The manuscript by Takhar et al. reported the SOA formation from OH oxidation of heated cooking oil and characterized the SOA composition and volatility using TD-GC/MS. A new method was used to analyze the composition of the complex product mixtures. The authors have found that an increase in OSc and a decrease in carbon number upon oxidation, which was attributed to fragmentation reactions during OH aging. In addition, by comparing product yields from individual precursors and applying an oxidation model, they conclude that aldehyde precursors are the main contributors of SOA formed from heated cooking oil. Overall, this is a well-written manuscript and the results can be a useful addition to better understanding the formation, composition and volatility of cooking SOA. I would recommend publication after a minor revision.

Specific Comments

1. The authors stated the increase in OSc and decrease in nC with oxidation. However, it is not very clear from Figure 3. Could the authors add the average OSc and nC in every panel of Figure 3?

2. L193-197, the authors did not compare the same thing here. In Lambe et al. (2012, 2015), they found the evidence of fragmentation because of the decrease in SOA yield upon oxidation. However, in this study, the evidence of fragmentation is from the decrease in average carbon number. If the authors also look at the SOA yield, it never decrease with increasing photochemical age (Figure 7 and Table S1). Therefore, the authors could not state that fragmentation reactions happen earlier for cooking oil than other precursors (e.g., alkanes and isoprene).

3. L293-295, I do not see any O/C or number of functional group dependence in Figure S9. The authors might need to change their way to present these data.

4. Figure 6 looks very interesting, but the authors did not discuss much about it. It seems that for higher-carbon-number products and 1-COOH products, the agreement is worse than others compounds. Any explanation for that?

5. In Figure 2, the recreated m/z 73 seems agree well with the measured signal. Could the authors provide a scatter plot as well? Maybe it can replace Figure S4c.

6. L201, what are the O/C ratios in previous studies? The author should put them here for comparison.

7. Exp. 7 (photochemical age = 40.7 h) is not included in Figure 7. The authors should mention that somewhere.

Technical Corrections

L470-475, same references.

There is an incorrect number (1:2:1) in Figure S5.