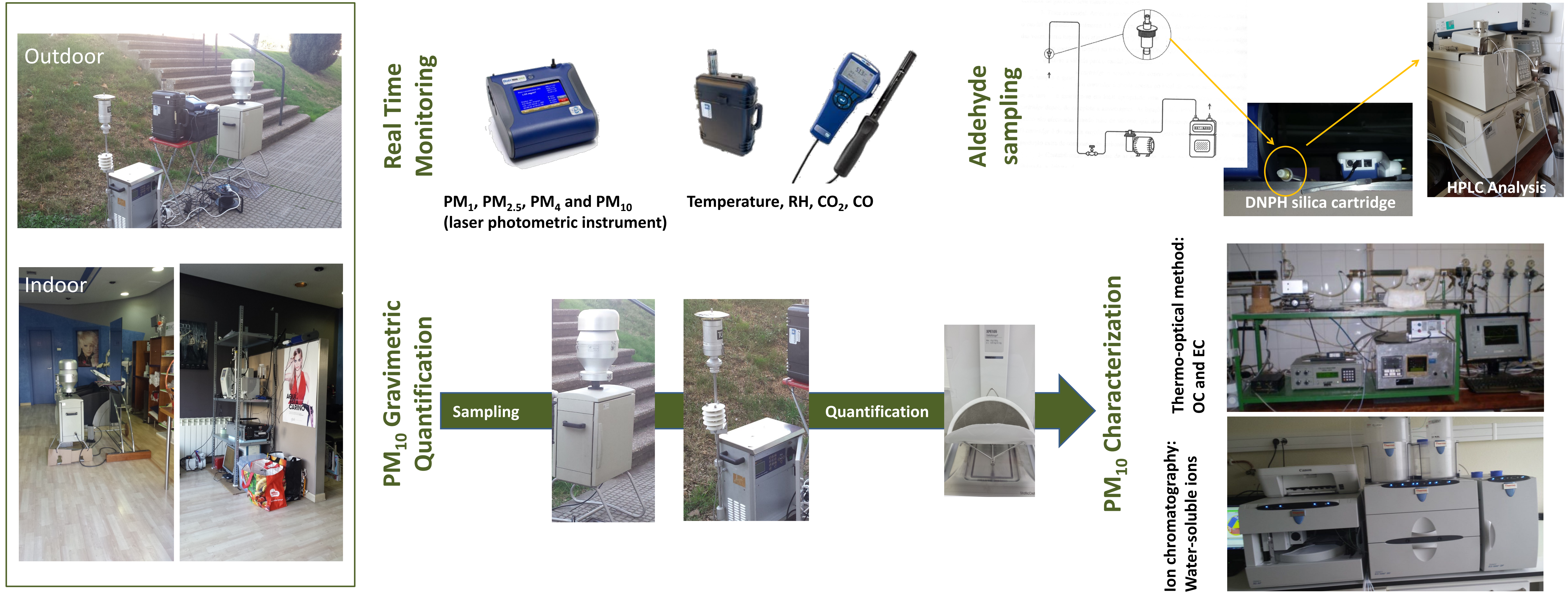


Introduction

In Europe, more than one million individuals are employed in the hairdressing sector with over 80% women workers (EU-OSHA, 2014). Hairdressers handle a vast array of chemicals through the use of cosmetics such as shampoos and hair conditioners, hair colorings, bleaching/lightening products, perming and curling products and hair sprays, among others. The products and treatment techniques used in beauty salons can put both the salon technicians and clients at risk of exposure to hazardous chemicals. A one-week sampling campaign was conducted in a hairdresser salon in the city of León, Spain.

