

**NON-OXYGENATED ALKALOID VAPING LOWERS THE STRESS AND CREATES  
MIND TO IMPRESS****Dr. Dhrubo Jyoti Sen\***

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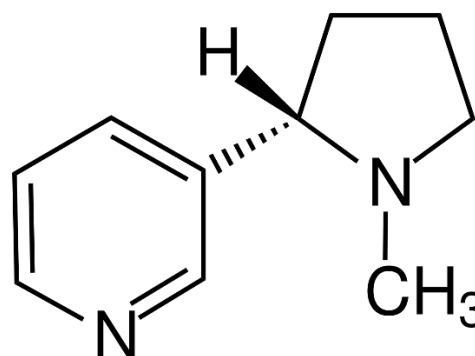
**ABSTRACT**

(SIH-guh-ret) A tube-shaped tobacco product that is made of finely cut, cured tobacco leaves wrapped in thin paper. It may also have other ingredients, including substances to add different flavors. A cigarette is lit on one end and smoked, and the smoke is usually inhaled into the lungs.

**KEYWORDS:** Nicotine, e-cigarette, tobacco, vaping, tar.**INTRODUCTION**

A cigarette is a narrow cylinder containing a combustible material, typically tobacco that is rolled into thin paper for smoking. The cigarette is ignited at one end, causing it to smoulder; the resulting smoke is orally inhaled via the opposite end. Cigarette smoking is the most common method of tobacco consumption. **James A. Bonsack**

completed his design with a complicated blade that cut the cylinder into cigarettes of uniform length. James Albert Bonsack (October 9, 1859–June 1, 1924) was an American inventor who developed an early cigarette rolling machine in 1880, and patented it the following year.<sup>[1]</sup>

**Figure-1: James Albert Bonsack; the inventor of cigarette.**

The term cigarette, as commonly used, refers to a tobacco cigarette, but the word is sometimes used to refer to other substances, such as a cannabis cigarette or an herbal cigarette. A cigarette is distinguished from a cigar by its usually smaller size, use of processed leaf, and paper wrapping, which is typically white. Most modern cigarettes are filtered, although this does not make the smoke inhaled from them contain fewer carcinogens and harmful chemicals. An electronic cigarette (e-cigarette) or vape is a device that simulates tobacco smoking. It consists of an atomizer, a power source such as a battery, and a container such as a cartridge or tank filled with liquid. Instead of smoke, the user inhales vapor. As such, using an e-cigarette is often

called "vaping". The atomizer is a heating element that vaporizes a liquid solution called e-liquid, which quickly cools into an aerosol of tiny droplets, vapor and air. E-cigarettes are activated by taking a puff or pressing a button. Some look like traditional cigarettes, and most kinds are reusable. The vapor mainly comprises propylene glycol and/or glycerin, usually with nicotine and flavoring. Its exact composition varies, and depends on several things including user behavior. Vaping is likely far less harmful than smoking, but still harmful. E-cigarette vapor contains fewer toxins than cigarette smoke. It contains traces of harmful substances not found in cigarette smoke. Nicotine [CAS Number: 54-11-5; IUPAC: 3-[(2S)-1-methylpyrrolidin-2-yl]pyridine] is

highly addictive. Nicotine is the chemical in tobacco that keeps you smoking. This is one of the non-oxygenated alkaloid reaches the brain within seconds of taking a puff. In the brain, nicotine increases the release of brain chemicals called neurotransmitters, which help regulate mood and behavior. Nicotine is a naturally produced alkaloid in the nightshade family of plants (most predominantly in tobacco and *Duboisia hopwoodii*) and is widely used recreationally as a stimulant and anxiolytic. As a pharmaceutical drug, it is used for smoking cessation to relieve withdrawal symptoms. Nicotine acts as a receptor agonist at most nicotinic acetylcholine receptors (nAChRs), except at two nicotinic receptor subunits (nAChR $\alpha$ 9 and nAChR $\alpha$ 10) where it acts as a receptor antagonist. Users become physically and psychologically dependent. Scientists do not know how harmful e-cigarettes are over the long-term because it is hard to separate the effects of vaping from the effects of smoking when so many people both vape and smoke. Tobacco is the common name of several plants in the genus *Nicotiana* of the family Solanaceae, and the general term for any product prepared from the cured leaves of these plants. More than 70 species of tobacco are known, but the chief commercial crop is *Nicotiana tabacum*. The more potent variant *Nicotiana rustica* is also used in some countries. Dried tobacco leaves are mainly used for smoking in cigarettes and cigars, as well as pipes and shishas. They can also be consumed as snuff, chewing tobacco, dipping tobacco, and snus. Tobacco contains the highly addictive

