

Supplementary Materials for

Influence of Time–Activity Patterns on Indoor Air Quality in Italian Restaurant Kitchens

Marta Keller ¹, **Davide Campagnolo** ¹, **Francesca Borghi** ², **Alessio Carminati** ¹, **Giacomo Fanti** ¹,
Sabrina Rovelli ¹, **Carolina Zellino** ¹, **Rocco Loris Del Vecchio** ³, **Giovanni De Vito** ³, **Andrea Spinazzé** ¹,
Viktor Gábor Mihucz ⁴, **Carlo Dossi** ⁵, **Mariella Carrieri** ^{6,*}, **Andrea Cattaneo** ^{1,*} and **Domenico Maria Cavallo** ¹

¹ Department of Science and High Technology, University of Insubria, Via Valleggio 11, 22100 Como, Italy;
mkeller@studenti.uninsubria.it (M.K.); davide.campagnolo@uninsubria.it (D.C.);
acarminati@uninsubria.it (A.C.); giacomo.fanti@uninsubria.it (G.F.); sabrina.rovelli@uninsubria.it (S.R.);
czellino@uninsubria.it (C.Z.); andrea.spinazze@uninsubria.it (A.S.); domenico.cavallo@uninsubria.it (D.M.C.)

² Department of Medical and Surgical Sciences, University of Bologna, Via Pelagio Palagi 9,
40138 Bologna, Italy; francesca.borghi12@unibo.it

³ Department of Medicine and Surgery, University of Insubria, Via Guicciardini 9, 21100 Varese, Italy;
rl.delvecchio@studenti.uninsubria.it (R.L.D.V.); giovanni.devito@uninsubria.it (G.D.V.)

⁴ Integrative Health and Environmental Analysis Research Laboratory, Institute of Chemistry, Eotvos Loránd
University, Pázmány Péter Sétány 1/A, H-1117 Budapest, Hungary; viktor.mihucz@ttk.elte.hu

⁵ Department of Theoretical and Applied Science, University of Insubria, Via J.H. Dunant 3, 21100 Varese, Italy;
carlo.dossi@uninsubria.it

⁶ Department of Cardiac, Thoracic, Vascular Sciences and Public Health, University of Padua,
35122 Padova, Italy

* Correspondence: mariella.carrieri@unipd.it (M.C.); andrea.cattaneo@uninsubria.it (A.C.); Tel.: +39-0498216638 (M.C.); +39-0312386642 (A.C.)

Supplementary Materials

Figure S1. Violin plots of indoor pollutant concentrations measured in winter during or in the absence of different cooking activities. *: $p_{MW} < 0.01$ and **: $p_{MW} < 0.001$.

