Biomass Burning Impairs Mucociliary Clearance and Muçus


Objective: To evaluate the effects of sugar-cane harvesting after biomass burning on mucociliary clearance (MCC) and mucus properties in rural workers of Brazil.

Methods: Twenty-seven workers (21-45 years, 16 never smokers and currently non-smokers) were recruited to evaluate nasal MCC by saccharine test (STT) and mucus properties. Measurements were performed during two periods of the year: (a) Non-Harvesting, during plantation (March), and (b) Harvesting, during harvesting (October) after sugar-cane burning. Clinical data (arterial blood pressure, heart rate, respiratory rate, arterial oxygenation, body temperature and associated illness), and the ambient temperature and relative humidity were also recorded.

Results: At Non-Harvesting, non-smokers and smokers presented similar values of clinical parameters, STT (14.6 ± 5.5 and 13.4 ± 5.6 minutes, respectively), mucus contact angle (27 ± 7°C and 28 ± 7°, respectively), and mucus transportability by sneeze (94 ± 13 and 103 ± 14 mm, respectively). However, at Harvesting, STT increased in non-smokers and smokers (26.3 ± 16.0 and 22.3 ± 10.2 minutes, p=0.001), mucus transportability by sneeze decreased (62 ± 28 and 59 ± 20 mm, p<0.001), and mucus contact angle increased (36 ± 8 and 35 ± 12°, p=0.047) compared with Non-Harvesting. During STT-measurements, the ambient temperature was similar at Harvesting (23.5 ± 0.8°C) and Non-Harvesting (23.3 ± 1.1°C). However, relative humidity was higher (p<0.001) during Harvesting (61 ± 5%) compared with Non-Harvesting (55 ± 2%).

Conclusion: Harvesting sugar-cane after biomass burning induced similar marked negative alterations in the first line of the respiratory defense of non-smoking and smoking rural workers.