Methods



Results

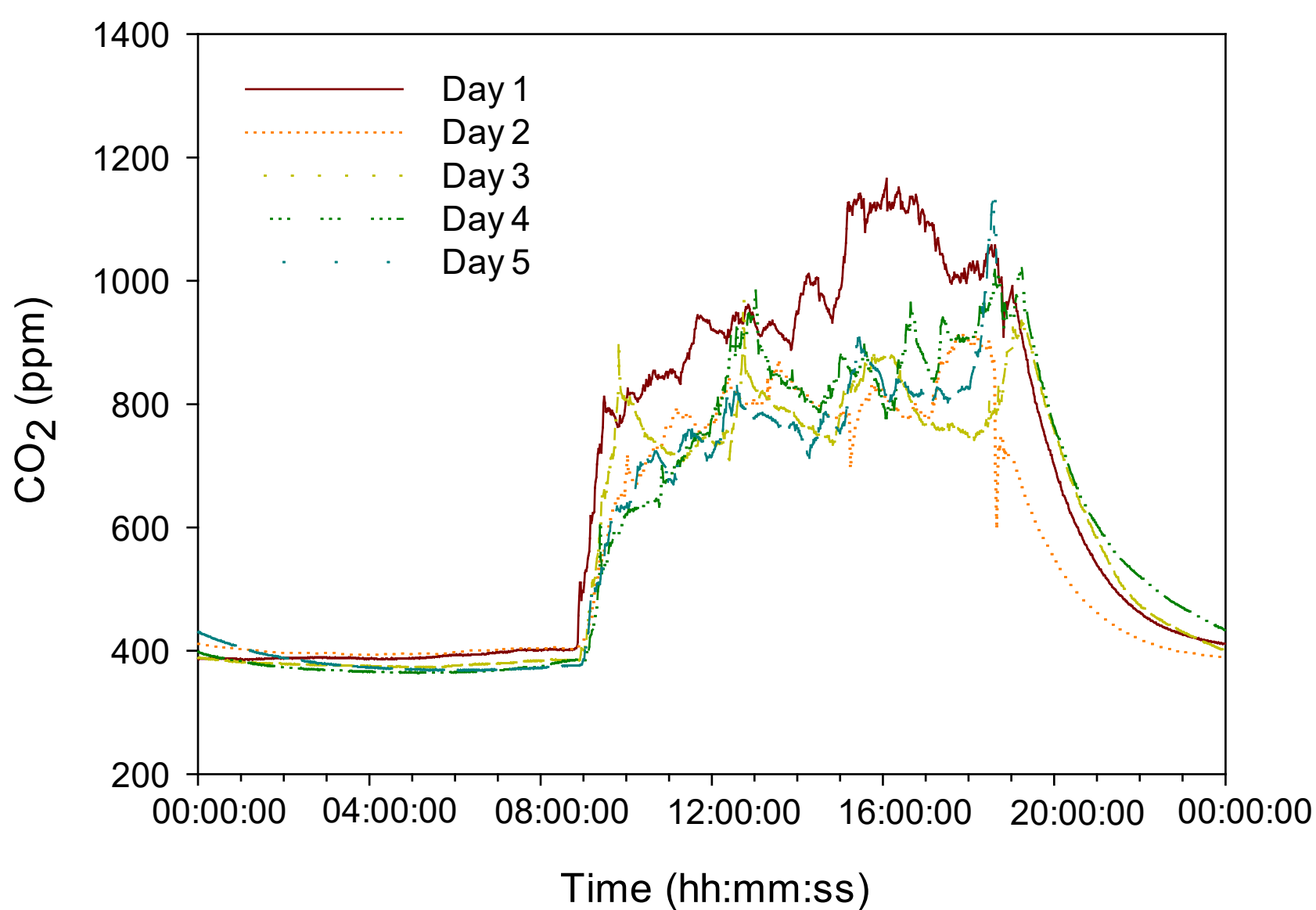


Fig. 1 Daily evolution of CO_2 concentrations indoors.

