

TOXICITY OF NICOTIANA TOBACCUM (TOBACCO) ON BIOLOGICAL SYSTEM
W.S.R. TO CARDIO-TOXICITYDr. Aruna V. Shelke^{1*}, Dr. Kailas B. Mahajan² and Dr. Sanjay S. Lokhande³¹HOD and Associate Professor, Agad Tantra Department, SRC Ayurved College, Chikhli Dist, Buldana (M.S.) India.²Assistant Professor, Agad Tantra Department, SRC Ayurved College, Chikhli Dist, Buldana (M.S.) India.³HOD and Professor, Swasthavritta Department, SRC Ayurved College, Chikhli Dist, Buldana (M.S.) India.

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ABSTRACT

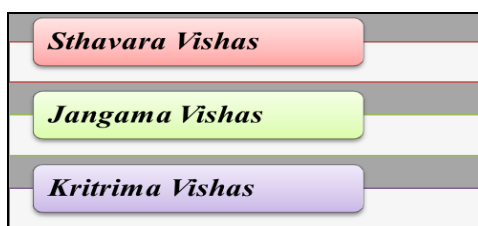
Agad Tantra is specific branch of Ayurveda which deals with study of poisons, their action and clinical complications of poisoning conditions. Agad Tantra works around acute, chronic as well as cumulative toxicity and their treatment. The various sources of poison includes poisonous plants, animals, insect and environmental toxicity, etc. Heavy metal toxicity and food incompatibility also leads toxic manifestations. Snake, spiders, scorpion and bees, etc. are major sources of animal and insect poisoning. Similarly there are many sources for plant based toxicity including Vanaspatij visha (vegetable poison) and tobacco (nicotine) poisoning is one of them. Nicotiana tobaccum (Tobacco) is responsible for many types of toxic manifestations like; lung cancer, respiratory distress, cardio-toxicity and mental abnormalities, etc. Dhoomapana of Tamraparna may leads to Hridayanasha, the nicotine induced cardio-toxicity involves consequences of irregular heart beat/pulse rate and excessive tobacco smoke may cause coronary artery disease.

KEYWORDS: Ayurveda, Vanaspatij Visha, Agad Tantra, Nicotiana Tobaccum, Tobacco.

INTRODUCTION

Ayurveda described every aspect of life and health, in this regards Ayurveda explained the concept of *Visha* (poison) and their management. The Ayurveda branch *Agad Tantra* encompasses detailed description, classifications and clinical manifestations of *Visha*. This branch also mentioned several approaches for preventing and treating poisoning conditions. *Agad Tantra* mentioned different sources of poisoning including animal, insect, plant, metals and chemical toxicity, etc.^[1-4]

Broadly '*Vishas*' are classified into three categories as depicted in **Figure 1**, *Sthavara Vishas* are originated from minerals or poisonous herbs, *Jangama Vishas* are belongs from the animal kingdom while *Kritrima Vishas* can be described as undesired compounding of drugs or artificial poisoning.

**Figure 1: Different Types of Vishas as per Ayurveda.**

The various types of *Vishas* depicted in Figure 1, amongst them *Sthavara Vishas* (originated from minerals or plant sources) can be subcategorized into *Vanaspatij visha* which mainly obtained from vegetables sources. The common example of *Vanaspatij visha* is Tobacco (Nicotine) poisoning which imparts severe adverse health effects if consumed for long period of time. Present article summarizes some aspects of tobacco poisoning W.S.R. to the effects on heart.^[4-7]

Tobacco

Nicotiana tobaccum (Tobacco) belongs to the family *Solanaceae*, in Ayurveda it is mentioned as *Vanaspatij visha* since leaves are harmful to the human being. The dried leaves are used in the form of smoke, chewing purpose or snuff. The main active constituent of Tobacco is Nicotine which causes addiction if used for chewing or smoking purpose. Nicotine also used as insecticides and somewhere in the form of drug in optimum amount.

Nicotine is known as tobacco camphor which is volatile substance and causes major impacts on human health whenever inhaled or chewed. The Sanskrit name of tobacco is *Tamraparna* due to the *Tamra varna* of leaves. It possesses *Vyavayi* and *Vikasi Karma*, acts as *Kapha-vatahara* and *Sukrahara* substance, imparts *Vasti sodhana* and *Anulomana* effects. The *Vyavayi* and *Vikasi*

Karma offer adverse health effects and contributed towards the poisoning properties of *Tamraparna*.^[7-9]

Acute poisoning symptoms

- Burning and acid sensation in the mouth
- Excessive salivation
- Nausea & vomiting
- Giddiness, faintness and numbness, etc.

Ayurvedic Properties:

- ✓ *Guna*: *Laghu, Tikshna, Vikasi* and *Vyayayi*
- ✓ *Rasa*: *Tikta* and *Katu*
- ✓ *Vipak*: *Katu*
- ✓ *Virya*: *Ushna*

The *Tikshna guna* and *Ushna virya* are responsible for *Kaphavatshamak* and *Pittvardhak* effects of nicotine. It imparts specific effects on various systems as depicted in **Table 1**.