stimulant alkaloid nicotine as well as harmful alkaloids.<sup>[2]</sup> Tobacco use is a cause or risk factor for many deadly diseases, especially those affecting the heart, liver, and lungs, as well as many cancers. In 2008, the World Health Organization named tobacco use as the world's single greatest preventable cause of death. E-cigarettes have not been used widely enough or for long enough to be sure. For people trying to quit smoking, e-cigarette use alongside prescribed nicotine replacement therapy (NRT) leads to a higher quit rate. For those trying to quit smoking without medical help, it is not clear whether e-cigarettes raise quit rates because the evidence is of poor quality.

### CONSTRUCTION

An electronic cigarette consists of an atomizer, a power source such as a battery, and a container for e-liquid such as a cartridge or tank. E-cigarettes have evolved over time, and the different designs are classified in generations. First-generation e-cigarettes tend to look like traditional cigarettes and are called "cigalikes". Second-generation devices are larger and look less like traditional cigarettes. Third-generation devices include mechanical mods and variable voltage devices. The fourth-generation includes sub-ohm tanks (meaning they have electrical resistance of less than 1 ohm) and temperature control. There are also pod mod devices that use protonated nicotine, rather than free-base nicotine found in earlier generations, providing higher nicotine yields.<sup>[3]</sup>

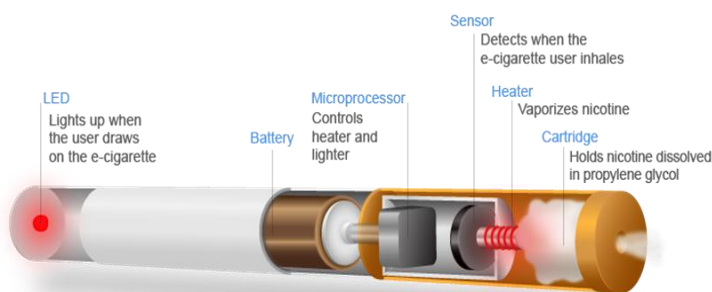


Figure-2: E-cigarette interior structure.

There are significant negative health effects from smoking cigarettes such as cancer, chronic obstructive pulmonary disease (COPD), heart disease, birth defects, and other health problems relating to nearly every organ of the body. Nicotine, the psychoactive drug in tobacco, makes cigarettes highly addictive. About half of cigarette smokers die of tobacco-related disease and lose on average 14 years of life. Every year, tobacco cigarettes kill more than 8 million people worldwide; with 1.2 million of those being non-smokers dying as the result of exposure to second-hand smoke. These harmful effects have led to strict legislation that has prohibited smoking in many workplaces and public areas, regulated marketing and purchasing age of tobacco, and levied taxes to discourage cigarette use. In the 21st century, a

product called an electronic cigarette (also called an e-cigarette or vape) was developed, in which the substance contained within it (typically a liquid solution containing nicotine) is vaporized by a battery-powered heating element, as opposed to being burned. Such devices are commonly promoted by their manufacturers as safer alternatives to conventional cigarettes, although there are some health risks associated with their use. Since e-cigarettes are a relatively new product, scientists do not possess data on their possible long-term health effects.<sup>[4]</sup>

**E-liquid:** The mixture used in vapor products such as e-cigarettes is called e-liquid. E-liquid formulations vary widely. A typical e-liquid is composed of propylene glycol and glycerin (95%) and a combination of

flavorings, nicotine, and other additives (5%). The flavorings may be natural, artificial, or organic. Over 80 harmful chemicals such as formaldehyde and metallic

nanoparticles have been found in e-liquids at trace quantities. There are many e-liquid manufacturers, and more than 15,000 flavors.



