ОПРЕДЕЛЕНИЕ КАНЦЕРОГЕННОГО ХИМИЧЕСКОГО СОСТАВА БЕЗДЫМНОГО ТАБАКА (НАСВАЙ) В УЗБЕКИСТАНЕ

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В данной статье представлены результаты изучения состава насвая – местного жевательного табака, распространенного в странах Центральной Азии. Авторами показано, что в образцах насвая имеются канцерогенные вещества –содержащие мышьяк, бериллий, кадмий, хром и никель. С учетом полученных результатов обосновывается необходимость осуществления мероприятий, направленных на регулирование состава насвая и меры по ограничению потребления насвая.

Ключевые слова: *насвай; некурительный табак; состав; канцерогены; Узбекистан.*

DETERMINATION OF CARCINOGENIC CHEMICAL COMPOSITION OF SMOKELESS TOBACCO (NASVAY) IN UZBEKISTAN

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This article presents the results of a study of the composition of nasvay, a local chewing tobacco widespread in Central Asian countries. The authors showed that nasvay samples contain carcinogenic substances – containing arsenic, beryllium, cadmium, chromium and nickel. Taking into account the results obtained, the need to implement measures aimed at regulating the composition of nasvay and measures to limit the consumption of nasvay is justified.

Key words: *nasvay; non-smoking tobacco; compound; carcinogens; Uzbekistan.*

In Central Asian countries, particularly in Uzbekistan, nasvay, a traditional smokeless tobacco that causes nicotine dependence with prolonged use, is widely used by local residents. The prevalence of other smokeless tobacco such as snus,

which is widely used in Scandinavian countries, especially Sweden, is much lower [1].

Nasvay is produced artisanally, so its composition differs not only by region of the country, but may also differ between producers within the same region, may even be determined by a purchased recipe or the availability and cost of ingredients. The main components of nasvay are crushed tobacco, a source of nicotine and strong carcinogens, and calcium hydroxide (slaked lime). Additional ingredients may include plant ash, vegetable oils such as cottonseed or sesame oil, and sweeteners (dried fruits) and flavourings. Some components of the mixture have a moulding function in the granulation of the ground tobacco.

Nasvay also contains many chemical compounds that are dangerous to human health, including heavy metals and nitrosamines, some of which are considered strong carcinogens.

Nasvay is sold as small "balls" or "sticks", and powder. The colour of the product varies from light green to dark green, depending on the ingredients.

According to recent studies, nasvay use can lead to serious health consequences, such as malignant neoplasms of the digestive system (cancer of the lips, tongue, mouth), contributes to the development of cardiovascular diseases, increases the risk of premature births and stillbirths in pregnant women, frequent use of nasvay causes nicotine addiction.

Current situation on the prevalence of nasvay use in Uzbekistan.

In Uzbekistan, several studies have been conducted to examine the prevalence of nasvay among the country's population aged 18-64 years.

The latest study was conducted in 2019 adult population based on the WHO STEPS methodology, incorporating a weighted, multi-stage, cluster sampling design across three sex and age groups: 18-29, 30-44 and 45-64 years. Data collection was done in three stages: interview, measurement of anthropometric, physical and some biochemical parameters. The total sample size was 4350 respondents, of whom 88.1% were included in the study.

The survey results showed that 16.5 % of the adult population used tobacco products (both smoked and smokeless). Smokeless tobacco was used by a total of 9,9 %, including 19,8 % of men and 0,4 % of women. The major share of smokeless tobacco is nasvay consumption (about 90 per cent). Consumption of nasvay is almost equal to the prevalence of smoking smokeless tobacco products – 15,8 % of males and 0.4 % of females respectively [2].

According to the same survey in 2014: 22.4% of the adult population as a whole used tobacco (smoked and/or smokeless), including 42.4% of men and 1,5 % of women. Nasvay was used by 12,0 % of the total population, including 23,2 % of men and 0.2 % of women [3]. Thus, no major changes in the prevalence of nasvay consumption were observed. Only in the young age group of men (aged 18-29 years) there was a downward trend in smokeless tobacco use among men from 15,1% in 2014 to 6,8% in 2019.

The composition of nasvay has been studied quite little. There are some studies that have studied the content of pesticides in nasvay. The results showed that the main pollutants of smokeless tobacco were gamma-hexachlorocyclohexane, hexachlorobenzene, and dichlorodiphenyldichloroethane (DDT) [4].

The aim of research was investigation of the chemical composition (cancerogenic elements) of nasvay in Uzbekistan

Material and methods. The Laboratory Analysis were conducted by the toxicohygienic laboratory of the Department of Sanitary and Epidemiological Surveillance of the Main Medical Administration under the Administration of the President of the Republic of Uzbekistan. Gas chromatography-mass spectrometry (Agilent GC 7890B / MS 7000D), was used to investigate major to identify and quantify chemical constituents of nasvay.

Two 20-gram samples of smokeless tobacco (called nasvay, sometimes referred to as naswar or nass)) in ground (A) and granulated (B) forms, obtained from Tashkent City's local market in January 2023 were analyzed using gas chromatographymass spectrometry (Agilent GC 7890B / MS 7000D). Our focus was major cancerogenic elements: Arsenic (As), Beryllium (Be), Cadmium (Cd), Chromium (Cr), Nickel (Ni) and Uranium-238 (U-238) were investigated.

Statistical Analysis: descriptive statistics was used to summarize the chemical composition of nasvay samples, and ranges of detected substances.

We identified 5 chemical elements that are carcinogens were found in the composition of nasvay produced in Uzbekistan – Arsenic (As), Beryllium (Be), Cadmium (Cd), Chromium (Cr) and Nickel (Ni). Uranium-238 (U-238) was not detected in the studied samples Table 1.

Table 1. Presence of carcinogenic elements in nasvay

Elements	As (mg/L)	Be (mg/L)	Cd (mg/L)	Cr 52 (mg/L)	Ni (mg/L)	U-238 (mg/L)
Sample 1	0.191	0.025	0.004	0.275	0.012	0.0
Sample 2	0.173	0.023	0.004	0.229	0.008	0.0

Presence of carcinogenic elements specified by Carcinogen by the International Agency for Research on Cancer as a Group 1 carcinogen ("sufficient" evidence of carcinogenicity to humans) [5] in nasvay showed in the Table 1.

Conslusion. Based on these data, over 860,000 of the 1,75 million daily smokeless tobacco users in Uzbekistan are at risk of premature death due to smokeless tobacco use. This figure could increase if appropriate measures are not taken.

In order to reduce nasvay consumption, medical workers need to carry out educational work among the population about the dangers of using nasvay, the risk of poisoning with its ingredients, the development of nicotine and mental dependence, and the occurrence of oral cancer.

Legislative restrictions on nasvay can be an effective way to reduce nasvay use.

On 24 May 2023, Act N 844 on restricting the distribution and use of alcohol and tobacco products was adopted, which prohibits the importation and sale of smokeless tobacco products, including nicotine-containing smokeless products, with the exception of nasvay [6].

Thus, the country has adopted a legal framework to regulate nasvay production, including the establishment of maximum permissible levels of substances harmful to human life and health in the composition of nasvay. It is required to carry out constant monitoring and control over the production, sales and consumption of nasvay.

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