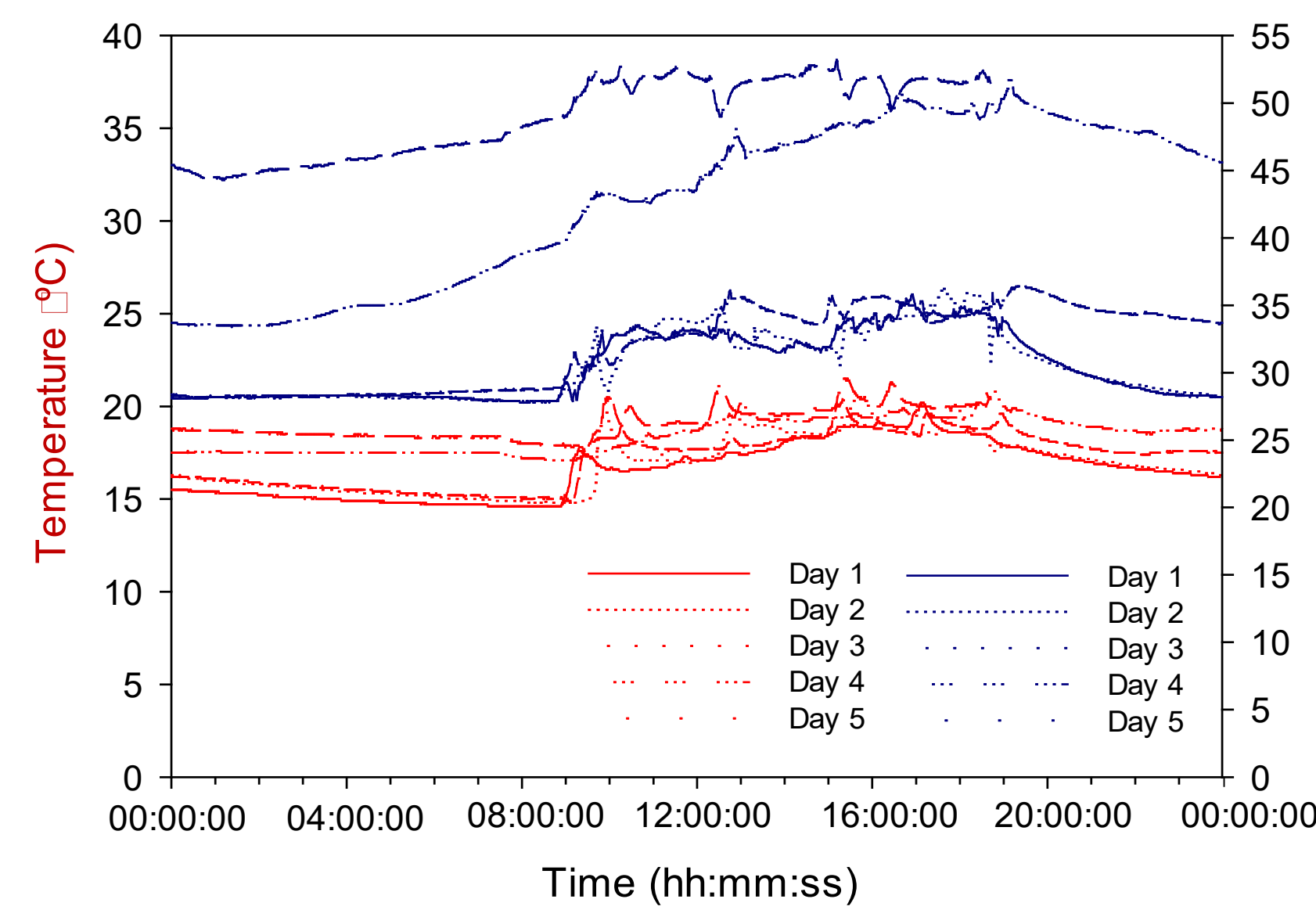


Fig. 2 Evolution of relative humidity and temperature indoors.