Figure-3: Tobacco and Nicotine.

Most countries regulate what e-liquids can contain. In the US, there are Food and Drug Administration (FDA) compulsory manufacturing standards and American E-liquid Manufacturing Standards Association (AEMSA) recommended manufacturing standards. European Union standards are published in the EU Tobacco Products Directive. Most e-cigarettes contain nicotine, which is addictive and toxic to developing fetuses. Nicotine exposure can also harm adolescent and young adult brain development, which continues into the early to mid-20s. E-cigarette aerosol can contain chemicals that are harmful to the lungs. Vaping is less harmful than smoking, but it's still not safe. E-cigarettes heat nicotine (extracted from tobacco), flavorings and other chemicals to create an aerosol that you inhale. Regular tobacco

cigarettes contain 7,000 chemicals, many of which are toxic. Vaping simulates smoking. Battery-powered vape devices create an aerosol that looks like water vapor but contains nicotine, flavoring, and more than 30 other chemicals. The aerosol is inhaled into the lungs where the nicotine and chemicals cross over into the bloodstream. The first device in the recent innovation in e-cigarettes was developed in 2003 by the Chinese pharmacist **Hon Lik** [Hon Lik (or Han Li) was born in Shenyang, China in 1951. He started smoking at age 18. He attended Liaoning University of Traditional Chinese Medicine and graduated with a pharmaceutical degree.], a former deputy director of the Institute of Chinese Medicine in Liaoning Province. Lik's patent application described a kind of electronic atomizing cigarette.<sup>[5]</sup>



Figure-4: Hon Lik; E-cigarette inventor.

Rolling paper is a specialty paper used for making cigarettes (commercially manufactured filter cigarettes and individually made roll-your-own cigarettes). Rolling papers are packs of several cigarette-size sheets, often folded inside a cardboard wrapper. They are also known as 'blanks', which are used to encase tobacco or cannabis. It may be flavoured. Rolling papers are also used for rolling cannabis cigarettes called joints.

**Filter cigarette**  
Cigarette filter  
Imitation cork tip paper  
Cigarette paper  
Tobacco  
Capsule (optional, not shown)  
Ink (not shown)  
Glue (not shown)



**History:** Paper cigarettes became popular in the second half of the 19th century, displacing the more expensive cigars and cigarillos. As cigars and cigarillos were expensive, the beggars of Spain would collect the cigar butts from the ground and roll them in pieces of paper to be smoked. During the Crimean War this culture became more prevalent and British soldiers learned how to roll tobacco in newspapers. Frequent use of rolling paper became a custom, and to fulfil the need, rolling paper companies Pay-Pay, Smoking, and Rizla emerged.<sup>[6]</sup>

**Composition:** Cigarette paper is made from thin and lightweight "rag fibers" (nonwood plant fibers) such as flax, hemp, sisal, rice straw, and esparto. The paper is available in rolls and rectangular sheets of varying sizes, and has a narrow strip of glue along one long edge. It may be transparent, colored and flavored. It has a high filler content and a basis weight of 10-28 g/m<sup>2</sup>. To control the smoking properties, this paper has a porosity that is suited to the type of tobacco and contains additives that regulate burning. One critical paper characteristic is permeability; its primary physical influence is smoke dilution. Among the fillers used are calcium carbonate to influence the permeability and color, magnesium carbonate to improve ash color, or titanium oxide if a particularly white ash is required. Sodium potassium tartrate (Seignette's salt, Rochelle salt), sodium and potassium citrate are used as a combustion regulator in cigarette paper, increased levels result in faster burning papers. Poly(vinyl alcohol) in aqueous solution is used for cigarette adhesives. Permeability is defined as the measure of the volume of air that flows through a specified area of cigarette paper in a given unit of time. It is measured in CORESTA units. US commercial filter cigarette brands have paper permeability between 14 and 51 CORESTA units. Increased cigarette paper permeability results in increased smoke dilution with air. Fire-resistant cigarettes, which reduce the risk of fire from unattended cigarettes, are made with special paper that includes a plastic compound, ethylene vinyl acetate. If a cigarette made with this type of paper is left unattended, the plastic in the paper will help the cigarette self-extinguish.<sup>[7]</sup>

