

Impact of 3-Methylnonane-2,4-dione on the Flavor of Oxidized Soybean Oil

Sir,

Recently, J.-W. Kao *et al.* (1) published results which contradict our previous suggestion (2–4) that 3-methylnonane-2,4-dione (MND) is mainly responsible for the light-induced off-flavor of soybean oil (SBO). In oxidized SBO the authors (1) found MND in concentrations up to 0.8 µg/kg, which are below the odor and taste threshold in oil of 23 µg/kg and 1.5 µg/kg, respectively, published by us (4). The low concentration of MND was measured by dynamic headspace analysis (1,5). However, according to our experience, this analytical procedure is not suitable for a precise determination of MND, especially in an oil sample, owing to its very low yield in the trapping and desorption steps. Because the authors (1) do not report any experiment demonstrating the accuracy and reliability of their analytical method, we assume that these parameters were not checked for MND quantitation.

To overcome the difficulties in the quantification of MND, we previously developed a stable isotope dilution assay using [²H₃]MND as internal standard (4). The SBO sample was spiked with this standard at the beginning of the analytical procedure. Hence, the results were not affected by losses of the analyte during clean-up. We found MND levels of 205, 721, and 1503 µg/kg in three samples of SBO which had been stored for 30 d at room temperature in the presence of diffuse daylight (4,6). After 48 h of storage two samples of SBO contained 3.4 and 89 µg/kg MND, respectively. These results are mean values of duplicates, which did not vary more than 10 %. Unfortunately, the authors (1) have overlooked the paper (4) in which the analytical method for MND was reported.

The statement in the article (1) that the impact of MND on the flavor of SBO was only suggested by us on the basis of the results of aroma extract dilution analysis (AEDA) is not correct. Because of the limitations of AEDA, which have been discussed in detail (7), the odorants screened by this method in oxidized SBO were quantified and then their odor activity values (OAV, ratio of concentration to odor threshold) were calculated. As MND showed by far the highest OAV, it was suggested as the main contributor to the off-flavor (4). In addition, experiments aimed at mimicking the off-odor revealed that the weak green, beany taste of the SBO sample containing 3.4 µg/kg MND could be imitated by the addition of 3 µg MND to 1 kg of a freshly refined plant oil. Higher amounts enhanced the intensity of the beany taste (8).

Recently, MND was also identified as main contributor to the hay-like off-flavor that develops in dry parsley (9) and in dry spinach (10). Furthermore, MND contributes significantly to the flavor of green tea (11).

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