADAV : 210107086

RAJENDRA PRASAD SARASWAT : 210107068

Introduction

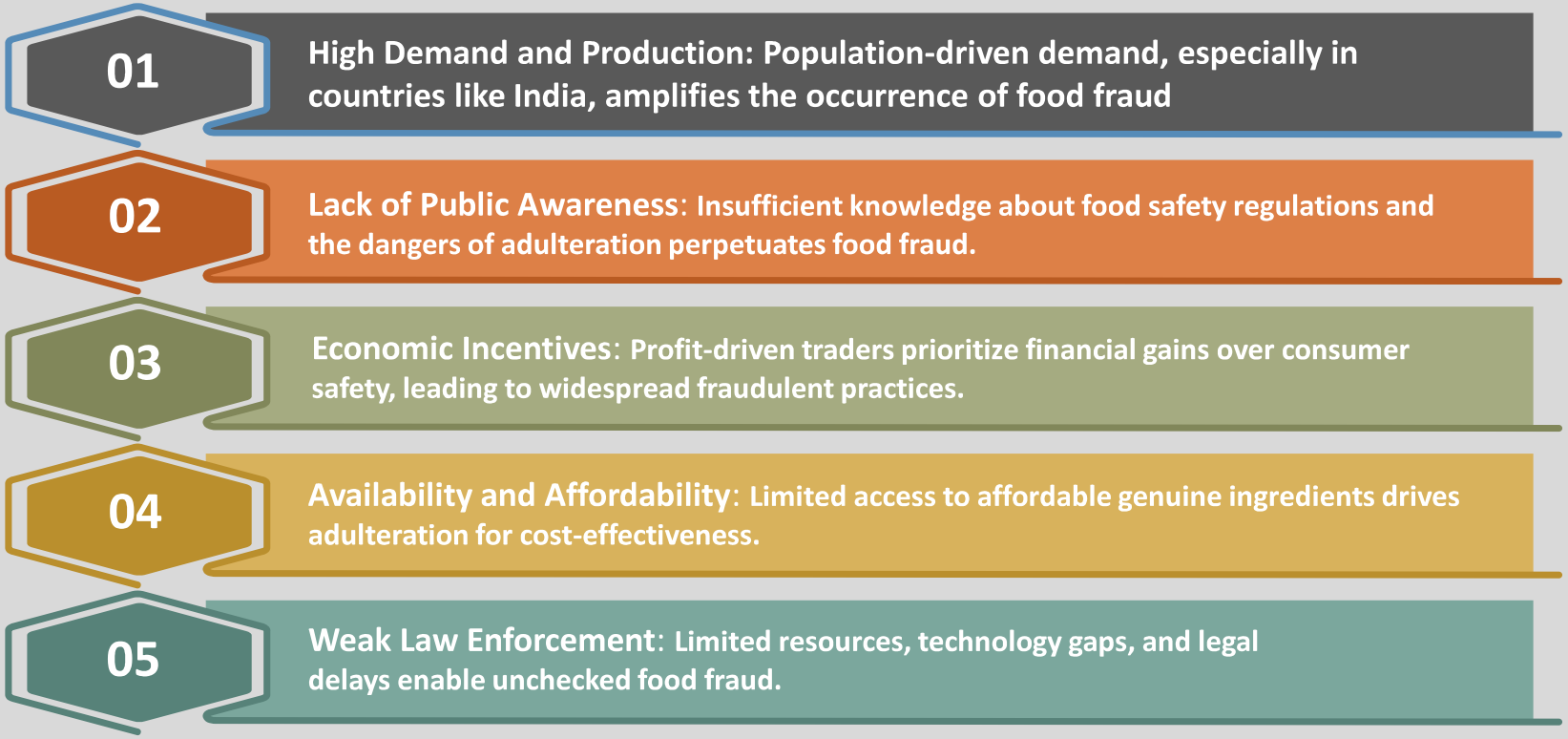
“Food Fraud” is the act of purposely altering, misrepresenting, mislabeling with any food product at any point along the farm-to-table food supply chain.

