Short-term Impact of the cooking aerosol on the human brain wave pattern
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ABSTRACT
Translational research examining the impact of indoor ultrafine particles on human health is important because humans spend more than 85% of their time indoors. Cooking is the major modifiable source contributing to indoor UFP (particles <100nm) exposures. Cooking emits a copious number of UFPs containing trace elements with different morphology. Healthy volunteers (N=30) over 25 were recruited for this study. The experiments were conducted for two consecutive days in an apartment under controlled conditions. The first day was a control experiment (without cooking), and the second was an exposure experiment (with cooking). An Electroencephalograph (QEEG) was used to measure the brain wave pattern. Volunteers entered the apartment at 8:00 am. The brain EEG was measured in 21 steps that started one hour after arrival (9 am) and continued at (10:00 am, 10:30 am, 11:00 am, 11:30 am, 12:00, 14:00, 16:00, 18:00, and 20:00). The last measurement was at 9:00 am the third day (97 hours after arrival). Frying chicken drumsticks and French fries in sunflower oil using a gas stove was conducted without ventilation at 9:30 am on the second day (cooking day). UFPs, particular matter, CO2, indoor temperature, RH, and oil temperatures were monitored continuously throughout the experiments. During cooking the UFP concentration reached its maximum value to be 5.3×105 particles/cm3. Our preliminary results showed that the brain wave pattern underwent statistically significant changes at different lobes as a result of the exposure. However, the brain reverted back to the normal after 24 hours. All frequency bands including beta 1, beta 2, beta 3, alpha, delta and theta underwent changes as a result of the exposure.