Effect of gas phase and particulate phase of cigarette smoke on salivary antioxidants. What can be the role of vitamin C and pyridoxine?

Maria Greabu1, Maurizio Battino2, Alexandra Totan1, Maria Mohora3, Niculina Mitrea4, Cosmin Totan5, Tudor Spinu6, Andreea Didilescu7

Correspondence: Maurizio Battino, e-mail: m.a.battino@univpm.it

Abstract:
The effect of smoking is in our days a serious global public health problem of major concern. Incidence of oral squamous cell carcinoma (SCC) in cigarette smokers is four to seven times higher than in nonsmokers. There is a constant and direct attack of various cigarette smoke constituents on the oral epithelial cells, which gradually accumulate and cause malignant transformation.

Saliva is the first biological fluid that encounters inhaled cigarette smoke (CS).

We have studied the influence of CS on salivary antioxidant capacity, uric acid, amylase and LDH (lactate dehydrogenase). In our study both, gas and particulate phase of CS were tested separately, and possible antioxidant effect of pyridoxine on salivary components was examined.

Our results indicate that exposure to both, gas and particulate phase of CS caused a statistically significant decrease in salivary uric acid, LDH and amylase activity.

We have also studied the effect of vitamin C (10 mg/dl) and vitamin B6 (1 mM) during incubation of saliva in the presence of CS. The addition of vitamin C had a significant (p < 0.05) protective effect on salivary uric acid level (0.25 ± 0.12 for saliva incubated with gas phase of CS vs. 0.65 ± 0.12 for saliva incubated with gas phase of CS in the presence of vitamin C). Vitamin C was not able to maintain/restore the original uric acid level. In the presence of the gas phase, pyridoxine had no protective effect, neither on salivary uric acid level nor on the FRAP activity of saliva.

The purpose of our study was to discover a connection between the level of antioxidants in saliva in the presence of the two components of CS. Our results show that salivary antioxidant system is significantly and distinctly affected by both gas and particulate phase of CS and suggest that an adequate intake of antioxidants may help smokers to avoid CS-induced oxidative damage and to prevent degenerative diseases.

Key words: cigarette smoke, oxidative stress, uric acid, salivary antioxidant system