Driven by economic motives, Food fraud deceives consumers, strains regulators, and risks health and economic losses. Notable incidents like tainted milk and toxic olive oil underscore its severity. Solutions require transparency, robust regulation, and unified action.

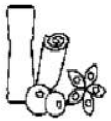
Types of Food Fraud

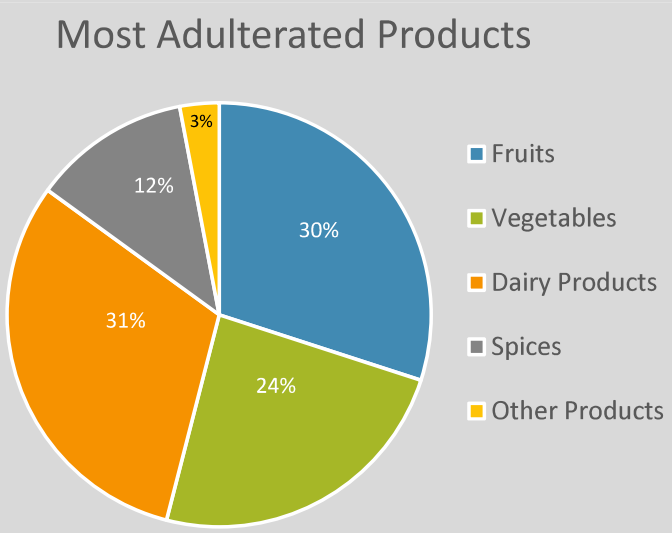
Term	Definition	Example
Adulteration	A component of the finished product is fraudulent	Melamine Added to milk
Tampering and Mislabelling	Legitimate products and packaging are used in a fraudulent way	Changed expiry information; false description of production method
Over-Run	The legitimate product is made in excess of production agreement	Under-reporting of production
Diversion	The distribution of legitimate products outside of intended markets	Relief food redirected to markets where aid is not required
Simulation	Illegitimate product is designed to look like but not exactly copy the legitimate product	“Knock-offs” (duplicate) of popular foods not produced with same food safety
Counterfeit	All aspects of the fraudulent product and packaging are fully replicated	Copies of popular foods not produced with same food safety

Factors Contributing to Food Fraud



Products Most at Risk of Food Fraud

Olive oil	Fish	Organic foods	Milk	Grains
				
Honey & maple syrup	Coffee and tea	Spices	Wine	Certain fruit juices
				



Impacts of Food Fraud

1. Threats To Health:

Food adulteration poses severe risks to public health, leading to a range of ailments such as diarrhea, abdominal pain, and vomiting, as well as more serious conditions including cancer, kidney stones, and liver damage

2. Economy:

Food fraud leads to financial losses due to recalls, legal actions, and damage to brand reputation, impacting producers and retailers alike.

3. Consumer Trust:

Food fraud erodes trust in supply chains and labeling accuracy, reducing consumer confidence in brands. Rebuilding trust demands transparent communication.

Adulteration in Dairy Industry

Adulterants Used	Purpose	Effects on Health
Water	Increase the quantity	Drops down the nutritive value
Sugar	Increase density	Cu deficiency, Ovarian Cancer ???
Starch	Increase Solid Content	Irritation of eyes , cough, chest pain ???
Hydrogen Peroxide	Reduce Cost of Process	Enhance ageing
Exc. Preservatives	Preserve for longer time	Diarrhoea, Extreme case-death
Urea	Whiteness	Indigestion, Ulcers, Cancers
Detergent and Soap	Emulsify	Gastrointestinal Problems

Adulteration in Fruits and Vegetables

ARTIFICIAL COLOURING

Synthetic dyes like tartrazine (E102) or sunset yellow (E110) and malachite green disguise old vegetables, but their accumulation in the body poses health risks.

