

## Original Research

### Assessment of effect of areca nut and smokeless tobacco- related habit in altering physical properties of saliva

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#### ABSTRACT:

**Background:** Areca nut is the fourth most commonly used social drug, ranking after nicotine, ethanol, and caffeine. The present study was conducted to assess effect of areca nut and smokeless tobacco- related habit in altering physical properties of saliva. **Materials & Methods:** 100 adults of both genders were divided into 2 groups of 50 each. Group I were with a habit of areca nut and smokeless tobacco and group II without any habit. Saliva samples were collected for analysis of salivary flow rate (SFR), pH, and buffering capacity using the GC Saliva Check Buffer Kit™. **Results:** Group I had 30 males and 20 females and group II had 25 males and 25 females. The mean stimulated salivary flow rate in group I was 3.1 ml/minute and in group II was 4.5 ml/minute. The difference was significant ( $P < 0.05$ ). The mean salivary pH in group I was 6.4 and in group II was 7.8. The difference was significant ( $P < 0.05$ ). **Conclusion:** There was reduction in salivary flow and change in the pH as well as the buffering capacity of the salivary flow in subjects with areca nut and tobacco-related habits.

**Key words:** Areca nut, smokeless tobacco, salivary flow rate

Received: 15-07- 2019

Accepted: 20-08-2019

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**This article may be cited as:** Shailly. Assessment of effect of areca nut and smokeless tobacco- related habit in altering physical properties of saliva. J Adv Med Dent Sci Res 2019;7(9):267-269.

#### INTRODUCTION

Areca nut is the fourth most commonly used social drug, ranking after nicotine, ethanol, and caffeine.<sup>1</sup> Over 600 million people presently use some form of areca nut worldwide, with the centers of heaviest use in Asia and the Western Pacific, as well as the Asian Diaspora who have settled in Africa, Australia, and the United States and United Kingdom.<sup>2</sup> Areca nut self-administration, with or without tobacco, is likely supported in part by arecoline, the primary psychoactive constituent in the nut. Arecoline is an alkaloid with primarily muscarinic cholinergic agonist properties.<sup>3</sup> Thus, areca nut consumption affects both sympathetic (e.g., increased adrenaline and noradrenaline) and parasympathetic (e.g., increased heart rate and blood pressure, pupil dilation) as well as the central (increased attention, dizziness) nervous systems.<sup>4</sup>

Whole saliva is a unique body fluid continually bathing the mucosa of the oral cavity, oropharynx, and part of the larynx.<sup>5</sup> It is a clear, slightly acidic, complex muco-serous secretion derived from the salivary glands, gingival fold, and oral mucosal transudate, in addition to containing mucous of the nasal cavity and the pharynx, non-adherent oral bacterial, food remainders, desquamated epithelial and blood cells as well as traces of medications or chemical.<sup>6</sup> Like the serum, saliva also contains hormones, antibodies, growth factors, enzymes, microbes, and their products.<sup>7</sup> The present study was conducted to assess effect of areca nut and smokeless tobacco- related habit in altering physical properties of saliva.

**MATERIALS & METHODS**

The present study comprised of 100 adults of both genders. All gave their written consent for the participation in the study.

Data such as name, age, gender etc. was recorded. Subjects were divided into 2 groups of 50 each. Group I were with a habit of areca nut and smokeless

tobacco and group II without any habit. Saliva samples were collected for analysis of salivary flow rate (SFR), pH, and buffering capacity using the GC Saliva Check Buffer Kit™. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**RESULTS**

**Table I: Distribution of patients**

Groups	Group I	Group II
Habit	Areca nut and smokeless tobacco	Control
M:F	30:20	25:25

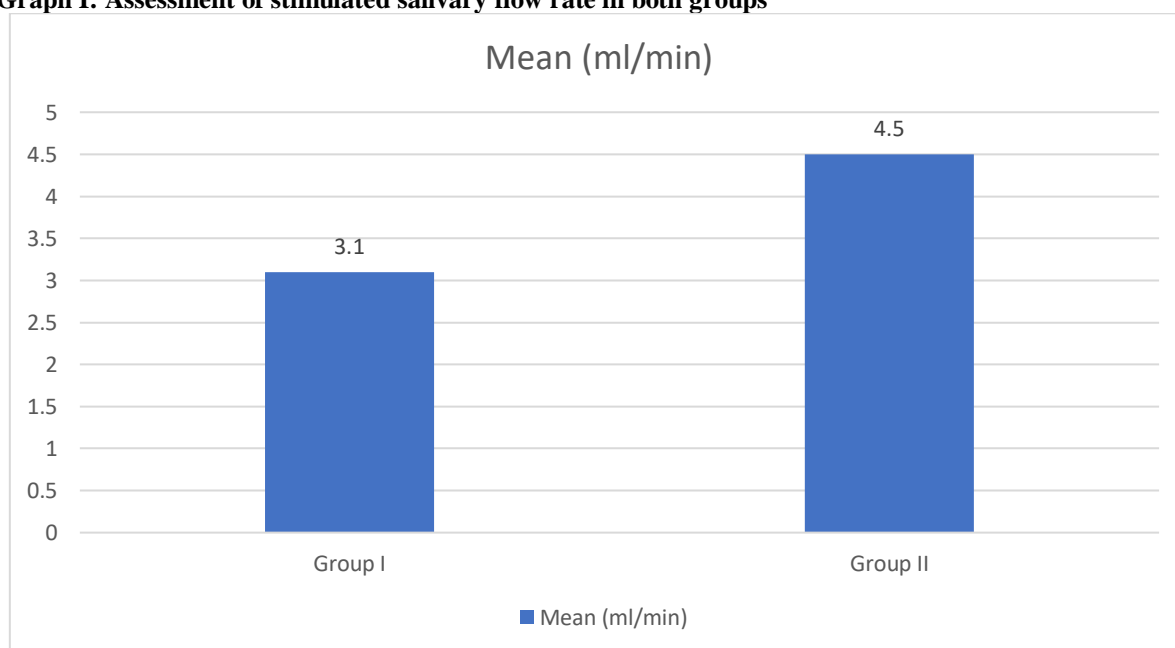
Table I shows that group I had 30 males and 20 females and group II had 25 males and 25 females.