Other specialty papers for tobacco products are: Imitation cork paper is a brownish yellow colored paper used for the production of cigarette tips. It has an imitation cork imprint and joins the filter to the tobacco stick.

Filter encasing paper is used for the production of acetate or cellulose filters. The tip paper may be covered with polyvinyl alcohol. Cigar or cigarillo casing paper holds the chopped tobacco together and serves as the inner casing.

### Consumption

**United States:** Rolling paper from *Nypa fruticans* leaf. In 2008, *Tobacconist Magazine* called roll-your-own

(RYO) the tobacco industry's fastest growing segment. It estimates that 2-4% of cigarette smokers in the United States, or approximately 2.6 million people, make their own cigarettes. Many of these smokers have switched in response to increasingly high taxes on manufactured cigarettes.

**Canada:** In 2000, a Canadian government survey estimated that 9% of Canada's 6,000,000 cigarette smokers smoked hand-rolled cigarettes "sometimes or most of the time", 7% smoked roll-your-owns "exclusively", and over 90% of rolling papers sold in Canada were for tobacco consumption. A more recent 2009 study has shown that approximately 925,000 Canadians roll their own cigarettes.

**United Kingdom:** According to *The Publican*, "Low price RYO has seen an astonishing rise of 175% in [2007] as cigarette smokers look for cheaper alternatives and to control the size of their smoke". The National Health Service has reported that roll-your-own use has more than doubled since 1990, from 11% to 24%. Many of these smokers apparently believe that hand-rolled cigarettes are less harmful than manufactured products, although it is equally possible that the increase is due to the steep rise in prices since the early-1990s to the present day.

**Thailand:** In Thailand, smokers of roll-your-own cigarettes have long outnumbered smokers of manufactured brands. A 2008 survey found that 58% of surveyed smokers in Thailand rolled their own cigarettes, compared to just 17% in neighbouring Malaysia.

**New Zealand:** The New Zealand Ministry of Health reported in 2005 that: "The ratio of roll-your-own to manufactured or tailor-made cigarettes consumed by New Zealanders has risen over (at least) the past decade, perhaps reflecting price differences between these products, and currently approaching 50 percent overall."<sup>[8]</sup>

**India:** As the prices of cigarettes rise year after year, roll-your-own is becoming a trend among Indian smokers. Rolling papers and rolling tobacco are now easily accessible and can be bought at almost any Pan Shops in India.

**Taxation:** Consumers' switching to roll-your-own has led to a response among certain tax authorities. In the United States, Indiana and Kentucky tax rolling papers. Kentucky set its tax at \$0.25 per pack (for up to 32 leaves, larger packs are taxed at \$0.0078 per leaf) in 2006 despite complaints from manufacturers. Louisiana Revised Statute 47:338.261 allows up to \$1.25 per pack at retail.

### Regulation

**United States:** The FDA stated in 2011 that every brand (including private labels) of cigarette rolling papers sold

in the US must submit their ingredients and seek agency approval or withdraw from the marketplace by March of that year if they had not been sold in the US before February 15, 2007.

Herbal cigarettes (also called tobacco-free cigarettes or nicotine-free cigarettes) are cigarettes that usually do not contain any tobacco or nicotine, instead being composed of a mixture of various herbs and/or other plant material. However, Chinese herbal cigarettes contain tobacco and nicotine with herbs added, unlike European and North American herbal cigarettes which have tobacco and nicotine omitted. Like herbal smokeless tobacco, they are often used as a substitute for standard tobacco products (primarily cigarettes). Herbal cigarettes are often advertised as a smoking cessation aid. They are also used in acting scenes by performers who are non-smokers, or where anti-smoking legislation prohibits the use of tobacco in public spaces. Herbal cigarettes can carry carcinogens.<sup>[9]</sup>

### Construction

**Paper and filter:** Herbal cigarettes are most often made using standard-issue rolling papers and cigarette filters, bundled together.