MISREPRESENTATION OF QUALITY

Deceptive coatings alter produce appearance with wax, potentially trapping harmful residues. Inferior quality may lack essential nutrients, impacting health.

ARTIFICIAL RIPENING

Carbide, used for fruit ripening, releases unsafe acetylene gas (C_2H_2) due to arsenic and phosphorous hydride impurities.

PRICE MANIPULATION

Price-fixing practices lead farmers to use cheaper pesticides and premature harvesting, raising chemical residue levels in produce and compromising safety.

Adulteration in Grocery Items

Products	Adulterants Used	Effects On Heath
Sugar	Chalk Powder	Stomach Infection
Chilli Powder	Artificial Colour, brick Powder, Sudan Dye	Blood And Lung Cancer
Turmeric	Lead Chromate, Sawdust, metal yellow	Carcinogenic
Food Grains and Pulses	Sand, stone, marble chips, and filth	Damage digestive tract
Vegetable Oil	Argemone Mineral Oil	Heart disease, cancer
Butter	Margarine and starch	Food Poisoning
Rice And Wheat	Mud grits, soapstone bits, sand, Ergot	Cancer
Sea Food	Mercury and arsenic	Stomach and brain disorder

Why is argemone oil added to mustard oil?

It is used as an adulterant mixed with edible oils like sunflower oil, mustard oil to increase the oil quantity. The consumption of adulterated oil can lead to health disorders like **Dropsy.**

Prolonged use causes **neural degeneration and paralysis**.

ResearchGate

Plant and flower of Argemone ochroleu...

Wikipedia

Argemone mexicana - Wikipedia

Hindustan Times

Argemone poisoning claims life in ...

India Today

10-year-old Punjab girl dies after eating her birthday cake ordered online

2 days ago

Notable Incidents Around The World

1985	2003	2007	2012	2013	2015
Diethylene glycol added to wine in Austria to add desired sweetness.	Insecticide mixed into group beef by a supermarket employee in Michigan, USA	Pufferfish mislabeled as monkfish in California and Hawaii, USA	Vodka laced with methanol in Czech Republic	Food containing horsemeat were mislabeled as beef	Maggi Ban in India due to excessive lead levels and alleged mislabeling

2017	2018	2020
Aluminum foil used in place of edible silver leaf on sweetmeats in India	Imported honey in Canada adulterated with foreign sugars	Unsafe ketchup produced illegally without proper labeling or licensing in Punjab, India.

Some Headlines From India

Sand-clay adulteration in wheat, video went viral so case on 6 including manager of silo bag india

The video of adulteration in wheat purchased at support price in Bandha village in Rampur Baghelan area of Satna district was going viral.

adulteration in wheat. In this case of adulteration of wheat, Rampur filed a case against 6 station...

2,060kg of paneer made with sulphuric acid seized

Health Team Raids Factory, Arrests Owner

SUPPLIED ITEMS TO SHOPS IN CHANDIGARH, MOHALI, ZIRAKPUR

₹1.5cr pepper coated with cancer-causing oil seized

TIMES NEWS NETWORK

Chennai: The food safety department on Wednesday seized 18 tonnes of adulterated pepper...

...mineral oil was used as a fungicide and polishing agent. This is the first such seizure...

...methods to preserve the spice. But black pepper coated with mineral oil gives out a kerosene-like smell," said a trader.

Experts say pepper coated ... easily be identified by the colour."

He said traders engaged in the malpractices were not aware of the health risks. "No awareness campaigns are conducted to sensitise them."

NDTV

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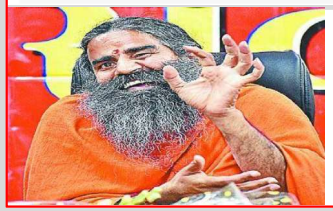
More than 60 per cent milk in country unsafe, adulterated with paint, detergent: Government



SC cautions Patanjali against making 'false' claims about its medicines in advertisements

'1/3 of food samples tested in '18-19 found adulterated'

Dipak.Dash@timesgroup.com

New Delhi: Almost one ...