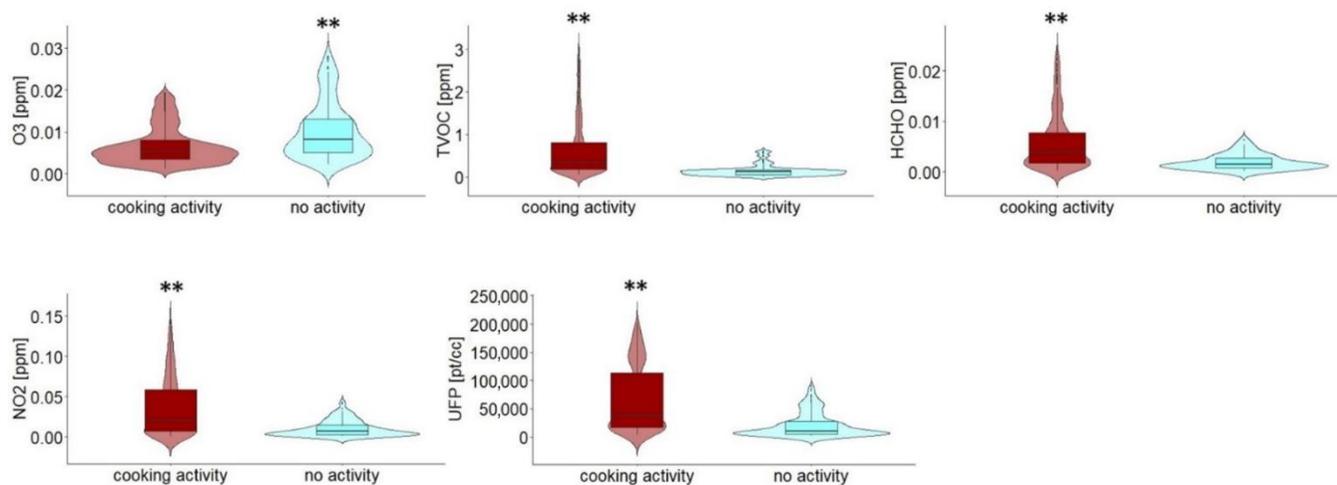


Figure S2. Violin plots of indoor pollutant concentrations measured in summer during or in the absence of different cooking activities. *: $p_{MW} < 0.01$ and **: $p_{MW} < 0.001$.

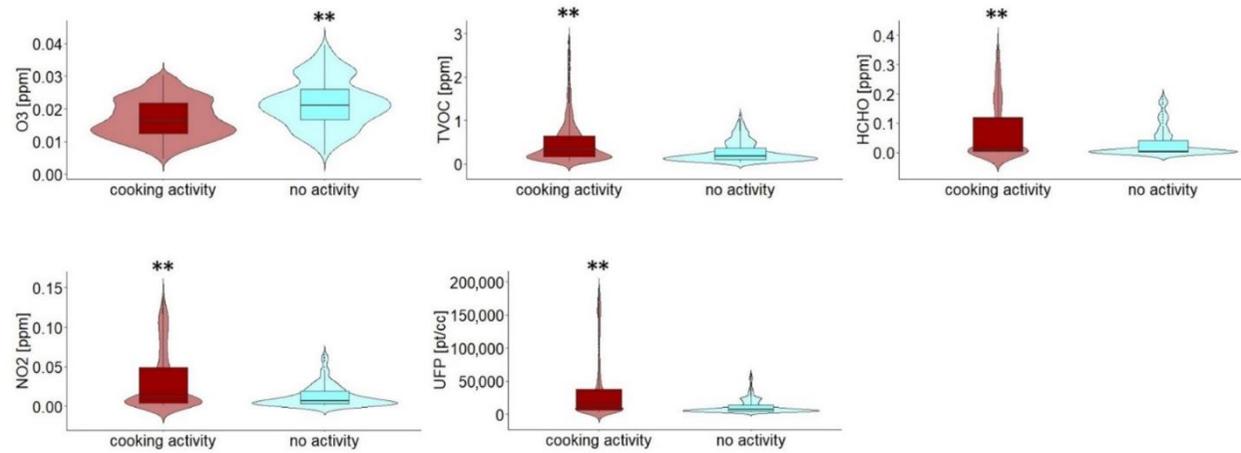


Figure S3. Violin plots of indoor pollutant concentrations measured in winter during or in the absence of different washing activities. *: $p_{MW} < 0.01$ and **: $p_{MW} < 0.001$.