**Table II: Assessment of stimulated salivary flow rate in both groups**

Groups	Mean (ml/min)	P value
Group I	3.1	0.01
Group II	4.5	

Table II, graph I shows that mean stimulated salivary flow rate in group I was 3.1 ml/minute and in group II was 4.5 ml/minute. The difference was significant (P< 0.05).

**Graph I: Assessment of stimulated salivary flow rate in both groups**



**Table III: Assessment of salivary pH in both groups**

Groups	Mean	P value
Group I	6.4	0.01
Group II	7.8	

Table III shows that mean salivary pH in group I was 6.4 and in group II was 7.8. The difference was significant (P< 0.05).

**DISCUSSION**

Areca nuts can cause oral cancer. However the effects of areca nut are considered habit related and dose dependent, especially with saliva.<sup>8,9,10</sup> There are fewer studies and research related to habitual areca nut chewing changes in the physical properties of saliva.<sup>11,12</sup> The present study was conducted to assess

effect of areca nut and smokeless tobacco- related habit in altering physical properties of saliva.

We found that group I had 30 males and 20 females and group II had 25 males and 25 females. Patel et al<sup>13</sup> constituted of 50 subjects (group A) with a habit of areca nut and smokeless tobacco and 50 subjects (group B) without any habit. Salivary properties like salivary flow rate, buffering capacity, and pH were

analyzed in both groups to test a hypothesis that the habit results in changes in the salivary properties and that there is a correlation between the changes and the frequency, duration, and exposure of the habit. Saliva samples were collected from these subjects for analysis of salivary flow rate (SFR), pH, and buffering capacity using the GC Saliva Check Buffer Kit™. The mean stimulated salivary flow rate among group A was  $3.34 \pm 1.32$  and pH was  $6.50 \pm 0.54$ . The mean stimulated salivary flow rate among group B was  $4.42 \pm 1.48$  and the pH was  $7.04 \pm 0.47$ . The difference in these values was found to be statistically significant.

We found that mean stimulated salivary flow rate in group I was 3.1 ml/minute and in group II was 4.5 ml/minute. We found that mean salivary pH in group I was 6.4 and in group II was 7.8. Siddabasappa et al<sup>14</sup> in their study 20 gutkha chewers without oral submucous fibrosis, 20 gutkha chewers with oral submucous fibrosis and 20 age and sex matched controls were included and the saliva was collected. After collection salivary flow rate was measured & expressed in ml/min. The pH determination of saliva was done by pH analyzer Elico-L1- 612. The estimation of copper and iron in saliva was done by atomic absorption spectrophotometry, AAS-203-CHEMITO. The salivary flow rate in gutkha chewers with and without oral submucous fibrosis was raised and was significant when compared with subjects without any habits (P was <0.001). The salivary pH was not altered. The salivary copper and iron were raised in patients of gutkha chewers with oral submucous fibrosis when compared with patient without oral submucous fibrosis (P was < .01). The increased salivary flow rate in gutkha chewers with and without oral submucous fibrosis could be due to parasympathomimetic activity of arecoline in the arecanut and the increase in copper and iron could be due to release of these elements present in arecanut while chewing gutkha. The present preliminary study was able to estimate copper and iron in saliva of gutkha chewers for a small group of population and showed increased levels.

Abdul et al compared the salivary flow rate (SFR) and salivary pH among areca nut chewers, oral submucous fibrosis (OSMF) patients and apparently healthy individuals. 135 outpatients (45 areca nut chewers + 45 OSMF + 45 control) were interviewed using structural proforma and Modified Schirmer strips and pH paper were implemented for assessing SFR and pH respectively. A statistically significant increase in SFR (35.7 mm at 3rd minutes) among areca nut group and a decrease in SFR among OSMF group (23.4 mm at 3rd minutes) when compared to apparently healthy subjects (30.7 mm at 3rd minutes). The mean pH among areca nut, OSMF and control groups was 6.76, 6.82, and 6.74 respectively with no statistical significance.

The limitation the study is small sample size.

## CONCLUSION

Authors found that there was a definite reduction in salivary flow and change in the pH as well as the buffering capacity of the salivary flow in subjects with areca nut and tobacco-related habits.

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