OVER 6,400 CONVICTED IN 2 YRS

How To Prevent

Mitigation strategies

Mitigation strategies should be implemented effectively to prevent or minimise vulnerabilities to food fraud. They must be specific to each company, manufacturing site and product.

Strategies 01

Comprehensive Training

Provide thorough food fraud training across all departments to ensure awareness and understanding of mitigation strategies.

02

Supplier Monitoring

Regularly monitor and approve source suppliers to minimize the risk of fraud in procurement processes.

03

Detailed Specifications

Develop precise ingredient and product specifications to ensure accurate sourcing and production.

04

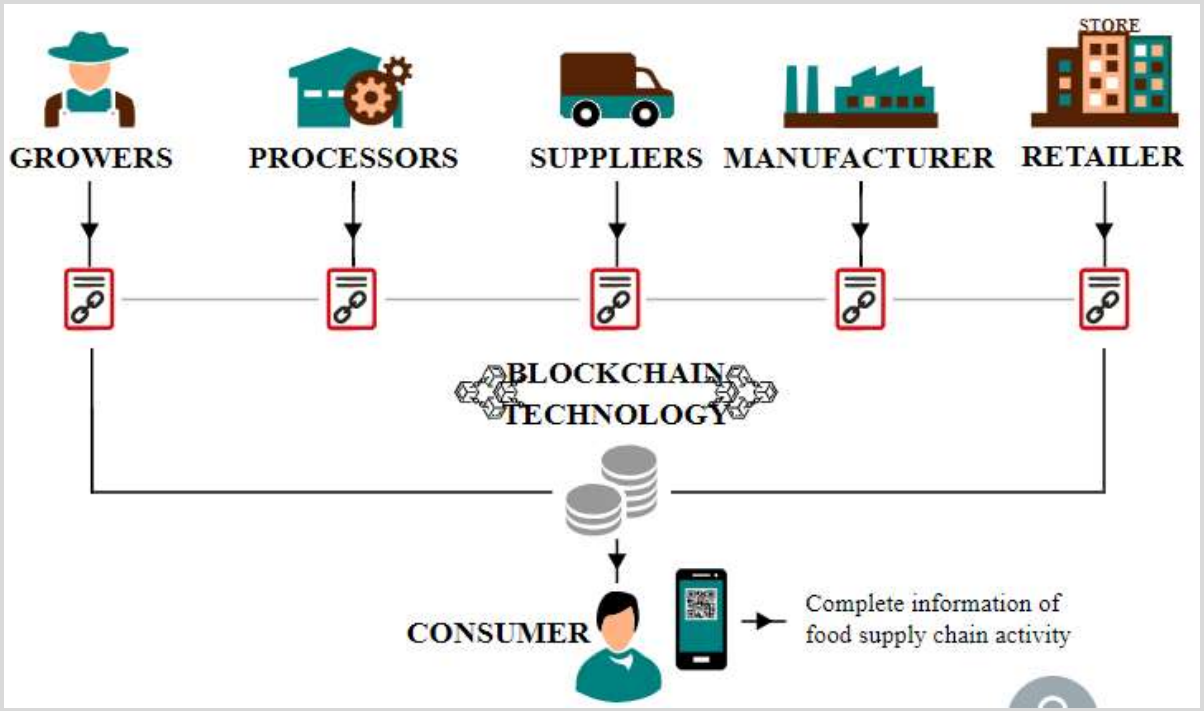
Reliable Testing

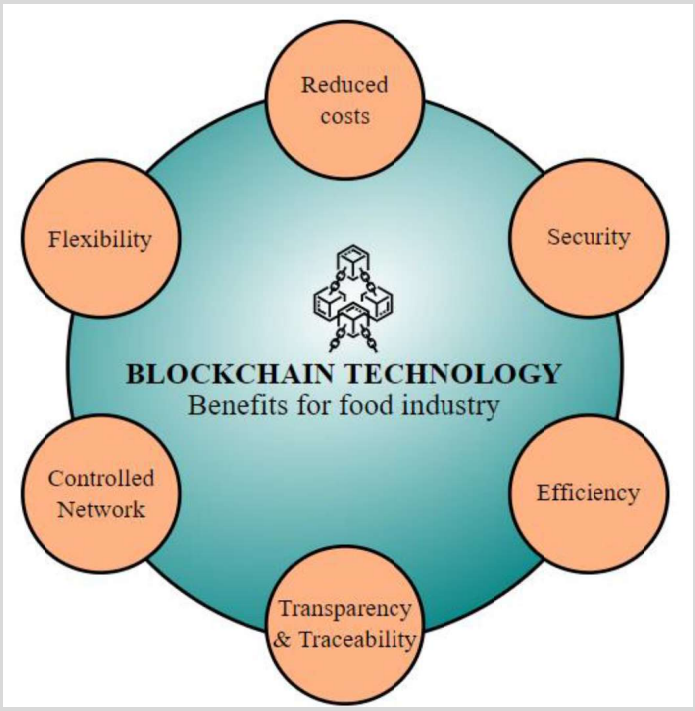
Implement robust sampling and testing protocols to verify authenticity and compliance consistently.

05

Collaboration

Foster partnerships with regulatory authorities and industry peers to share information and report suspected cases of food fraud promptly.


STORE
GROWERS
PROCESSORS
SUPPLIERS
MANUFACTURER
RETAILER
BLOCKCHAIN TECHNOLOGY
CONSUMER
Complete information of food supply chain activity


Reduced costs
Flexibility
Security
BLOCKCHAIN TECHNOLOGY
Benefits for food industry
Controlled Network
Efficiency
Transparency & Traceability

Methods To Detect Adulterants

Chemical/ Biochemical Techniques

- Chromatography Based: (Separate and detect components within food samples)
  Technologies: High Performance Liquid Chromatography (HPLC), Thin Layer Chromatography (TLC), Gas Chromatography (GC)
- Spectroscopy Based: (Analyse the interaction between electromagnetic radiation and food samples)
  Technologies: Nuclear Magnetic Resonance (NMR), Gas Chromatography Mass Spectroscopy (GCMC), Liquid Chromatography Mass Spectroscopy (LCMC)