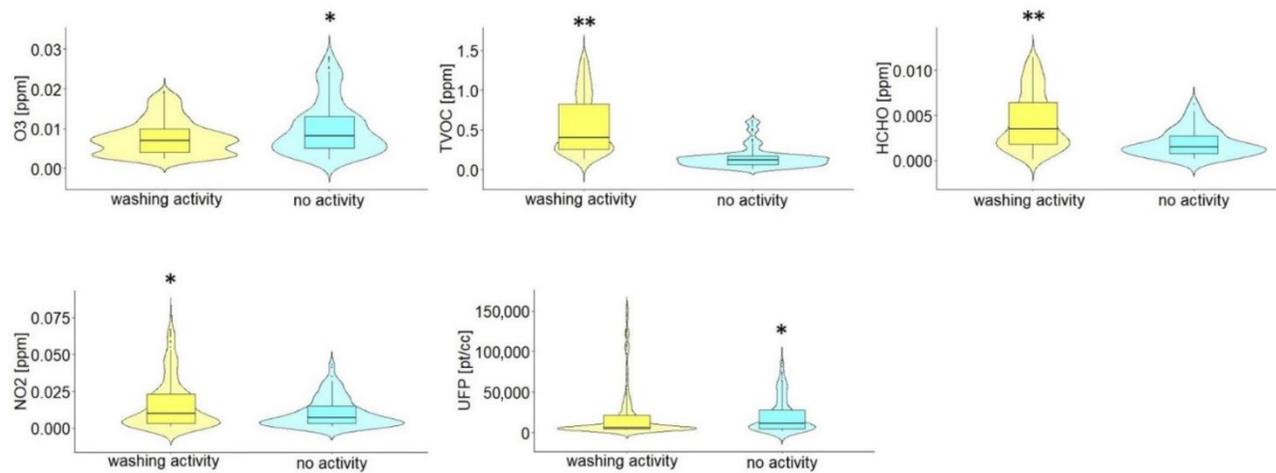


Figure S4. Violin plots of indoor pollutant concentrations measured in summer during or in the absence of different washing activities. *: $p_{MW} < 0.01$ and **: $p_{MW} < 0.001$.

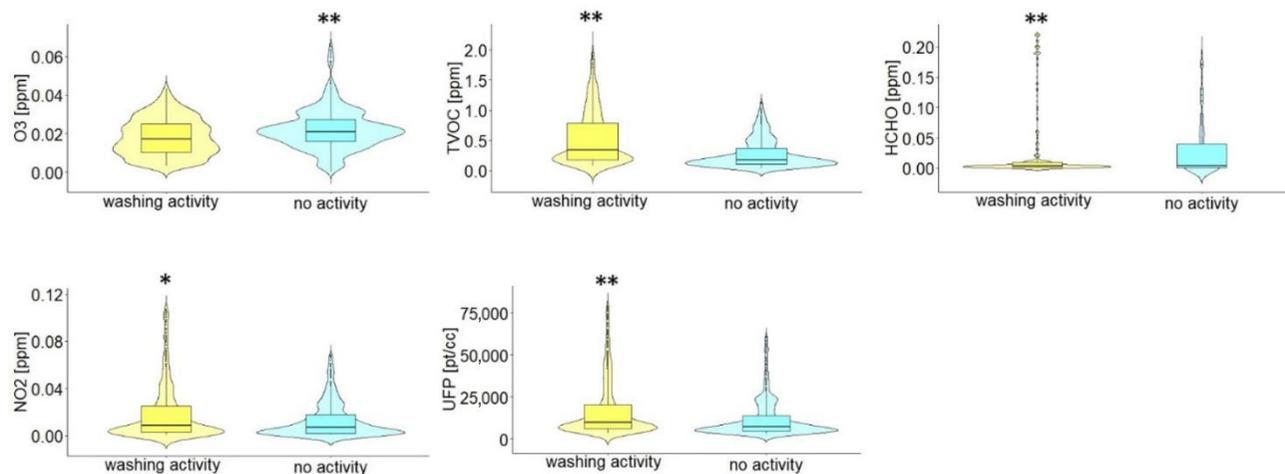


Figure S5. Box-plots of TVOC levels for the main activities observed during the monitoring campaigns (winter and summer, respectively).