Table 1: Specific action of *Tamraparna* on local area of body

S. No.	System/ Local Area of Body	Effects of <i>Tamraparna</i>
1	<i>Pachanvah sansthan</i>	<i>Vamak</i> and <i>Krumighna</i> effects
2	<i>Swasan sanshtan</i>	<i>Shwasan uttejiti</i>
3	<i>Mutravah sansthan</i>	<i>Alpamutra pravrutti</i>
4	<i>Prajanan sansthan</i>	<i>Garbhusa uttejak</i>
5	<i>Nadisansthan</i>	<i>Nadisansthan uttejiti</i>

The consumption of *Tamraparna* in any forms leads *Uttejiti* and *Vamak* effects due to the *Tikshna, Ushna, Vyayayi* and *Vikasi* properties. The *Alpamutra pravrutti* caused by nicotine may be due to the stimulation of sympathetic nervous system. The stimulation of this system leads retention of natural urges and speed up heart rate.

The general poisoning symptoms (*Vishakt Lakshane*) of *Tamraparna* are as follows.

- *Daha*
- *Mukshoth*
- *Bhram*
- *Murcha*
- *Drubhalya*

General pathological events of tobacco poisoning

- ✓ Rapid respiration at first then slow respiration leading to the respiratory distress.
- ✓ Respiratory failure due to the paralysis of respiratory muscles.
- ✓ Delirium, convulsions and areflexia.
- ✓ Sudden paralysis of central nervous system.
- ✓ Chronic cough, bronchitis and pharyngitis.
- ✓ Pulmonary emphysema.
- ✓ Carcinoma of buccal mucosa.
- ✓ Lung cancer.

- ✓ Poor vision, early menopause, mood stimulation and persistent cough.

Cardiac Poisoning of *Nicotiana Tobacum*

The cardiac poisoning of *Nicotiana tobacum* includes disturbance in heart rhythm and modulation in blood pressure. When tobacco is chewed or smoked the mild poisoning may occur in form of sudden rise in blood pressure. Cardiac arrhythmia or respiratory failure may observe as consequences of chronic poisoning and overdosing of tobacco. Cardiac arrhythmia, extra systole and chest pain may observe along with clinical manifestation of angina pectoris. *Dhoomapana* of *Tamraparna* leads to *Hridayanasha* which mainly seen in elderly people.

Smoking is considered as major risk factor for coronary artery disease, the poisoning effects of tobacco on heart includes irregular pulse, increases in heart rate, peripheral vasoconstriction, hypertension and arrhythmia, etc. Tobacco smoking is major reason of peripheral vascular disease in non diabetic population. Coronary event, cardiac arrhythmias and high blood pressure commonly seen in population addicted to tobacco consumption. The pulse rate decrease initially then increases rapidly due to the modulation in cardiac pumping. Very large dose of tobacco may accelerate pulse significantly due to the increases in heart rate.

The inhalation or consumption of tobacco first causes stimulation of nicotinic cholinergic receptors which resulted hypertension and tachycardia. The second phase is considered as inhibitory phase which involves symptom of hypotension and bradycardia, etc. As per literature it is evident that risk of coronary heart disease (CHD) may be twice in heavy smokers. Nicotine stimulates vagal and autonomic ganglia therefore causes stimulatory action then affects cerebral and spinal centers also, these all pathological effects alters cardiac activity and leads adverse effects on the functioning of heart. Constricted blood vessel is major pathological event associated with tobacco addiction; this further may leads chances of cardiovascular disease and stroke.^[8-10]

Ayurvedic Treatment of Tobacco Poisoning

✚ *Nidanam parivarjanam*

Need to avoid the uses of tobacco.

✚ *Sodhan chikitsa*

Sodhan chikitsa helps to remove toxins from the body.

✚ Medicines

Cardio protective drugs like *Arjuna, Dashmool, Aswagandha* and *Hirak Bhasma*, etc. can be used to protect and strengthen heart against tobacco poisoning.

✚ Yoga & Meditation

These therapies helps to control mind thus improves will power which can help to quit tobacco. The *Pranayama*

play significant role to combat against the toxic symptoms of tobacco and also boost up mental strength.

CONCLUSION

Tobacco (nicotine) poisoning described as *Vanaspatij visha* in ancient text which is responsible for many types of toxicity including lung cancer, cardio-toxicity, mental abnormalities and respiratory distress, etc. Consumption of *Tamraparna* in any forms leads *Hridayanasha* (cardio-toxicity) which involves consequences of irregular heartbeat, coronary artery disease, rise in blood pressure, cardiac arrhythmia, chest pain and angina pectoris, etc. The *Vyavayi* and *Vikasi Karma* of *Tamraparna* impart poisoning symptoms as like other poisons. The consumption of *Tamraparna* leads *Uttej* effects on heart due to their *Tikshna*, *Ushna*, *Vyavayi* and *Vikasi* properties. The stimulation of sympathetic nervous system speeds up heart rate and causes rise in blood pressure. *Nidanam parivarjanam*, *Sodhan chikitsa* and *Yoga* or meditation can be suggested for preventing or treating tobacco poisoning along with cardio protective drugs like *Arjuna*, *Dashmool*, *Aswagandha* and *Hirak Bhasma*, etc.

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