- Electrophoresis Based: (Separate and analyze molecules based on size, charge, and mobility in electric field) Technologies: Polyacrylamide Gelectrophoresis (PAGE), Capillary Electrophoresis.

Physical Techniques

- Macroscopic and Microscopic
- Visual Structural Evaluation

Blockchain Technology

- Blockchain technology allows for the secure and transparent recording of food supply chain data.
  Blockchain tracks food products from farm to fork, aiding in adulteration detection by flagging inconsistencies or unauthorized alterations.

Food Safety in India

Food Safety and Standards Authority of India (FSSAI) is responsible for setting standards and regulating food in India. FSSAI conducts inspections, audits, and sampling to ensure compliance. It is mandatory for food businesses to obtain licenses or register with FSSAI.

Food Safety and Standards Act, 2006:

The Act consolidates food laws, establishes the Food Safety and Standards Authority of India, and regulates food manufacturing, storage, distribution, sale, and import. It sets science-based standards for food articles, ensuring safe and wholesome food availability for human consumption.

Conclusion

“Food fraud” significantly impacts public health, economy, and consumer trust, hindering progress towards SDGs like No Poverty and Zero Hunger by deceiving consumers and exacerbating food insecurity. It marginalizes small-scale farmers economically and erodes trust in food systems, affecting SDG 12 (Responsible consumption and production) too. Collaboration among governments, industries, and consumers is vital to enhance regulation, transparency, and awareness. By prioritizing these actions, we can mitigate food fraud's impact, advancing towards a future where safe, nutritious food is accessible to all, promoting well-being and sustainable development.

Thank You

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