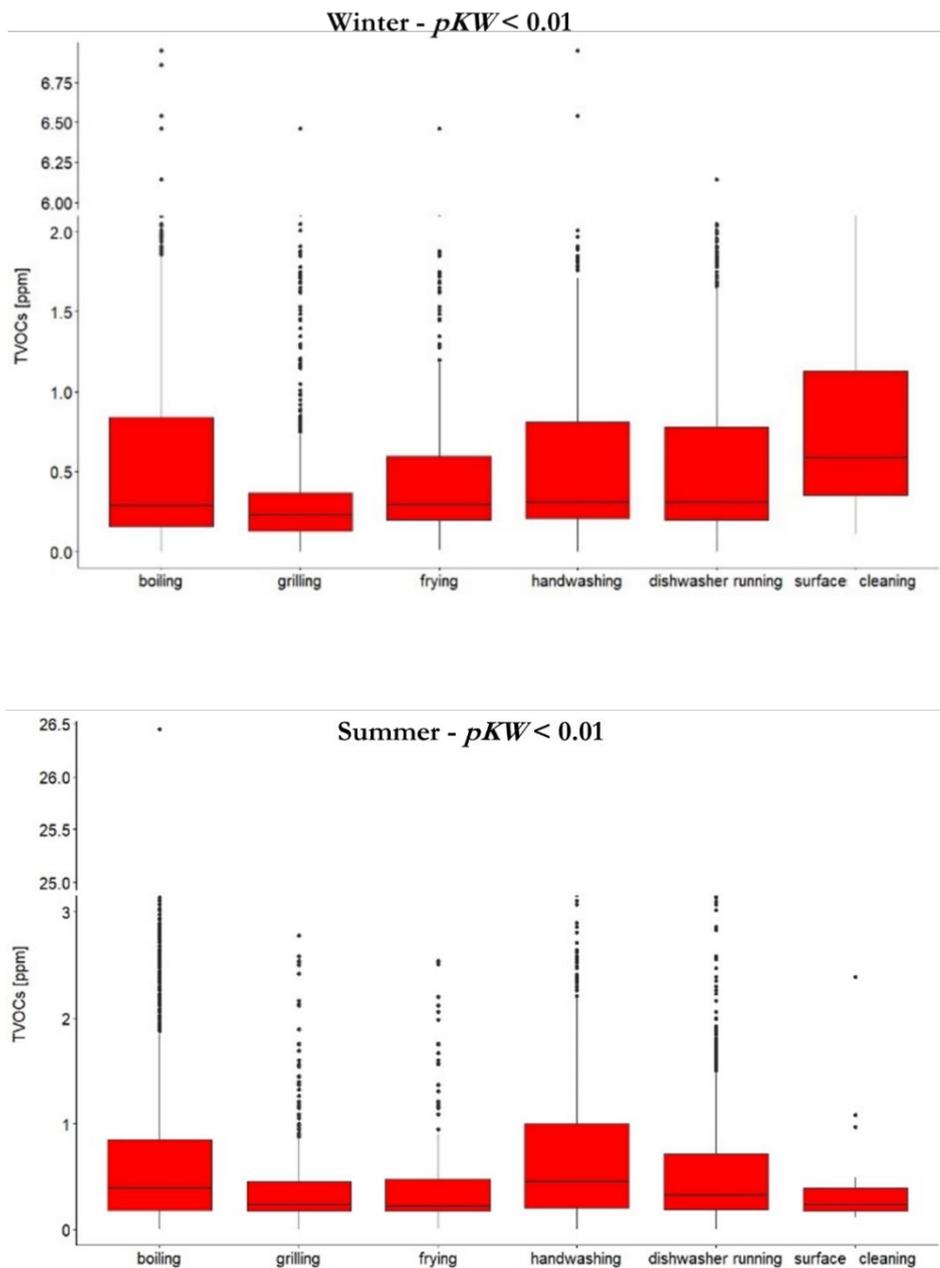


Figure S6. Box-plots of HCHO levels for the main activities identified during the monitoring campaigns (winter and summer, respectively).