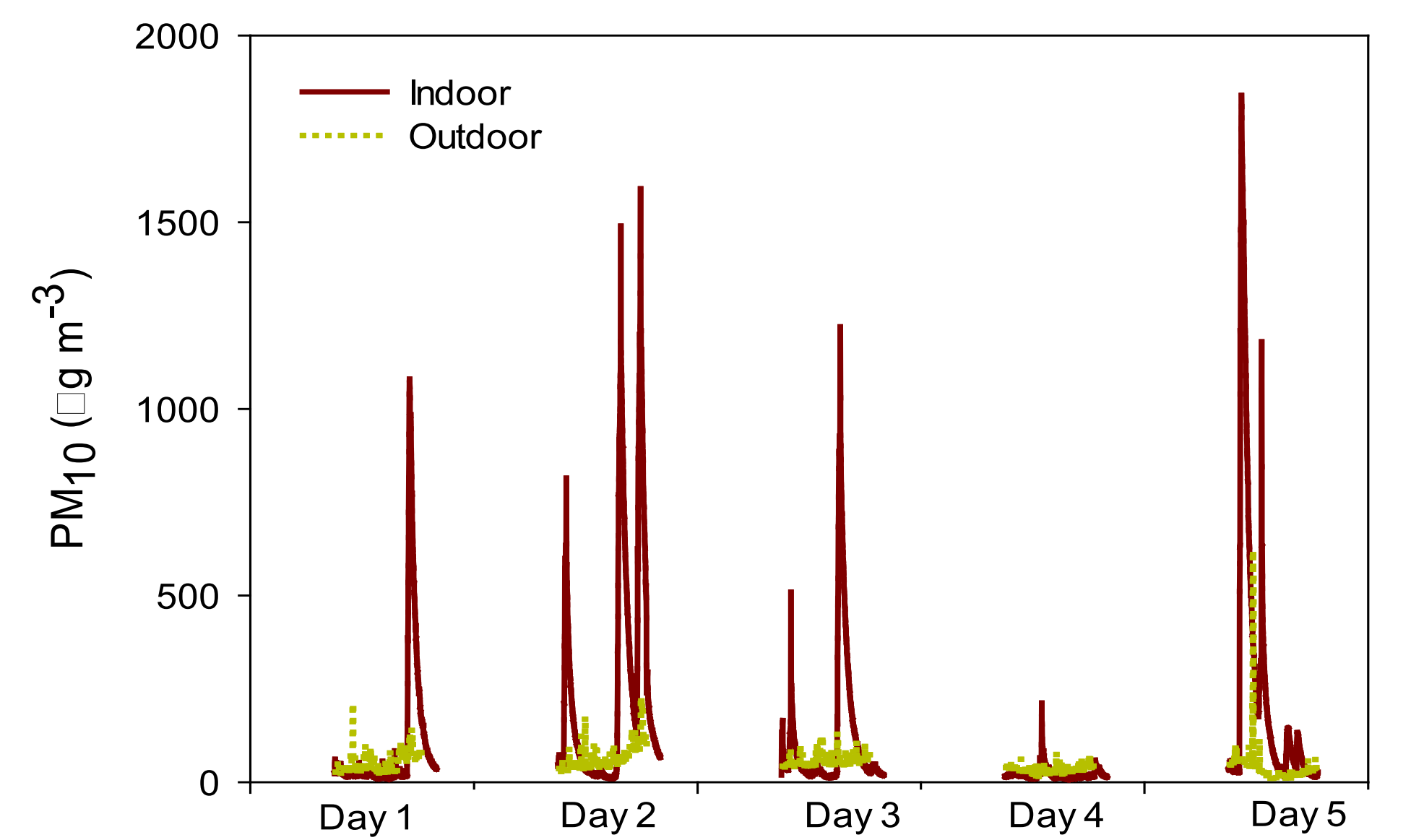


Fig. 3 Daily evolution of PM_{10} concentrations indoors and outdoors during the occupancy period.

