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Tobacco-based Dentifrices: A Common Practice in Rural India's Oral Care Routine

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Abstract

This study is to assess the prevalence of tobacco-based toothpaste and tooth powder among the population of Barsana (Mathura) town and chemically analyse the tooth powders with infrared spectroscopy. The study involved 68 subjects from Barsana town in the range of 25 years to 60 years out of which 20 were male subjects and 48 subjects were female. 4 out of 20 male patients consumed these tobacco-based dentifrices n=4/20 on the other hand 14 out of 48 individuals consumed tobacco n=14/48. We also assessed how many of the subjects were willing to quit these tobacco dentifrices in which we found that 5 people were not willing to quit the habit and 13 people were willing to quit this habit. IR is done by an interest in examining nicotine in these tobacco-containing dentifrices. IR study confirms the presence of functional groups of nicotine.

Keywords: Tobacco Based Dentifrices, IR Spectroscopic Analysis

Introduction

Nicotine is the principal substance of tobacco. [1].Tobacco kills up to half of its users who don't quit[3-5]. India has the highest share of oral cancer in the world. Tobacco kills more than 8 million people every year, including an estimated 1.3 million non-smokers due to passive smoking. [2]. The main effects of nicotine are elevated blood pressure, heart rate, and respiration rate; elevated blood catecholamine levels; elevated levels of free fatty acids; elevated blood sugar levels; and disruption of antioxidant defence mechanisms [6-10]. There is compelling evidence that using smokeless tobacco increases the chance of developing oral mucosal lesions [11,12], including oral precancerous lesions, gingival recession [13], cardiovascular disease, diabetes, adverse effects on reproductive health, and overall mortality. Nicotine exerts harmful effects on the foetus and enters the placenta quickly [14,15]. An average smoker's life expectancy is shortened by seven years [16]. In India, Tobacco paste is easily available in the rural market and there are many studies including our study it is observed that tobacco paste is more prevalent in females than in males. As in developing countries like India, this tobacco paste is a one-stop solution for dental needs and tobacco cravings and many companies use the

addictive nature of nicotine by packaging and positioning them as dant manjan.[17] Indians use tobacco in several different ways: smoked tobacco, which includes cigarettes and bidis (dry tobacco rolled in paper or leaf); smokeless tobacco (ST), which includes sucking gutkha, chewing Khaini, Surti, or Paan Masala, and using Gul or Gudaku as a dentifrice.[22]

Indian government prohibits the use of tobacco as an ingredient in dental products. [10,18] In the eastern states of India, including Assam, Arunachal Pradesh, Uttar Pradesh (UP), and Bihar, Gul—tobacco containing dentifrice—is a pyrolyzed tobacco product combined with sugar or molasses, alkaline modifiers, and other unidentified ingredients. It is sold in small tin cans under various brand names. Research on nicotine levels in popular dental cleaning products in India revealed that Gul had a total of 13,400–17,100 ng/g of tobacco-specific nitrosamines (TSNAs) and 216.10 mg/g of nicotine. [19,20]

This study is to assess the prevalence of tobacco-based toothpaste and tooth powder among the population of Barsana (Mathura) town and chemically analyse the tooth powders with infrared spectroscopy.

Material and Method

The present study is a cross-sectional study which was carried out in a dental camp in Barsana Town. Patients from age 25 to 60 years were asked about their regular toothpaste and powder. The subjects asked questions with an anonymous pre-tested questionnaire. Before asking any question proper consent was taken from the patients who were not willing to participate and were excluded from the survey. Only a few minutes were required to perform the survey. The study population of natural sampling was used and the study population was calculated by the formula n=z.p.q/r^2. The sample size obtained was = 68. The study was conducted on 68 individuals aged between 25 years to 60 years old. The patient was asked a few questions about their toothpaste to understand the kind of dentifrices they use and whether is it possible for them to quit these tobacco-based toothpastes or not. As these dentifrices are mostly addictive to use so a very brief habit cessation counselling was done to quit the habit. Then descriptive statistical tests were conducted chi-square tests were conducted. Data was analysed under spss version 19. Further chemical analysis of the tooth powder and paste was done with Infrared spectroscopy. Infrared spectroscopy is done to identify the presence of nicotine in the tooth powder contain.

