SATSA Mukhapatra - Annual Technical Issue **30** : 2026 ISSN 0971-975X **Short Communication**

Breaking Habitual Smoking Dependency Through a Smart Herbal Combination and Farming Practices

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Introduction

Tobacco addiction remains a major public health challenge, driven not only by nicotine's neurochemical grip but also by deeply ingrained behavioural rituals. While awareness of smoking-related harm has increased, cessation rates remain low, and alternatives such as vaping introduce new risks, particularly in unregulated markets. This article examines the neurological, behavioural, and agricultural dimensions of tobacco dependence, highlighting the limitations of conventional nicotine replacement therapies that address chemical dependency but neglect psychological comfort and habit memory. It introduces *Tzaar Aers*, a research-backed, nicotine-free alternative developed at IIT Delhi, designed to replicate the ritual of smoking while eliminating key toxicants. Using plant-derived biochemicals targeting GABA receptors, advanced nanofiltration, and aeronutrient delivery, Tzaar aims to reduce relapse without creating dependency. Importantly, the innovation extends upstream, offering tobacco farmers a sustainable transition to medicinal plant cultivation, thereby integrating public health, environmental sustainability, and rural economic resilience into a single harm-reduction framework.

The Bafflement About Smoking

Tobacco addiction remains a leading cause of both physical illness and mental health deterioration (Gilbody *et al.,* 2025; Meckel and Rittenhouse, 2025). While smoking becomes addictive, primarily because of the nicotine content in tobacco leaves, the smoke has more than 7000 chemicals (American Cancer Society medical and editorial content team, 2025). Disastrous chemicals like tar, carbon monoxide, formaldehyde, arsenic, polycyclic aromatic hydrocarbons (PAHs), etc. are common. Constant intake of these chemicals often results in crippling, debilitating diseases, including life-threatening cancer (Li and Hecht, 2022). While awareness of smoking-related harm has increased, quitting remains difficult due to the neurochemical grip of nicotine available in the tobacco smoke and the deeply ingrained behavioural ritual of smoking (Gill *et al.,* 2021).

Addiction is Not Just Chemical. It is Neurological and Behavioural

Nicotine mimics acetylcholine, which rapidly travels through the lungs and blood to the brain, binding to neuronal cell receptors in the brain. This triggers the opening of ion channels, releasing a cascade of secondary neurotransmitters, including dopamine, adrenaline etc., which in turn gives the feeling of pleasure, satisfaction and energy (Mannino, 2009). A surge of Dopamine reinforces reward pathways. With a constant nicotine supply,

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the neurons keep generating more nicotine receptors, increasing the requirement for more nicotine for the same amount of pleasure. When nicotine intake stops, dopamine signalling drops, triggering anxiety, irritability, and craving—commonly referred to as withdrawal (Marzo *et al.*, 2022).

With recent research, education, and Governmental interference, the knowledge about the associated harmful chemicals in tobacco smoke has increased. This, in recent years, led many users to shift to vaping, often perceiving it as a safer alternative. However, vapes frequently contain higher concentrations of nicotine, leading to increased frequency of use, and the presence of synthetic chemicals has been linked to emerging lung diseases (Ritchie, 2025). In India, where vaping is illegal, this problem is compounded by unregulated products and black-market supply chains.

Nicotine Replacement Therapies (NRTs) such as patches and gums are often recommended as first-line interventions (Sivasankari *et al.,* 2023). Most cessation approaches aim to fight dopamine dependency directly, either by tapering nicotine or blocking receptors. Yet their long-term effectiveness remains limited.

- Absolute quit rate of ~11%
- 89% of users relapse within one year
- NRTs focus solely on nicotine delivery, not :
    - Withdrawal anxiety
    - Behavioural rituals
    - Oral fixation and habit memory

In essence, most cessation tools remove nicotine without replacing the neurological or behavioural comfort that smoking provides.

As a more recent alternative, an effective, harmless, well-researched product has been developed by a group of researchers from IIT Delhi, called the **Tzaar Aers** (https://tzaar.shop/). Tzaar Aers are designed to replicate the external form and ritual of a cigarette, while transforming its internal composition and physiological impact. Tzaar lowers the psychological barrier to switching—while eliminating the most harmful components. Instead of nicotine, Tzaar uses plant-derived biochemicals that interact with GABA (gamma-aminobutyric acid) receptors. By calming the nervous system during cessation, Tzaar aims to reduce the compulsive urge to relapse—without creating dependency. Tzaar Aers also integrate certified advanced nanofilters that adsorb and remove carbon monoxide and significantly reduce tar and polycyclic aromatic hydrocarbons (PAHs), with reductions of up to 80 per cent under research conditions. The product contains no harmful flavouring agents, further reducing toxic exposure. On the non-burning end, a Vitamin B12 filter capsule functions as an aeronutrient delivery system. Nutrient diffusion through the lung alveoli allows for significantly higher bioavailability—up to 54 times more effective than oral intake—supporting overall wellness while transforming a harmful habit into a supportive ritual.