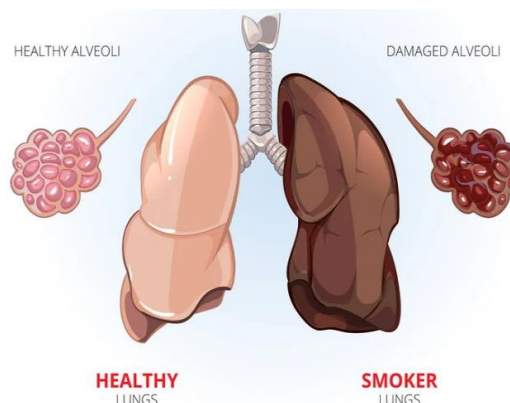


Figure-5: Health issues by cigarette.

**Herbal blend:** A wide range of consumable products may be used as a filling, in lieu of tobacco. Corn silk and a number of flavorful herbs, such as mint, cinnamon or lemongrass, have been utilized by a wide number of herbal cigarette producers. Other manufacturers have included non-herbs like rose petals or clover leaves. Some use the flavorless bagasse and make the herbal cigarette depend on the flavoring; this is especially common in shisha. Some are made with dried lettuce leaves or shredded cabbage leaves.

### Toxic chemicals

**Tar:** The tar level was found at 5.5 mg/cig, which was higher than the package indicated. In South Korea, a study found that tar levels were higher than the tolerance range set by the South Korean tobacco business law. Chinese herbal cigarettes were found to have the same amount of tar as regular cigarettes. Tar contains most of the cancer-causing and other harmful chemicals found in tobacco smoke. When tobacco smoke is inhaled, the tar can form a sticky layer on the inside of the lungs. This damages the lungs and may lead to lung cancer, emphysema, or other lung problems.



**Carbon monoxide (CO):** In a South Korean study there was carbon monoxide detected at  $12.30 \pm 0.30$  mg/cig. Vegetable-based herbal cigarettes can produce carbon monoxide equivalent to regular cigarettes.

**Aromatic amines:** 4-aminobiphenyl, a group 1 carcinogen, was marginally higher in herbal cigarettes than in regular cigarettes and 1-aminonaphthalene, 2-aminonaphthalene, and 3-aminobiphenyl was lower in herbal cigarettes than in regular cigarettes.<sup>[10]</sup>

**Smoke condensate:** The mutagenic aspect of the smoke condensate of herbal cigarettes is similar to regular cigarettes.

**Health effects:** Research shows that herbal cigarettes compared with regular cigarettes can be just as harmful in terms of the carcinogens they contain. Dr. John Moore-Gillan, chairman of the British Lung Foundation,

states the addictive qualities to herbal cigarettes may be taken out, however other harmful elements remain. A study on Chinese herbal cigarettes found they had about the same amount of carcinogens as regular cigarettes. There are toxic components of the smoke of herbal cigarettes which are similar to regular cigarettes. Aminobiphenyl can cause bladder cancer. CO can be fatal in "low concentration of approximately 667  $\mu\text{g/mL}$ ." CO can cause coronary artery disease as well. Short term symptoms of CO include headaches, dizziness, irritability and difficulty breathing.<sup>[11]</sup>

### World famous cigarettes<sup>[12-15]</sup>

**1. Gold Flake Kings** top the list of best cig in India. This indigenous brand, known as Khandani, is the highest-selling in India. Made from golden tobacco, Gold Flake Kings offers several varieties, such as Gold Flake Kings lights and Gold Flake lights. This brand's reputation is

built on quality and consistency, making it a favourite among smokers in India.