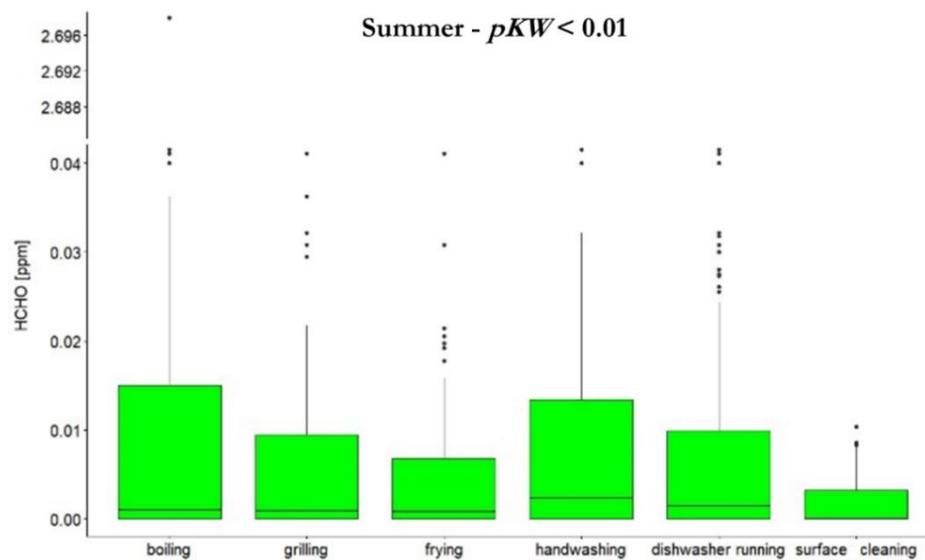
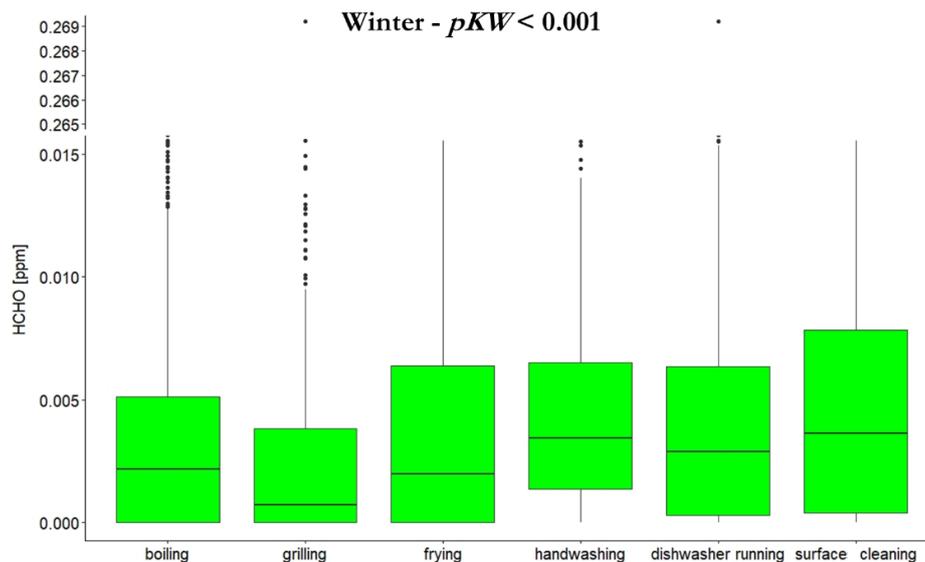


Figure S7. Box-plots of NO₂ levels for the main activities identified during the identified during the monitoring campaigns (winter and summer, respectively).

