Enhancing Sesame Oil Quality by Heat Treatment

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Heating, in general, destroys quality of edible oils. Since heated sesame oil is rich in antioxidants (AO) such as sesamol, in this research, we tested the hypothesis that quality of sesame oil was preserved during heating. Oil was extracted using a screw expeller from 70:30 black:white sesame seeds. A 2-factor-2-level design of experiment with centre point was used. Factors and levels were temperatures *(T)* at 70 °C and 180 °C and durations *(t)* at I and 4 hr. Choice of the said levels were governed by no appreciable changes in oil characteristics being detected with oil heated for 1 h at 70 °C (denoted by lowest level, LL) and considerable changes being detected with oil heated for 4 hr at 180 °C (denoted by highest level, HL). Crude oil samples, in duplicate, were oven-heated and centrifuged at 2200 g for 10 min. AO activity was quantified by assessing the 2,2-dipheny1-1-picrylhydrazyl radicals scavenging activity (RSA, in %) of oil samples. Free fatty acid content (FFA, as % oleic acid) was also assessed. Analysis of variance results of estimated interaction models of RSA and FFA revealed that all coefficients were statistically significant (p <0.05) and adjusted R^2 were 94 and 88%, respectively. Anderson-Darling tests revealed that residuals of both models were normally distributed. Said models showed that fitted mean of RSA of sesame oil at HL was 5.8 times the mean at LL and fitted mean of FFA reduced from 1.8 at LL to 0.9 at HL. Increase in RSA of sesame oil with heating may be attributed to the conversion of sesamolin to sesamol, a potent AO. Further experimentation showed that more than 30 hr of heating at 180 °C was required for RSA of sesame oil to start declining, which may be explained by potential destruction of sesamol. Decrease in FFA may be attributed to evaporation of fraction of free fatty acids during heating. It was, therefore, concluded that heating in the parameter space studied enhanced sesame oil quality by raising its AOA and lowering its FFA.

Keywords: Antioxidant activity, Free fatty acid (FFA), Radical scavenging, Sesame oil

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