Three brands of particular batches of commonly used non-medicated tooth powders were selected on the basis of the survey. The tooth powder was coded as follows S1= Nirala, S3= Musaka, S2= 5 photo. Samples are prepared by crushing the sample which has an oily texture this thin layer is applied over a salt plate to be measured.

Results and Discussion

Nicotine is the principal substance of tobacco. [1].Tobacco kills up to half of its users who don't quit[3-5]. Tobacco kills more than 8 million people every year, including an estimated 1.3 million non-smokers due to passive smoking. [2] . Many companies use the addictive nature of nicotine by packaging and positioning them as dant manjan.[17] Indian government prohibits the use of tobacco as an ingredient in dental products[10,18]. In Delhi, 6.9% of adults only used smokeless tobacco, making up 24.3% of the adult population who currently used tobacco. In comparison to other states and union territories, Delhi reported a 10.5% prevalence of smokeless tobacco use and a 0.3% prevalence of oral tobacco use (as Mishri, Gul, and Gudakhu). [21] The study involved 68 subjects from Barsana town in the

range of 25 years to 60 years out of which 20 were male subjects and 48 subjects were female.

A standard anonymous questionnaire modified (GATS) was used in this survey. We assessed that 26.47% of the sample population used orally applied tobacco which is way more higher than Mehra et al.[23] this increase in usage of oral tobacco is due to poverty as these orally used tobacco like gul, nirala serve as a one-stop solution for dental needs and tobacco cravings. 4 out of 20 male patients consumed these tobacco-based dentifrices n=4/20 on the other hand 14 out of 48 individuals consumed tobacco n=14/48. This data was statistically insignificant with a p value of p=0.434. [ref table1] This clearly shows women have a higher consumption rate of tobacco-based dentifrices than male subjects. Now this is very clear that Smokeless tobacco is consumed more by females than by males as this is less stigmatised for women and also easy to conceal.

The money spent on Gul likely serves a variety of purposes, such as providing an alternate tobacco source, pain treatment, and assistance with mouth hygiene. According to our analysis, 74.19% of Gul users said they began using the product to relieve dental pain, and the majority of Gul consumers had never seen a dentist. Therefore, rather than seeing a dentist, the upper lower class, with its limited financial means, turns to such tactics for pain treatment. In many rural areas of India, there is a widespread perception that smokeless tobacco is a pain reliever and provides preventive properties for teeth. According to recent reports, teenagers in India are still using tobacco products as dentifrices, proving that this misconception persists. [24]

We assessed which tobacco-based dentifrice is most popular in this particular area. we assessed that 14.70 % out of the total subject (n=10/68) used nirala manjan , 2.94% of individuals n=2/68 used musaka gul , 8.82% (6/68)of the total individuals used 5 photo manjan.[ref. table 2] We also assessed how many of the subjects were willing to quit these tobacco dentifrices in which we found that 5 people were not willing to quit the habit and 13 people were willing to quit this habit. statistically, the value is significant p= 0.016.[ref.table 3] Maybe this is due to poor awareness among the people of rural or semi-urban areas.

IR is done by an interest in examining nicotine in these tobacco-containing dentifrices. IR study confirms the presence of functional groups of nicotine. In IR spectroscopy mainly two main regions are observed The functional group region and the fingerprint region. The fingerprint region ranges from 1600-625cm-1. [ref graph 1, graph 2, graph 3]

Survey Observation

Table 1

Population	Medicated toothpaste	Tobacco-tooth powder
Male patient	16	4
Female patient	34	14
Total	50	18

P value is 0.434 not significant at $p<0.05$

Table 2

Tobacco based tooth powders	Count	Percentage
Nirala manjan	10	14.70%
Musaka gul	2	2.94%
5 photo manjan	6	8.82%
Gudaku paste	0	0%
Total	18	26.47%