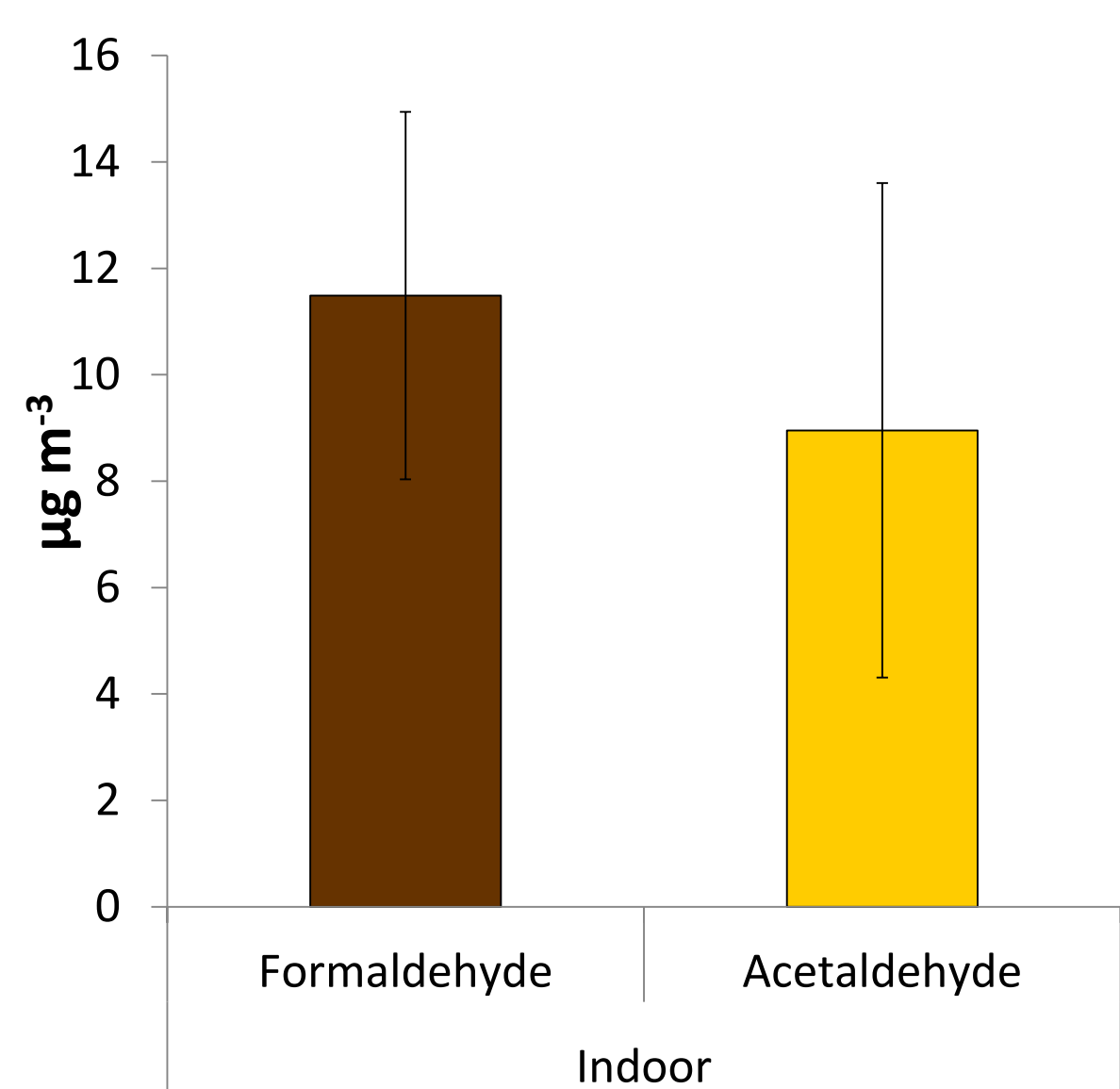


Fig. 4 Aldehyde concentrations indoors during the occupancy period.

