Impact of Seed Moisture Content on Yield, Antioxidant Activity and Free Fatty Acid Content of Sesame Oil

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This research was undertaken to assist Sri Lankan sesame oil producers to further enhance yield and quality of their products. Oil samples were extracted using a screw expeller, in triplicate, from blackish (86±1%) sesame seeds having moisture content (M) of 0.3, 3.3, 3.6, 4.6, 5.1, 6.3, 7.0 and 7.9% on dry basis (db). Oil samples were half filled in clear glass bottles and stored on table top for 4 months. Antioxidant activity (AOA) was determined by quantifying the amount of 2, 2-diphenyl- 1 -picrylhydrazyl (DPPH) radicals scavenged by phenolic fractions of oil. Free fatty acid in oil (FFA, % as oleic acid) was also determined. Oil yield (Y g oil per 100 g dry weight of seeds) was estimated as $Y = 0.6M^3-11.8M^2+71.9M-95.9$ and mean temperature (°C) of oil being extracted as $T = -1.5M^2+14.9M+21.8$ with 99.7% and 90.3% variability in Y and T explained by M, respectively. Maximum Y of 45.0+0.2 and T of 60+3 °C were close to M of 4.6 and 5.1% db, and these values were significantly different from other M values studied. FFA contents of all oil samples studied were well below 3.0 and therefore satisfied the quality standard for FFA of sesame oil. Minimum and maximum FFA contents of 0.810.1 and 2.2±0.1 were obtained at M of 4.6 and 7.9% db, respectively, both of which were significantly different from FFA of all other M values studied. No significant differences were observed among ADA of oil samples studied which spanned the range of 0.67 to 0.75 µmot DPPH loss per g oil. It could therefore be concluded that 4.6 to 5.1% db seed moisture contents gave the seeds adequate amount of water to maintain the temperature required to assist in cell wall rapture and in pushing oil out of the seeds and through the voids with ease while preventing plasticization within the seeds. Lowest and the significantly different FFA content obtained suggested that an M of 4.6% db was the best choice for delaying potential oil oxidation leading to rancidity during oil storage.

Keywords: Antioxidant activity, Free Fatty acid (FFA), Seed moisture, Sesame oil, Yield

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