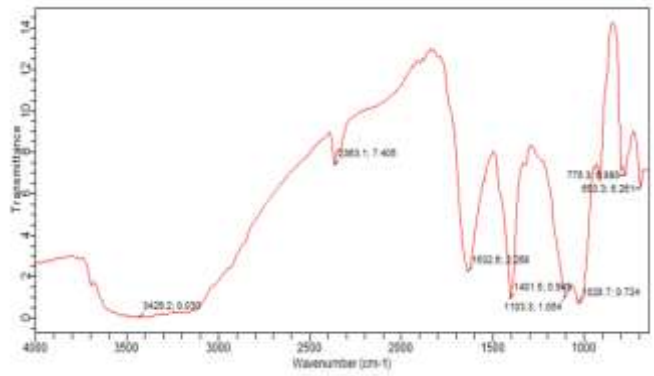
Table 3

	Patient willing to quit	Patient not willing to quit
Male	1	3

Female	12	2
Total	13	5

P value is 0.016 hence significant at p<0.05

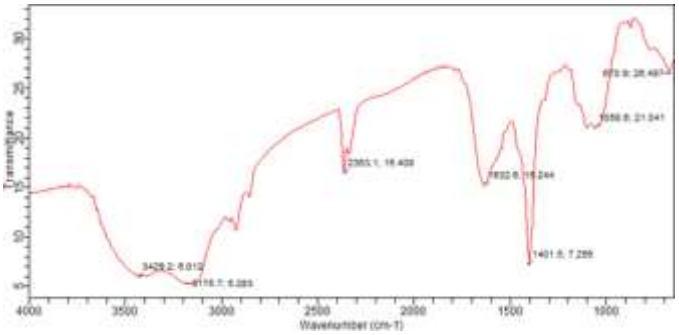
IR Study of the Sample (Nirala Manjan, Musaka Gul, 5 Photo).



Sample: Nirala Manjan (S1) [Graph1]

Range: 4000 – 650

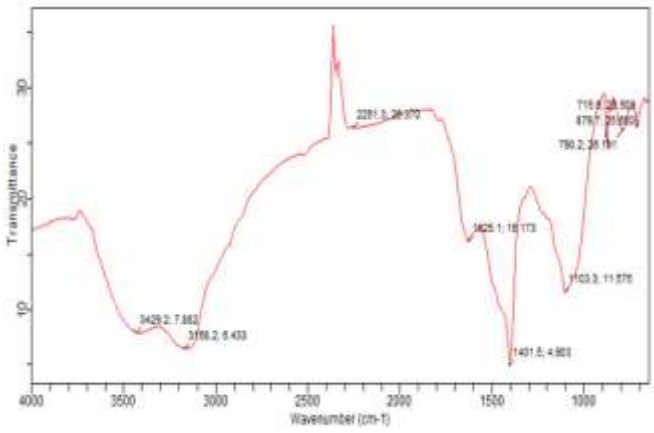
Anodization: Happ - Genzel 2.



Sample: 5 PHOTO(s2) [graph2]

Range: 4000 – 650

Apodization: Happ-Genzel



Sample: Musaka Gul (s3) [graph3]

Range: 4000 – 650

Conclusion

In conclusion, our study has managed to bring the prevalence of tobacco-based toothpaste in the Barsana region near Mathura, Uttar Pradesh and confirm the presence of nicotine in these paste through IR. Our study does have a few limitations such as a limited number of subjects and a very small area. Awareness programmes are needed of the hour to educate people about the ill effects of these tobacco-based dentifrices/manjans. It is very important to regulate the selling of these tobacco-based dentifrices by local grocery shops as dental hygiene aids. In our study, we found that everyone used these manjans as a dental pain reliever.

Our research has shown that to limit the harm this manjan consumption is causing, It is now very important to pay attention to this emerging threat.

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