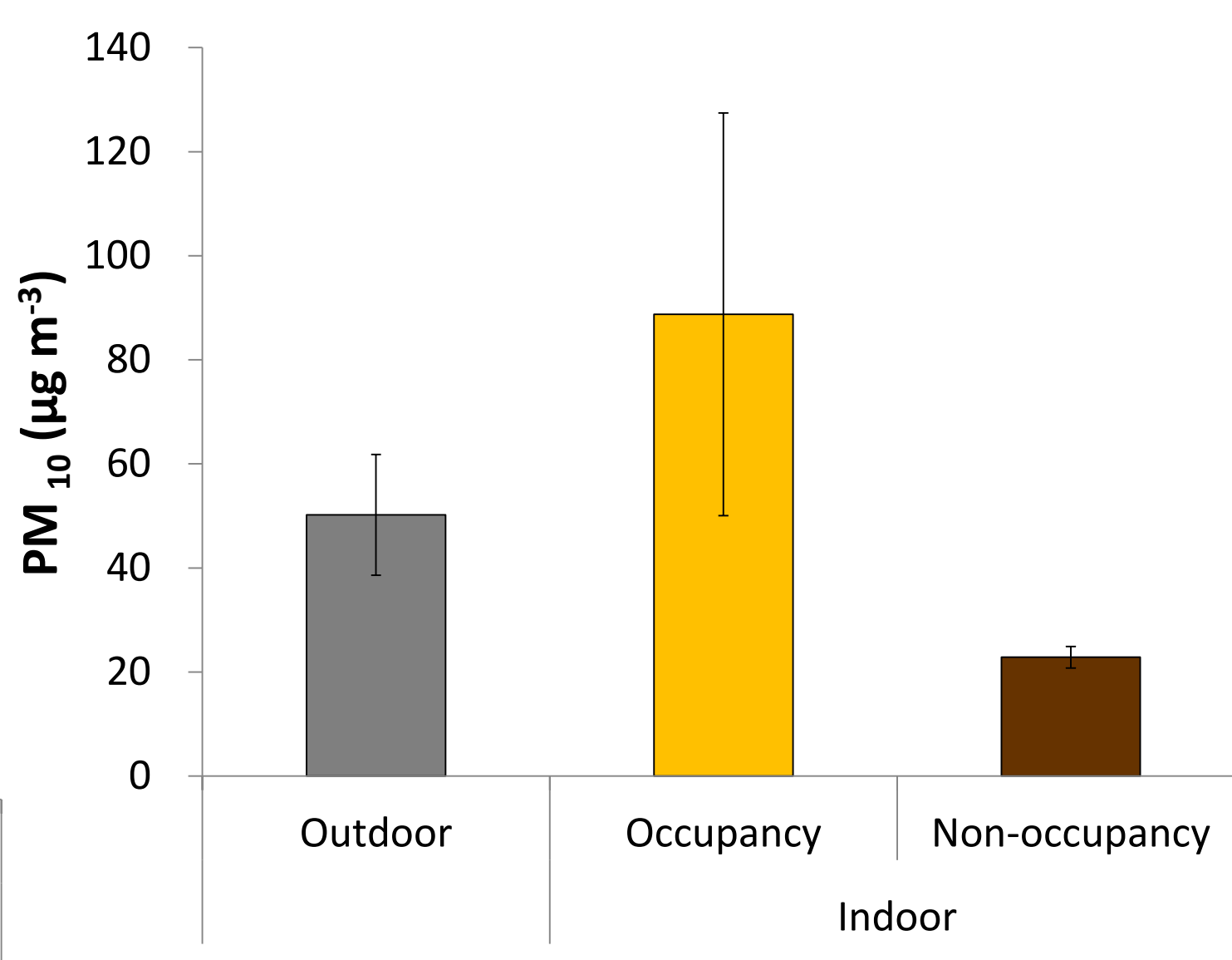


Fig. 5 PM_{10} concentrations indoors (during occupancy and non-occupancy) and outdoors.