Tobacco Farming : An Economic and Health Irony

For decades, tobacco cultivation has been positioned as a reliable cash crop for

farmers across several regions in India (Arif, 2025). However, behind this apparent stability lies a cycle of ecological degradation, declining health, and economic vulnerability. Tobacco monocropping gradually exhausts soil nutrients, increases dependency on chemical fertilisers and pesticides, and leaves farmers exposed to volatile demand driven by global regulation and shrinking consumption. As anti-tobacco policies strengthen worldwide, farmers cultivating tobacco face increasing uncertainty with limited viable alternatives.

India's conversation on tobacco harm reduction almost always begins with the smoker. It rarely begins with the farmer. Yet the future of public health, environmental sustainability, and rural livelihoods is deeply intertwined in the fields where tobacco is grown. As regulations tighten and consumption patterns change, millions of farmers remain locked into tobacco cultivation—a system that is economically precarious, ecologically damaging, and physically dangerous. Any serious attempt to reduce tobacco harm must address this upstream reality.

Tobacco farming has long been framed as a dependable livelihood, particularly in regions with limited crop alternatives. In reality, it is a classic monocrop trap. Repeated tobacco cultivation depletes soil nutrients, increases dependence on chemical fertilizers, and demands heavy pesticide use. Over time, land productivity declines while input costs rise, squeezing farmers from both ends (Panchal *et al.,* 2021). At the same time, global demand for tobacco is shrinking under stricter health regulations, leaving farmers exposed to market volatility they have little power to control.

The health costs borne by tobacco farmers are even less visible than the economic ones. Green Tobacco Sickness, caused by nicotine absorption through the skin during harvesting, remains widespread yet underreported. Symptoms such as nausea, dizziness, and chronic fatigue are often normalised as part of farm life (Schmitt *et al.,* 2007). Combined with pesticide exposure and respiratory problems, tobacco cultivation quietly erodes the health of those who grow a product widely acknowledged as harmful. These costs never appear on balance sheets, but they shape lives, nonetheless.

In addition to economic risks, tobacco farming imposes severe health costs. Farmers are routinely exposed to **Green Tobacco Sickness**, a condition caused by nicotine absorption through the skin during harvesting. Symptoms include nausea, dizziness, headaches, and long-term neurological stress. Combined with pesticide exposure and chronic respiratory issues, tobacco cultivation often leads to rising healthcare expenses, loss of workdays, and reduced quality of life (Ali *et al.*, 2022). These hidden costs are rarely reflected in the price farmers receive for raw tobacco leaves, locking them into a system that undermines both their health and livelihoods.

Tzaar Aers : An Evolved, Balanced Ecosystem Gateway

Tzaar Aers was conceptualised with an understanding that responsible alternatives to smoking must also address

the upstream agricultural ecosystem. Founded by **Shtaakhshi Dubey**, under the academic guidance of **Prof. B Kundu and Prof. Hariprasad P from IIT-Delhi**, Tzaar is building India's first **plant-powered Aers**—a **nicotine-free, carbon monoxide-free**, research-backed, responsible alternative for individuals who smoke or vape. The company is currently **incubated at FITT (Foundation for Innovation and Technology Transfer, IIT-Delhi)** and is undergoing structured scientific research and validation. Tzaar is not positioned as another herbal cigarette or wellness product. It is an attempt to **redefine nicotine de-addiction** through neuroscience, material science, and sustainable agriculture—while respecting the deeply ingrained rituals that make smoking difficult to quit.

At the heart of Tzaar's innovation lies a simple but powerful insight

Rather than relying on tobacco or nicotine-based inputs, Tzaar uses **medicinal and functional plant blends** that can be cultivated in **marginal or semi-arid land**. These crops are inherently better suited to diverse Indian agro-climatic zones and do not require the intensive chemical treatments associated with tobacco farming. This enables farmers to reduce their dependence on pesticides while improving soil health over successive growing cycles.

One of the most significant impacts observed in pilot transitions is the **shorter crop cycle** of these medicinal plants compared to tobacco. Faster harvesting allows farmers to improve cash flow and reduce exposure to climate risk over long growing seasons. Additionally, these crops command **higher per-kilogram prices** than raw tobacco leaves, resulting in improved income per acre. For farmers previously constrained by fixed procurement systems and limited price negotiation, this shift offers greater economic agency and resilience.

The Tzaar model represents a **just agricultural transition**, where farmers are not asked to abandon their livelihoods without support, but are instead offered a pathway to safer, more profitable, and environmentally responsible cultivation. By aligning demand for science-backed nicotine de-addiction products with sustainable agricultural sourcing, Tzaar creates a closed-loop system that benefits both consumers and producers.

Importantly, this approach reframes the narrative around tobacco alternatives. Rather than merely replacing one harmful product with another, Tzaar's impact begins at the farm level, addressing the root causes of ecological harm and farmer health risks. The result is a value chain that integrates public health goals with rural development and environmental stewardship.

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