

CRUNCH MODE: ON



Picture the crack of a chip, the pop of popcorn, the pssst of soda... sounds that make snacking irresistible. Do you ever wonder how science turns simple ingredients into sensory explosions? **Owais Ahmad Khan, AIS VYC Lko, VIII A**, brings to you part IV of GT's Science Behind Snack series, where every snack shall have its moment. Without further ado, let's dig in!

Power type



Chip's superpowers - The crunch comes from its brittle, porous structure, while seasonings and fats work together to create an intense flavour experience. As you bite, the chip fractures into tiny pieces, releasing aromas

and flavours across your mouth. The fat helps carry flavour compound like umami, tang, spice, and savoury notes. With this, you have a snack engineered for maximum sensory impact.

Snack-ology



The process involves controlling everything from slicing and starch levels to frying temperature, moisture removal, and oil uptake. Food engineers work hard to make sure that every chip has a predictable texture, flavour, and appearance while also meeting safety and quality standards. Physics plays a major role too. During frying, convective heat transfer moves heat from the hot oil to the potato. Water inside the chip turns into steam and escapes, leaving behind a dry, porous structure. It is this rapid moisture removal that helps transform a soft potato slice into the crisp snack we know and love.

Lab behind the bite

Starch gelatinisation occurs when potato starch absorbs water and swells during cooking, helping shape the chip's structure. Then



comes the Maillard reaction, which occurs during high-temperature cooking between sugars and amino acids, creating many of the colours and flavours we associate with fried foods.

Meanwhile, heat causes water inside to turn into steam. As moisture escapes, it leaves behind tiny pores in the starch-rich structure, making the chip light and crisp. Oil is absorbed during frying, adding richness, flavour, and mouthfeel. The final crunch depends on getting the balance of moisture, starch, oil, and cooking temperature just right.

Well, why can't you stop munching?



Chips combine several sensory cues at once creating a highly rewarding eating experience. Their crisp texture quickly breaks down when chewed, while low moisture

Did you know?

The secret behind the freshness of chips lies partly in the puffiness of the packet. Most packets are filled with nitrogen, a gas that helps displace oxygen and reduce oxidation, which can make fats turn rancid. It also cushions the chips during transport, helping prevent them from being crushed.

and high energy density let small amounts pack more calories. The combination of fat, starch, and salt can make chips particularly appealing, encouraging us to keep reaching for more. Even the crunch plays a role: the sound and texture provide feedback that makes it more satisfying. So, while evolution did not specifically design us to crave chips, our brains are naturally responsive to energy-rich foods and rewarding sensory experiences.

Rating: ★★★★★



Ghosts above the storm

Unveiling The Fleeting Red Flashes That Dance Above Thunderstorms

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Imagine looking up at a thunderstorm and spotting a giant red flash flickering high above the clouds, so brief that it vanishes before your eyes can fully register it. For decades, pilots reported these strange bursts of light, only to have their accounts dismissed as optical illusions. Today, we know they were witnessing sprites i.e. enormous flashes that dance at the edge of space, revealing that thunderstorms can reach far beyond the clouds we see. Let us uncover the mystery of these ghostly lights.

Into the light

Sprites are massive flashes of red light that occur in the mesosphere, about 50–90 km above Earth. During thunderstorms, charge

builds up within clouds, sometimes producing a powerful positive lightning strike. This creates an electrical field above the cloud, exciting nitrogen molecules in the thin upper atmosphere. As these molecules release energy, they glow reddish orange, forming giant flashes known as sprites, often resembling jellyfish or carrots. Unlike ordinary lightning, sprites belong to a group of phenomena called Transient Luminous Events (TLEs).

An atmospheric assortment

Sprites appear in several forms. Jellyfish sprites have a glowing, bell-shaped head with trailing tendrils. Carrot sprites feature a broad upper section that narrows as it descends. Column sprites resemble towering pillars of red light, while Ghost sprites are faint, wispy flashes that seem almost trans-

parent. Their shapes depend on atmospheric conditions such as air density, temperature, electrical field strength, and the amount of charged particles present in the sky.

Above the storm

Sprites inhabit a hidden electrical region of the atmosphere, where the air is thin and the sky is darker. Powerful lightning below can trigger these glowing displays high overhead, revealing that storms influence not only the clouds beneath them but also the atmosphere above. Sprites are not alone. Other members of the TLE family include Blue Jets, ELVES, and Halos. Scientists find these regions difficult to study because they lie too high for weather balloons and most aircraft to reach, yet too low for satellites to observe closely. Darkness and severe weather add further challenges.

Capturing ghosts

Sprites are notoriously difficult to photograph because they last only a few milliseconds, sometimes for just a single millisecond. Most people never see them because they appear briefly above distant storms. They are more commonly observed by pilots, astronauts, and astrophotographers. Their existence was finally confirmed in 1989, when their first photograph was captured accidentally by a team of scientists from the University of Minnesota. Since then, high-speed imaging has revealed much about these atmospheric 'ghosts'.

Scientists continue to study sprites because even though much has been learned, these ghostly flashes still hold many secrets, making them one of the atmosphere's most intriguing mysteries.