

## Scientific Approach to Treat Tobacco Addiction – A Review

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### ABSTRACT

In this current review, we have gathered the information regarding the various aspects of tobacco. The propagation & measures taken like the climatic condition for instance temperature, soil texture are discussed in this review. The different methods of isolation using fungal pectinase to release mesophilic cells & its further process are reviewed in this work. Attempts have been made to gather information on the side effects of tobacco & the various measures to treat nicotine addiction are highlighted in this article.

KEYWORDS ; Tobacco ,Chemical constituents ,Isolation , Treatment , Nicotine patches .

### INTRODUCTION

Tobacco is a product prepared from leaves of the tobacco plant by curing them. Tobacco consists of dried leaves of '*Nicotiana tabacum*', belonging to family 'Solanaceae'. While more than 70 species of tobacco are known, the chief commercial crop is *nicotiana tabacum*. The more potent variant *Nicotinum rustica* is also used around the world. (Kokate C.K 2017)

Tobacco is a plant grown for its leaves which are dried and fermented before being put in tobacco products. Tobacco contains nicotine an ingredient that can lead to addiction which is why so many people who use tobacco find it difficult to quit. There are also many other potentially harmful chemicals found in tobacco or created by burning it.

### CLIMATIC CONDITION

Climatic requirements for tobacco cultivation is basically tobacco is a semi tropical crop but can be successfully grown in tropical region. It requires 210 °C to 310 °C temperatures during growth period. The cultivation of tobacco usually takes place annually. It has a height of 1 to 3 meters. It has erect stem and few branches. The tobacco is germinated in cold frames or in early spring. Depending upon the nature of the tobacco, the requirements of the soil and climate also vary. Seeds are used for the cultivation. The majority of varieties will start showing germination in 7-10 days, or even a little sooner but different varieties do germinate at different speeds. It is unusual for some to take a long as two weeks to show signs of germination and this can stretch into

3-4 weeks in cold soil and in summer heat. The crop can be grown on heavy textured soils (sand clay loam and heavier) provided. For limitation of the growth appropriate measures taken to overcome this by late ploughing. Tobacco is sensitive to water logging.

Warm season veggies require both warm soil and high temperature (with a little cooling at night). To grow staidly and produce crops they include traditional summer crops such as beans etc. (Kokate C.K. 2017).

### MORPHOLOGICAL CHARACTERS

COLOUR :- Green or slightly brown

ODOUR :-Characteristic to nicotine

TASTE :- Bitter

SIZE :- 62 to 80 cm in length, 35 to 45 cm width

SHAPE :- Ovate. Elliptic or lanceolate

### EXTRA FEATURES

The leaves are usually sessile, sometimes petiolate and with frilled wing.

### TOP 10 LARGEST TOBACCO PRODUCING COUNTRIES ACROSS THE WORLD IN 2018-2019

- 1) CHINA
- 2) BRAZIL
- 3) INDIA
- 4) UNITED STATE OF AMERICA
- 5) INDONESIA
- 6) ARGENTINA
- 7) ZIMBABWE
- 8) TURKEY
- 9) MALAWI
- 10) PAKISTAN

### ISOLATION OF TOBACCO MESOPHYLL CELLS IN INTACT AND ACTIVE STATE

A Procedure using a fungal pectinase was developed to rapidly release mesophyll cells from tobacco leaves. 50 % to 90 % of the released cells were morphologically intact and were converted into spherical protoplasts by cellulose treatment. Cells isolated from tobacco mosaic virus inoculated leaves supported multiplication of the virus during subsequent incubation. (James F, Shepard 1995)

### INFECTION OF TOBACCO MESOPHYLL PROTOPLASTS BY TOBACCO MOSAIC VIRUS

It was provided that the protoplasts prepared from mesophyll of *nicotina tabaccum* are infected by tobacco mosaic virus. The infection occurred when purified tobacco mosaic virus particles were added to a protoplast suspension in the presence of poly-L-ornithine. The virus multiplied in this protoplast to a level of  $10^6$  virus particles per infected protoplast during 24 hours of incubation. The efficiency of infection was remarkably high exceeding that by mechanical inoculation of tobacco leaves.

Isolated protoplasts from healthy tobacco mesophyll tissues were infected by contact with infectious RNA from tobacco mosaic virus (TMV). During subsequent incubation of the protoplasts in a liquid medium, a synchronous multiplication of TMV occurred and the amount of intracellular virus reached a maximum after 22 hrs. Fluorescent antibody staining showed that 3-7% of the protoplasts were infected. Average virus yield per infected protoplast was estimated to be  $0.9-5.5 \times 10^5$  particles (saoki, takebei, otsaki, 1969).

### CHEMICAL CONSTITUENTS

Tobacco contains pyridine –Piperidine type of alkaloids, (0.5 to 1.5%) among which the most prominent is nicotine. The other alkaloids are nornicotine and anabasine.

