



DEPARTMENT OF CHEMISTRY

A CHEMISTRY PROJECT ON
"INVESTIGATION OF NICOTINE IN
TOBACCO PRODUCTS"

In Partial fulfillment of All India Secondary
Certificate Examination

SUBMITTED BY:

NAME: Pranab Bhakta

CLASS: XII (Sc)

ROLL NO:.....

GUIDED BY:

Dr. S.K. Mishra

P.G.T. Chemistry

AIM

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To extract nicotine from tobacco and to determine the percentage of nicotine deposited as tar in various brand of tobacco product and make a comparison.

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ACKNOWLEDGEMENT

I thankfully acknowledge the guidance and support provided to me by all my well-wishers for completing project work.

At the beginning, I would like to pay my regards to our chemistry teacher Dr. S.K. Mishra for his guidance and support.

Finally I would like to thank all my class-mates for their help and support.

NAME:Pranab Bhakta

Class : XII (Sc.)

Roll No. :

JNV Dibrugarh

CERTIFICATE

This is to certify that Roll No. a student of Jawahar Navodaya Vidyalaya, Dibrugarh of Class XII (Sc.) has successfully completed this chemistry project entitled "**Investigation of Nicotine in Tobacco Products**" as part of CBSE under the direct guidance of the Chemistry teacher.

This chemistry project is hereby submitted by the student

Dr. S.K. Mishra
Head of Chemistry Dept.
JNV Dibrugarh
Date:

INTRODUCTION

This project was undertaken to educate the students about the ill effects of cigarette smoking caused due to the deposition of nicotine. Nicotine is a highly toxic and addictive drug which can cause serious damage to smokers and their children. The project was undertaken under two sections and subsequently compiled to form one investigatory project.

QUALITY OF TOBACCO :-

Tobacco belongs to the family Solanaceae. The genus is *Nicotina*, which includes about 35 species. The most widely grown species are *N. glauca* and *N. glauca*.

The world trade is usually carried out with *N. glauca* only and not *N. glauca*. The trade classification is based on the use to which the leaf is put to, namely, cigar, cigarette, beedi, snuff etc.

The quality of the tobacco is judged by the following characteristics:

- **Color :** Color is an index of strength of tobacco. The darker the tobacco the stronger it is. In case of cigarette tobacco the color should be bright lemon yellow or light brown. Dark leaves are preferred for beedi and pipe tobacco.
- **Texture:** Thick leaves have greater nicotine content than thin leaves. The cigarette leaves should be thin and fine. In the case of cigars, the texture should be medium to heavy. Thick leaves are preferred for beedi and chewing.
- **Size :** It is considered important only in case of the wrapper tobacco of the cigar.

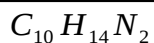
DISEASE IN TOBACCO PLANT

The common disease are as follows -

1. Mosaic
2. Wilt (bacillus Solanacearum)
3. Mildew (Eryshipcichoracearum)
4. Leaf of spot disease (Cercosporanicotianae)

PEST OF TOBACCO-

1. Tobacco stem borer (Gnorimaschemaphlorimoer)
2. Cricket (Brachytrypesachatinus)
3. Tobacco borer.



PHYSICAL PROPERTIES OF NICOTINE

Nicotine is colourless volatile liquid. It boils at 246-247 °C. It is soluble in most solvents including water. Pure nicotine ($C_{10}H_{14}N_2$) is highly poisonous and has a unpleasant odor.

It, is to a small extent, used in medicine and for horticultural insecticides. It posses sharp taste. It is hygroscopic and distils over the still. Aqueous nicotine is strongly alkaline to litmus.

It is easily soluble in ethanol, light petroleum, ether and benzene. On exposure to air it turns yellow then brown.

Nicotine is laboratory. It is converted to nicotine acid on oxidation with potassium permanganate or chromic acid. Nicotine is a plant growth regulator and a vitamin. The structure of nicotine is given below.

EFFECT OF NICOTINE

Nicotine effects the nerve which are activated by acetylcholine neurotransmitter. It causes increase in the blood pressure and heart beats by constricting the arteries. It decreases the secretion of the pancreases leading the avodenalvicers. It cause intra beats in the heart, which can cause attack of angina or bring about an heart attack.

COMPONENT	PERCENTAGE
Carbohydrates	23
Protein	12.2
Soluble nitrogenous compound	3.3
Cellulose	10
Ether soluble resin	7.00
Pentose	3
Tennins	2
Organic Acid	13
Unidentified	7.5
Inorganic compounds	12
Pectin	7

PATHWAY OF CARBON FOR ALKALI OI D ALKALOID FORMATION IN THE SEQUENCE

Sugar organic acid amino amino acid alkaloid

EXPERIMENT NO. 2

Extraction of Nicotine from the tobacco products

Apparatus required :

- Conical Flask
- Separating funnel
- Water bath
- Beaker
- Funnel
- Test tube

Chemical Required :

- Concentration NaOH
- Concentration HCl
- Ether

Procedure

- About 100gm of tobacco was taken in a conical flask and 50 ml of concentrated NaOH was added to it. The contents were warmed on a low flame and stirred vigorously. The process was continued till strong smell of tobacco started coming out of the flask.
- When the entire amount of tobacco had mixed with the NaOH, the contents were cooled to room temperature. The contents were then transferred to a separating funnel, which had already been washed, and about 80 ml of ether added. Later the contents were stirred gently to ensure complete mixing. Sometimes was allowed to elapse till the ether layer separated from the rest of the contents. Then the bottom layer of NaOH was removed and poured back to the flask. The ether was taken in a beaker and placed in a boiling water bath to allow the ether to evaporate.

➤ The process was repeated for all the four varieties of leaves

that were investigated. To confirm the presence of nicotine, a small quantity of the liquid was treated with concentrated HCl. The dark brown colour of the solution confirmed the presence of nicotine.

Result

Sample	A	B	C
Original wt. of the tobacco leaves (gm)	13.48	19.14	10.31
Wt. of boiling tube without nicotine (gm)	30.51	32.61	30.40
Wt. of tobacco tube with nicotine (gm)	30.58	33.32	31.35
Wt. of nicotine (gm)	0.07	0.71	0.95

With increase in the colour of the tobacco leaf the nicotine content also increase in the sample.

By products and uses:

Tobacco stalks can be used as fertilizers, fuel, compost, paper manufacture, fiberboard and insulating board. Oil has been extracted from the tobacco seeds. Tobacco is a source of many chemicals including (alkaloids used as pesticides), nicotine and acids (vitamins), pectin and certain organic acids.

PICTORIAL EVIDENCE

BIBLIOGRAPHY

I had taken help from

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By S.C. Khetrapal, S.N. Dhavan and P.N. Kapil
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