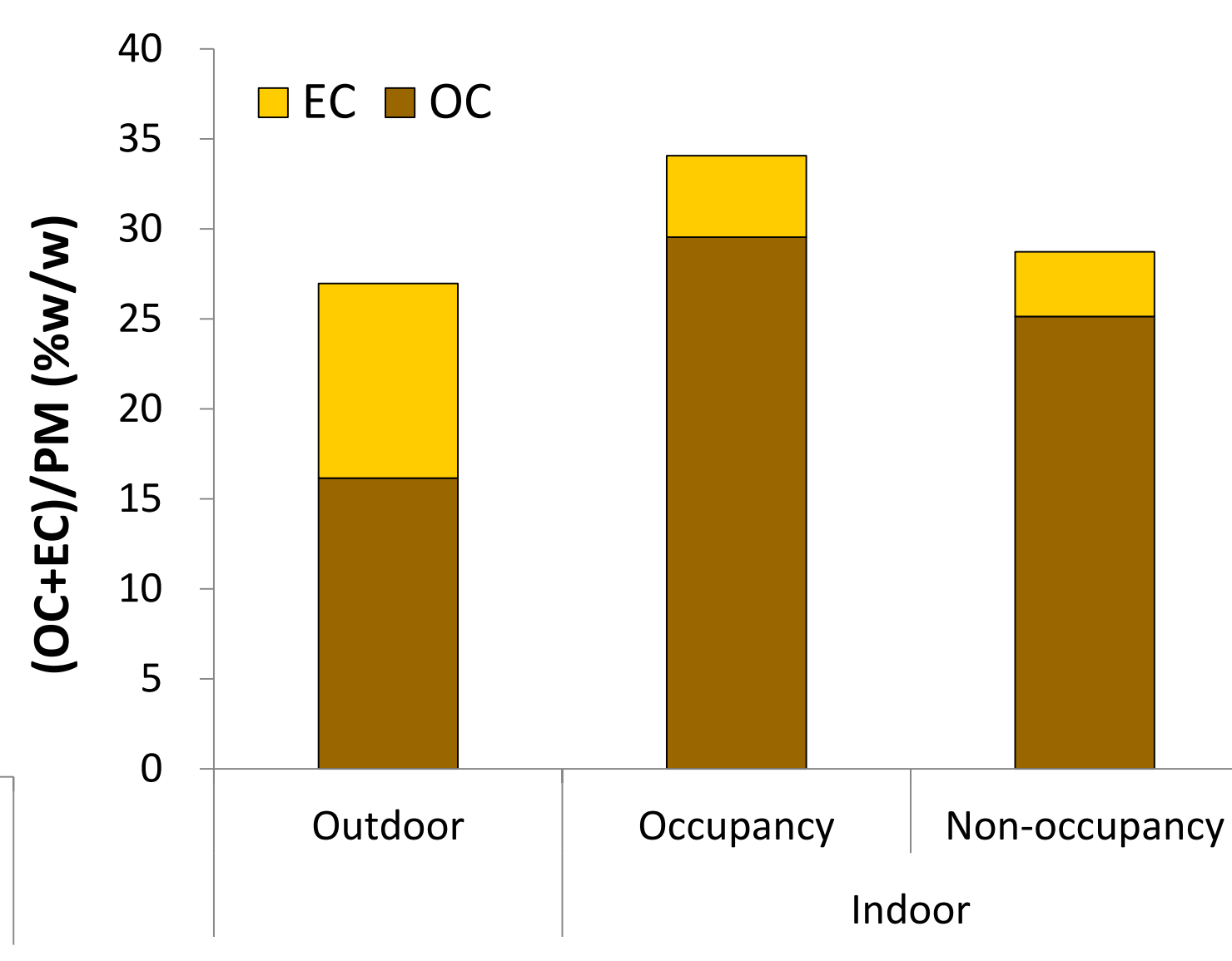


Fig. 6 (OC+EC)/ PM_{10} ratios indoors (during occupancy and non-occupancy) and outdoors.

