

Impact of Ozone Gradient on Grapevine Leaves

Ana Alebic-Juretic (1,2), Itana Bokan-Vucelic (2), Boris Mifka (2), Marija Zatezalo (2), and Velimir Zubak (2)

(1) University of Rijeka, School of Medicine, Environmental Health Department, Croatia (ana.alebic.juretic@medri.uniri.hr),

(2) Teaching Institute of Public Health Rijeka

Due to complex orography and air mass circulation, the Rijeka Bay area is characterized by O₃ gradient, with concentrations risen with the altitude (1). Therefore AOT40 values were often exceeded and should result in harmful effects on vegetation. Based on previous controlled experiments (2), we examined the possible effect of atmospheric ozone on grape leaves under natural O₃ gradient.

Grapevine leaves (2-5) were collected from May to September 2016 at two sampling points in the proximity of two AQM stations: Site 1 in the city centre (20m asl) and Site 2 (186m asl) in the suburban settlement. Subsequent to weighing and determination of surface area, the leaves (0,5 g) were extracted in 95% ethanol and analysed on chlorophyll a (Chla), chlorophyll b (Chlb) and carotene (Car) content by UV-VIS spectrometry on 3 wavelengths (664, 649, 470 nm) (3)

In summer 2016 O₃ gradient was not that pronounced as usual (1), but stil the concentrations differed by approx. 20%, exceeding national AOT40 value at both sites (22.360 and 28.061 $\mu\text{g m}^{-3}\text{ h}$, respectively, at Sites 1 and 2). The concentrations of other pollutants were bellow limit values (LV).

The Cha and Chb in a sample leaves collected at the end of May at Site 2 are equal to that with filtered O₃ in control experiment (2), i.e. without damage caused by ozone, while the Car content is lower approx. 50% and is kept at the same level. The con-centrations of pigments obtained in July proved the possible damage by O₃, while in subsequent months could speed up natural ageing.

This is the first evidence of O₃ damage on plants in the Rijeka Bay area, in spite of weaker O₃ gradient and lacking visible signs of damage. Preliminary results indicate the need for more frequent sampling, particularly in the period included in AOT40 (May-July).

References:

1. Alebić-Juretić A (2012) *Int J Remote Sensing*, 33(2): 335-345
2. Britvec M, Reichenauer T, Soja G., Ljubešić N, Pećina M (2001) *Biologia (Bratislava)*,56/4: 417-424
3. Sumanata N, Haque CI, Nishika J, Suprakash R (2014) *Res J Chem Sci*, 4(9):63-69