The in vitro addition of 7,8 benzoflavone inhibits the aryl hydrocarbon hydroxylase in hepatic microsomes from methylcholanthrene treated male rats, but not in hepatic microsomes from control or phenobarbital treated animals. (Kokate C.K 2017).

### CHEMICAL TEST

Aqueous extract of tobacco when treated with cyanogen bromide solution gives orange colour. (Kokate C.K 2017).

### HOW DO PEOPLE USE TOBACCO

People can smoke, chew or sniff tobacco. Tobacco smoked products has cigarette, cigars, bidis and kreteks and some other people will smoke loose tobacco in a pipe or hookah it is also called water pipe. Products of chewed tobacco include chewing tobacco, snuff, ndip and snus; snuff can also be sniffed (Ibrahim al ,msjygross 1990).

### HOW DOES TOBACCO EFFECT THE BRAIN

The nicotine in any tobacco product readily absorbs into the blood when person uses it upon entering the blood, nicotine immediately stimulates the adrenal glands to release the hormone epinephrine (adrenaline). epinephrine stimulates the central nervous system and increases blood pressure breathing and heart rate .as with drugs such a cocaine and heroin, the brain is activated by nicotine which reward circuits and also increases level of the chemical messenger dopamine which reinforces rewarding behaviours, by this studies suggests that other chemicals in tobacco smoke such as acetaldehyde, it may enhance nicotine`s effects on the brain.(Ibrahim al ,msjygross 1990 ).

### MISCELLANEOUS HEALTH EFFECTS OF TOBACCO USE

Nicotine is addictive most of the severe health effect tobacco use comes from others chemicals. Tobacco smoking can lead to lung cancer chronic bronchitis and emphysema. It increases the risk of heart diseases, which can lead to stroke or heart attack. Cancer is linked by smoking like leukaemia, cataracts and pneumonia all of this problem apply to use of any smoked product , including hookah tobacco . The risk of cancer is increases by smokeless tobacco especially mouth cancer.

The risk of miscarriage is increased in pregnant women to those women who and all smoke cigarettes infants with low birth weight or premature infants or stillborn. During pregnancy smoking may also be associated with learning and behavioural problems in exposed children.

During smoking people who and all stand or sit near others smokers it exposed to second hand smoke either coming from the burning end of the product of tobacco or exhaled by the person who is smoking. Second hand smoke exposure can also lead to the diseases called as lung cancer and heart related diseases. It can cause health problems in both adults and in children, such as coughing phlegm reduced lung function pneumonia and bronchitis. Children exposed to second hand smoke are at an increases risk of ear infection, lung infection severe asthma and death from sudden infant death syndrome.

#### HOW DOES TOBACCO USE LEAD TO ADDICTION

Long term use of tobacco brain changes brought on by continued nicotine exposure it results in addiction .when a person tries to quit her or she may have withdrawal symptoms such as

- \*Irritability
- \*Increased appetite
- \*Problems paying attention
- \*Powerful cravings for tobacco
- \*Trouble sleeping

#### HOW CAN PEOPLE GET TREATMENT FOR NICOTINE ADDICTION

Both behavioral treatments and medication can help people quit smoking but the combination of medication with counseling is more effective than either alone

A national toll-free quit line has established by the U.S. department of health and human services , 1-800 quit now, to serve as an access point for anyone seeking information and help in quitting smoking .

#### BEHAVIORAL TREATMENTS

Behavioral treatment use a variety of methods to help quit smoking in people it ranging from self-help materials to counseling

Tobacco road novel by Erkin Caldwell published in 1932, a tale of violence and sex among rural poor in the American south. The novel was highly controversial in its time. It is the story of Georgia sharecropper Jeeter Lester and his family, who are trapped by the bleak economic condition of the depression as well as by their conceited intelligence and destructive sexuality Its tragic ending is almost

foreordained by the characters inability to change their lives. (Ibrahim al , MS jygross 1990).

#### NICOTINE

Nicotine is a potent parasympathomimetic of stimulant and an alkaloid found in the nightshade family plants. Nicotine acetylcholine receptors, except at two nicotinic receptor subunits where it acts as a receptor antagonist. Nicotine is found in the leaves of *nicotiana rustica*.

#### WHAT TYPE OF DRUG IS NICOTINE

Nicotine is a legal, highly addictive drug found in many forms. The usual way is cigarettes. It is a stimulant which means it increases heart rate circulation and the production of dopamine.