#### Pros

Wide variety of products

Made from high-quality golden tobacco

#### Cons

More expensive than other brands

**2. Wills Classic Mild;** Wills Classic Mild, another product of ITC limited, offers a stylish and readily

available option for smokers in India. Filled with blue leaf tobacco and wrapped in imported cigarette paper, this 84 mm cigarette offers a unique taste that sets it apart from other brands.

#### Pros

Unique blue leaf tobacco

Stylish design and packaging

#### Cons

Limited variety available



Figure-6: World famous cigarettes.

**3. Marlboro:** Marlboro, a globally recognized brand, offers a wide variety of flavours, including Menthol, Clove, and Red advance. Manufactured by Philip Morris, Marlboro initially launched cigarettes targeting women, but it now caters to both genders. It is also one of the best cigarette brands in India.

#### Pros

Wide range of flavours

Globally recognized brand

#### Cons

More expensive than other brands



**4. Four Square:** Four Square, one of the most established producers of cigarettes in India, offers products in various sizes. Produced both in Scotland and India, this brand's reach extends beyond national borders, demonstrating its global popularity.

Pros

Available in different sizes  
Internationally recognized brand

Cons

Availability may vary from location to location

**5. Navy Cut:** Navy Cut, another product of ITC Limited, stands out as one of the best filtered Indian-made cigarettes. Known locally as Wills, this brand offers a unique smoking experience that appeals to both local and international smokers. Navy Cut, another product of ITC Limited, stands out as one of the best filtered Indian-made cigarettes. Known locally as Wills, this brand offers a unique smoking experience that appeals to both local and international smokers.

Pros

High-quality filters  
Popular among local smokers

Cons

Limited international availability

**6. Benson and Hedges:** Benson and Hedges, a British cigarette brand, offers strong dual flavoured cigarettes. The brand, owned by various companies like Philip Morris international, British American Tobacco, and Japan Tobacco, has a global presence and offers a unique smoking experience.

Pros

Strong dual flavours  
Globally recognized brand

Cons

More robust than other brands

**7. Parliament:** Parliament, known for its rich flavour and filtered cigarettes, is a favourite among business owners and entrepreneurs. Marketed by Philip Morris, Parliament was the first brand to introduce paper filters, enhancing the smoking experience by allowing only the nicotine to reach the smoker's mouth.

Pros

First to introduce paper filters  
Rich flavours

Cons

More expensive than other brands

**8. Insignia:** Insignia, a luxury brand produced by ITC limited, is famous for its smooth tobacco flow and excellent taste. Known for its matte black packages, Insignia is a preferred choice for the corporates and college-going students.

Pros

Smooth tobacco flow  
Luxury brand

Cons

High price

**9. Pall Mall:** Pall Mall, produced by R.J Reynolds Tobacco Company, is known for its unique stuffing technique and a variety of flavours. This leading brand offers an assortment of sizes, making it a top choice for those seeking the best cigarette in India.

Pros

Unique stuffing technique  
Variety of flavours and sizes

Cons

Pricing varies depending on size and flavour

**10. Dunhill:** Dunhill, manufactured by British American Tobacco Company, is known for its quality and luxury. Available worldwide, Dunhill offers a variety of cigarettes with different content of tar and nicotine. Known for its lingering spicy taste and unique smell, Dunhill is a preferred choice for those who enjoy luxury smoking experiences.

Pros

Luxury brand  
Variety of flavours

Cons

Priced higher than other brands

## CONCLUSION

While the health risks associated with smoking cannot be understated, the demand for cigarettes in India remains high. From luxury brands like Insignia and Dunhill to more affordable options like Four Square and Navy Cut, the Indian market offers a wide range of options for smokers. Remember, it's essential to make informed choices and understand the health implications associated with smoking. It's hoped that this roundup of the best cigarette brands in India has been informative and helpful. Remember, if you're a smoker, it's never too late to quit. There are many resources available to help you quit smoking and lead a healthier life.