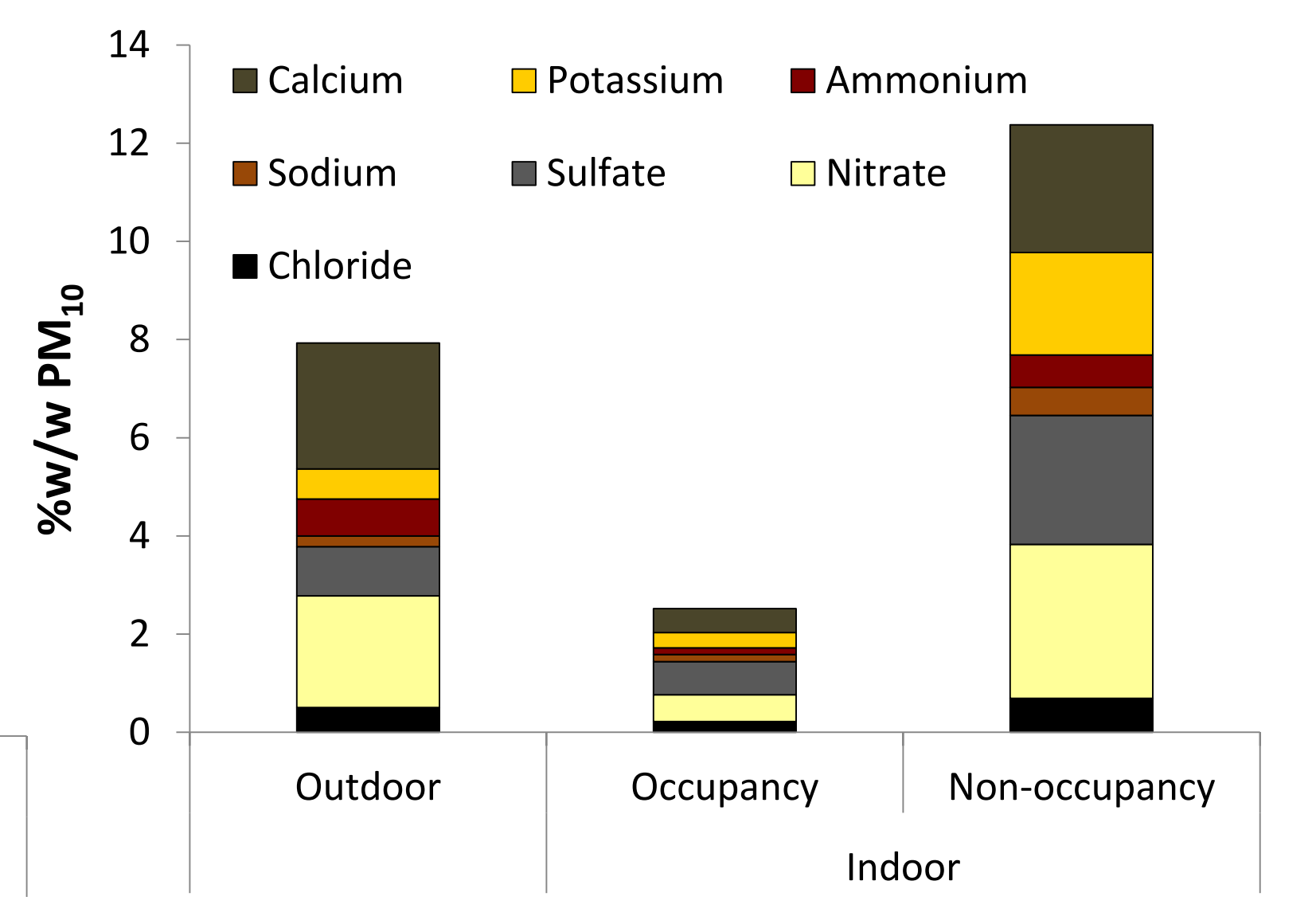


Fig. 7 Water-soluble ions indoors (during occupancy and non-occupancy) and outdoors.

Conclusions

- Temperature recorded throughout the sampling campaign was not within the ASHRAE comfort zone in the winter season (20 – 23 °C).
- Good correlation was found between PM_{10} concentrations and the number of female customers ($R^2 = 0.8052$) and between CO_2 concentrations and the total number of clients attending the salon ($R^2 = 0.721$).
- Indoor formaldehyde concentration was below the short-term guideline ($0.1 mg m^{-3}$) recommended by WHO to prevent sensory irritation.
- Indoor PM_{10} levels were largely affected by indoor sources, since the calculated I/O ratios were much higher than 1 during the occupancy period.
- Inorganic ions had low contribution to the PM_{10} mass during the occupancy period (2.72 %w/w) increasing over night (12.4 %w/w). The carbonaceous matter had larger contribution, representing 34.1 and 28.7% w/w of the particulate mass during the occupancy and non-occupancy period, respectively.