Nicotine is chemical that contains nitrogen, which is made by several type of plants, including the tobacco plant. It is a colourless, odourless liquid with an oily consistency but when exposed to light or air, it acquires a brown colour and gives off a strong odour of tobacco. Nicotine is the chief addictive ingredient in the tobacco used in cigarettes, cigars and snuff

Its formula : C<sub>10</sub> H<sub>14</sub> N<sub>2</sub>

Molar mass : 162.23grams/Mol

Elimination half – life: 1 to 2 hours, 20hours active metabolite

Addiction liability: High

Melting point : 79 degree C{-110 degree F}

Metabolism: primarily hepatic CYP2A6,CYP2B6, FM03

Excretion: urine {10-20%{gum}}, PH dependent, 30%{inhaled} 10-30% {int}

#### NICOTIN PATCH; THE BEST TOOL FOR QUITTING

The tough job of the smoking is trying to quit .the psychological part of the habit in addition to having to break every one also face which nicotine addiction getting off of nicotine is a difficult processes no matter what and it can be so brutal if u take the abrupt 'cold turkey' method that many smokers just can't get through .nicotine replacement methods can help smokers kick the habit by allowing them to step down on the amount nicotine they consume

#### HOW NICOTINE PATCHES WORK

That is where the nicotine patches come in the patches stick on your body through the skin you

absorbed the nicotine into your blood stream this is known as transdermal for smoking nicotine into your system as a replacement The nicotine which is covered by a layer of plastic by the nicotine patches that have a pad and that layer of plastic and to look like a bandage, extremely sticky of the patches are seen and stay in place for most of the day ,and will usually not come off even if a bump them into something in general they are designed to be worn for 24 hrs and delivered a specific amount of nicotine over that period

#### **NICOTINE LEVEL**

The nicotine patch roughly correlates are the beginning dosage form to heavily you smoked so that it will provide an initial adequate replacement for the nicotine you consumed in cigarettes. the strengths range from 7mg to 21mg. the intention is that after some time ,your body will requires less nicotine and you can step down to a lower strength until you are gradually able to taper off the nicotine replacement patches altogether

#### **HOW IS NICOTINE BAD FOR YOU**

It isn't the stuff that can cause serious illness and death from cancer, lung and heart disease. Those culprits are the tar and toxic gases that are released from burning tobacco when you smoke .nicotine is a chemical that is dangerous not because it causes cancer but because it can addict you to cigarettes

#### **USES OF NICOTINE PATCHES**

This medication can help to quit smoking by replacing the nicotine in cigarettes. The nicotine in tobacco is an important part of cigarette addiction. When you stop smoking, your nicotine levels drop quickly. This drop can cause withdrawal symptoms such as craving tobacco nervousness irritability headache weight gain and difficulty concentrating.

Stop smoking is hard and your chance of success of is best when you are ready and have made a commitment to quit. Nicotine replacement products are part of a total stop smoking program that includes behaviour change counseling and support. Smoking causes lung diseases cancer and disease

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Stop smoking is one of the most important things you can do to your health and live longer

#### **WHAT FORMS DOSE THIS MEDICATION COMES IN**

The medication is available as 7 mg/day, 14mg/day and 21mg/day

#### **WHO SHOULD NOT TAKE THIS MEDICATION:-**

- Are allergic to nicotine or any ingredient of patches
- Are a non smoker or an occasional smoker
- Are under 18 year of age
- Are pregnant or breast feeding
- Have just had a heart attack
- Have life threatening arrhythmias
- Have severe or worsening angina
- Have recently had a stroke
- Have a generalized skin disorder. (Bergcj, Thomas JI, Guoh ,2010).

#### **SOME OF THE DRUGS WHICH COULD INTERACT WITH THIS MEDICATION ARE**

There may be an interaction between nicotine patches and any of following:-

Acetaminophen  
Adenosine  
Benzodiazepines  
Caffeine  
Furosemide  
Imipramine  
Insulin  
Labetalol  
Phenylephrine  
Prazosin( Berg cj, Thomas JL, Guoh an , 2010).

#### **CONCLUSION & SUMMARY**

In this review we have obtain the information about the morphological characteristics of tobacco .The different methods of isolation using fungal pectinase to release the mesophilic cells and also obtaining the information of drawbacks and different measure to treat nicotine addiction is important topic in this article .

**REFERENCES**

1. Berg CJ, Thomas JL, Guoh, Okuyermi KS, Collinstc, et al, (2010); Predictions of smoking reduction among blacks ; Nicotine and tobacco research; 12(4); 423-31
2. Ibrahim ,Al , Ms Jygross (1990); How does people use tobacco , 3rd edition Bosten butter worths ; Chapter 40
3. James F, Shepard ,Rogere ,Totten, (1975); Isolation and Regeneration of tobacco mesophyll Cells protoplast under low osmotic condition; plant physical; 55(4); 689–694
4. Kokate C K, Purohit A P, Gokhale S B, (2017); Pharmacognosy 53rd edition ,Natural pesticides, Antibiotics and Allergenic extracts, 18.9-19.12
5. Saoki ,Takebei , Otsaki Y, (1969); Infection of tobacco mesophyll protoplast by tobacco mosaic virus, Proc Natl Acad Sci; 64(3); 843-848