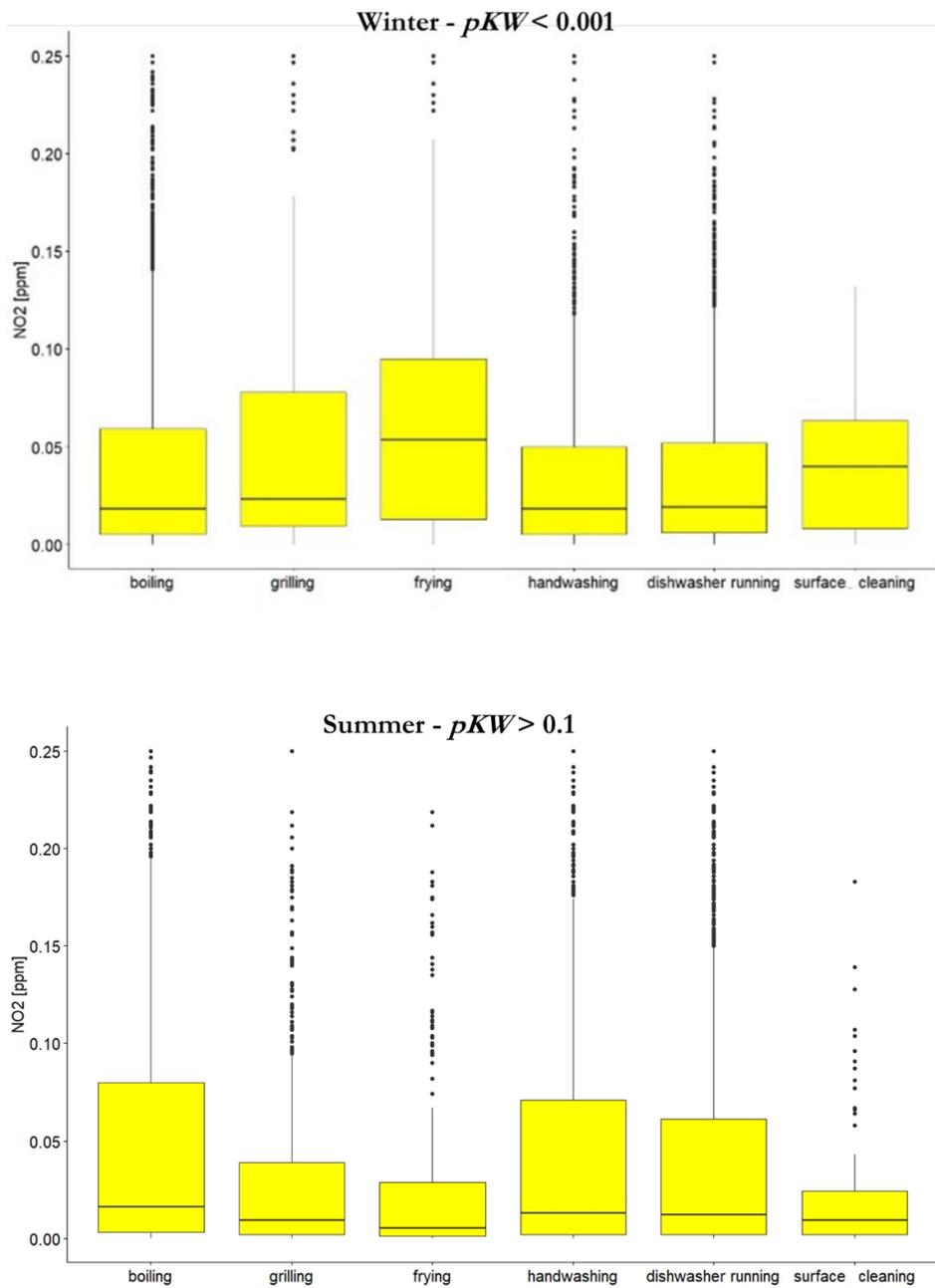


Figure S8. Box-plots of UFP levels for the main activities identified during the identified during the monitoring campaigns (winter and summer, respectively).