## REFERENCES

- Orellana-Barrios, Menfil A.; Payne, Drew; Mulkey, Zachary; Nugent, Kenneth "Electronic cigarettes-a narrative review for clinicians". *The American Journal of Medicine*, 2015; 128(7): 674-81.
- Weaver, Michael; Breland, Alison; Spindle, Tory; Eissenberg, Thomas "Electronic Cigarettes". *Journal of Addiction Medicine*, 2014; 8(4): 234-240.
- Natori T, Sata M, Washida M, Hirata Y, Nagai R, Makuuchi M. "Nicotine enhances neovascularization and promotes tumor growth". *Molecules and Cells*, 2003; 16(2): 143-146.

4. Supradip Mandal, Kushal Nandi, Dr. Dhrubo Jyoti Sen and Dr. Dhananjay Saha Hookah: the technology of smoking through water filters the alkaloid having no oxygen: *World Journal of Pharmaceutical Research*, 2021; 10(7): 1113–1129.
5. Bruijnzeel AW "Tobacco addiction and the dysregulation of brain stress systems". *Neuroscience and Biobehavioral Reviews*, 2012; 36(5): 1418–41.
6. Drope, Jeffrey; Cahn, Zachary; Kennedy, Rosemary; Liber, Alex C.; Stoklosa, Michal; Henson, Rosemarie; Douglas, Clifford E.; Drope, Jacqui "Key issues surrounding the health impacts of electronic nicotine delivery systems (ENDS) and other sources of nicotine". *CA: A Cancer Journal for Clinicians*, 2017; 67(6): 449–471.
7. Balfour, David J. K.; Benowitz, Neal L.; Colby, Suzanne M.; Hatsukami, Dorothy K.; Lando, Harry A.; Leischow, Scott J.; Lerman, Caryn; Mermelstein, Robin J.; Niaura, Raymond; Perkins, Kenneth A.; Pomerleau, Ovide F.; Rigotti, Nancy A.; Swan, Gary E.; Warner, Kenneth E.; West, Robert "Balancing Consideration of the Risks and Benefits of E-Cigarettes". *American Journal of Public Health*, 2021; 111(9): 1661–1672.
8. Schraufnagel, Dean E.; Blasi, Francesco; Drummond, M. Bradley; Lam, David C. L.; Latif, Ehsan; Rosen, Mark J.; Sansores, Raul; Van Zyl-Smit, Richard "Electronic Cigarettes. A Position Statement of the Forum of International Respiratory Societies". *American Journal of Respiratory and Critical Care Medicine*, 2014; 190(6): 611–618.
9. Franck, C.; Budlovsky, T.; Windle, S. B.; Filion, K. B.; Eisenberg, M. J. "Electronic Cigarettes in North America: History, Use, and Implications for Smoking Cessation". *Circulation*, 2014; 129(19): 1945–1952.
10. D'Souza MS, Markou A. "Neuronal mechanisms underlying development of nicotine dependence: implications for novel smoking-cessation treatments". *Addiction Science & Clinical Practice*, 2011; 6(1): 4–16.
11. Vijay Vasani, Hiren Raninga, Prof. Dr. Dhrubo Jyoti Sen and Prof. Dr. C. N. Patel Street drugs as from the height of ecstasy to the depths of hell; as quick as a flash: *European Journal of Pharmaceutical and Medical Research*, 2018; 5(8): 411–426.
12. Smolinske SC, Spoerke DG, Spiller SK, Wruk KM, Kulig K, Rumack BH. "Cigarette and nicotine chewing gum toxicity in children". *Human Toxicology*, 1988; 7(1): 27–31.
13. Bruin JE, Gerstein HC, Holloway AC "Long-Term Consequences of Fetal and Neonatal Nicotine Exposure: A Critical Review". *Toxicol. Sci.*, 2010; 16(2): 364–374.
14. Grizzell JA, Echeverria V. "New Insights into the Mechanisms of Action of Cotinine and its Distinctive Effects from Nicotine". *Neurochemical Research*, 2015; 40(10): 2032–46.
15. Benowitz NL, Herrera B, Jacob P. "Mentholated cigarette smoking inhibits nicotine metabolism". *The Journal of Pharmacology and Experimental Therapeutics*, 2004; 310(3): 1208–15.