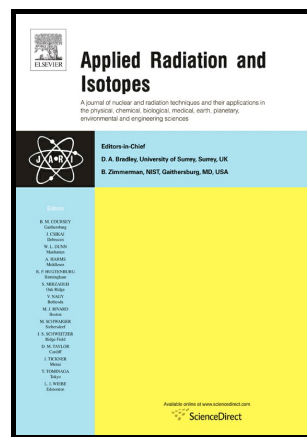


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Study of the elemental composition of saliva of smokers and nonsmokers by X-ray fluorescence

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Abstract

Cigarette smoking is a serious public health problem. According to data from the World Health Organization, it is estimated that currently more than 1.2 billion people worldwide do tobacco use and that smoking-related diseases are responsible for about 6 million deaths each. With attention to this, it is necessary to seek preventive and prognostic of trying to reduce these numbers and alert the public in general about the danger and the harm caused by its use. Thus, the objective of the research work undertaken was to evaluate and compare the chemical composition of collected saliva samples of smokers and nonsmokers by X-ray Fluorescence analyses. 32 individuals were selected, 16 of which used cigarette on a daily basis and the other 16 had never smoked. Saliva was collected with the help of a (sterile) disposable Pasteur pipette and samples sent to the Applied Nuclear Physics Laboratory at UNISO (LAFINAU), where analyzes were carried out. Individuals who agreed to participate in the study answered a questionnaire to define their profile of inclusion and signed an informed consent form (CEP Protocol nº 831.753 of 09/10/2014). The results clearly showed that there are differences in the concentrations of chemical elements in the saliva of smokers and non-smokers. The biggest discrepancies were found at concentrations of the chemical elements Sulfur, Phosphorus, Chlorine and Potassium, and smaller differences in the concentration of the elements Calcium, Manganese, Iron, Copper, Titanium, Vanadium and Nickel. In only one saliva sample, and in quite low amounts, arsenic was detected. The results indicate that smoking produces more significant changes in the saliva of women than in men, increasing the concentration of some elements in the saliva of female smokers, much more than in the male smokers. The cigarette usage time also appears to exert a greater influence on the composition of the saliva of women than in men, indicating that the damage caused by cigarette use may in fact be higher in women than in men.

Keywords:

X-ray Fluorescence analysis; Saliva; Tobacco; Male and Female smokers

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1. Introduction

In the cigarette there are numerous potentially toxic chemical substances. It is believed that more than a thousand components of carcinogens and toxic gases and metals (Gunnerbeck et al., 2014) are present in tobacco. When swallowed, tobacco smoke is inhaled into the lungs, which have a large blood flow, allowing such deleterious substances to pass the alveolar barrier and, after approximately 10 seconds, they are distributed by the circulatory system and reach the brain. This speed is only to be compared with an intravenous application of medication (Rang et al., 2007). The main component of tobacco that causes addiction is nicotine, found in all tobacco derivatives, which is a psychoactive substance that acts in the *accumbens* nucleus in the central

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