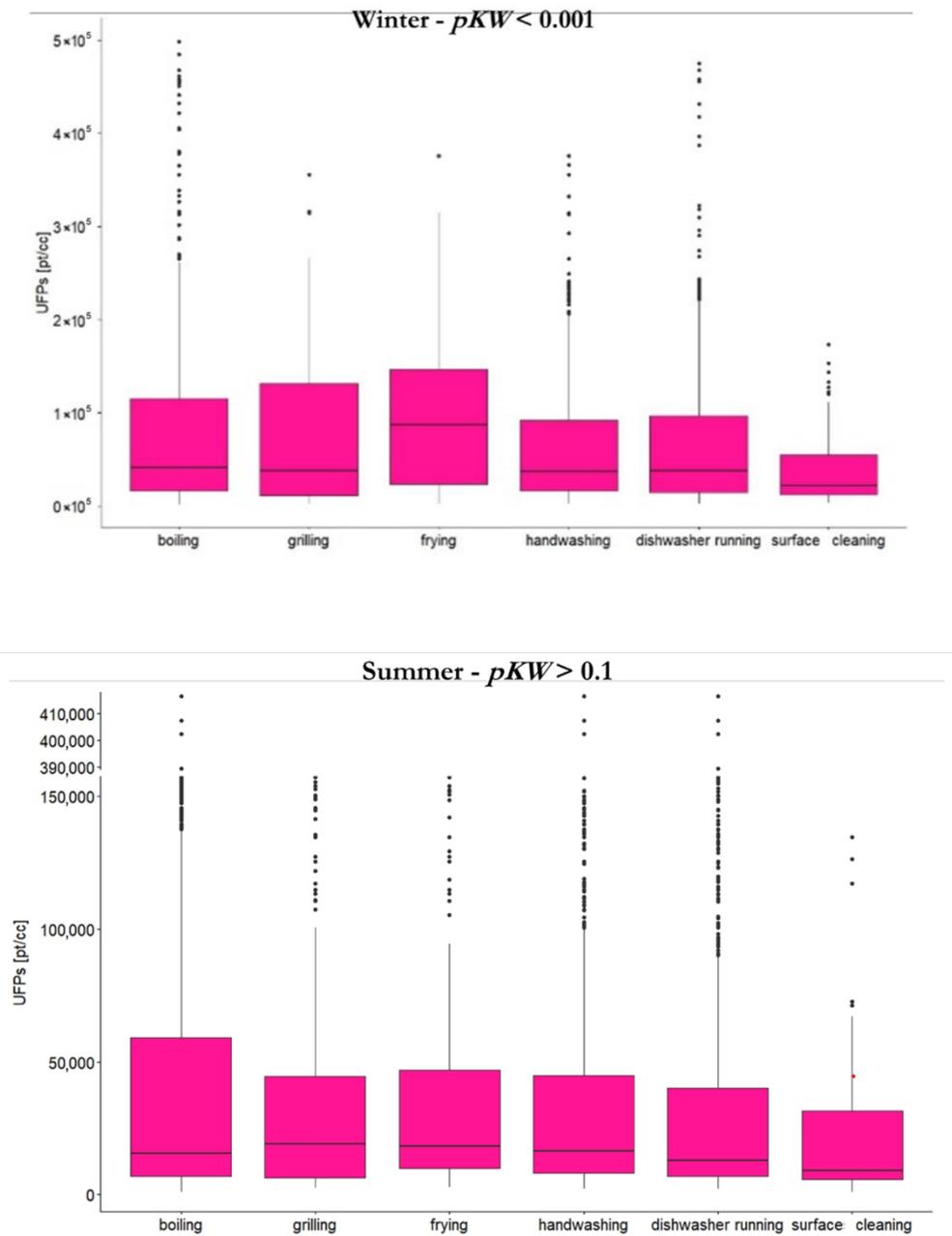


Table S1. Indoor concentrations of air pollutants and physical parameters (temperature and relative humidity) monitored on a real-time basis in restaurants' kitchens.

Pollutants	Winter						Summer					
	N	Min	Mean	SD	Me-dian	Max	N	Min	Mean	SD	Me-dian	Max
O₃ (ppm) *	418 9	<LOD	0.009	0.009	0.006	0.185	419 2	<LOD	0.019	0.011	0.018	0.067
TVOCs (ppm) *	347 1	<LOD	0.577	0.762	0.280	6.95	417 4	<LOD	0.707	1.26	0.330	26.5
UFPs * 10³(pt/cm³) *	410 5	1.42	62.5	69.7	32.5	497	402 0	1.02	36.2	56.8	11.7	417
HCHO (ppm)	418 4	<LOD	0.005	0.011	0.002	0.27	408 0	<LOD	0.047	0.145	<LOD	2.70
NO₂ (ppm) *	394 2	<LOD	0.036	0.052	0.014	0.250	432 7	<LOD	0.034	0.049	0.010	0.250
CO₂ (ppm) *	418 9	387	678	220	623	1902	397 2	419	607	132	574	1276
Temperature (C°)	419 1	9.83	20.2	3.19	20.7	25.5	432 7	14.4	30.7	2.44	30.2	36.6
RH (%)	419 1	21.7	40.1	9.80	40.4	67.5	432 7	29.5	44.7	5.76	44.7	65.3

N= number of kitchens sampled; LOD= limit of detection; Min= minimum concentration; SD= standard deviation; Max= maximum concentration; RH= Relative humidity