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Evaluation of the quality of oils sampled from takeaway outlets: is there a need for regulation of oil quality?

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Deep frying is the most popular method for the preparation of fast food in catering outlets. During repeated heating of oil at temperatures between 160 and 180°C there are various oxidative; polymerisation and thermal degradation reactions that change the quality of the oil leading to the production of degradation products that may be deleterious to human subjects' health. Many countries have created regulations and recommendations to control the reuse of frying oils⁽²⁾. In the UK, the Food Safety Agency (FSA) provides practical recommendations such as the use sunflower or rapeseed oil at an optimum temperature of 175°C, filtration of the oil once a day and replacement of the oil after 20 frying hours⁽³⁾. However, there is currently no enforcement of frying practice leaving the control of the oil quality to individual managers. The present study aimed to investigate the variation in oil quality around the Wigan area. For this purpose, oils from twelve food takeaways outlets in the area of Wigan were sampled during working hours. The oils have analysed for the standard quality parameters including acid value, peroxide value and iodine value using AOCS methods⁽¹⁾.

Sample	Acid value	Peroxide value	Iodine value
	Mean (SD) (%)	Mean (SD) (mEq/kg)	Mean (SD)
Control (rapeseed)	0.05 (SD 0.014)	1.1 (SD 0.14)	102.26 (SD 3.63)
A	0.60 (SD 0.00)	4.4 (SD 0.28)	95.95 (SD 7.01)
B	3.30 (SD 0.14)	3.4 (SD 0.28)	67.99 (SD 2.12)
C	2.90 (SD 0.14)	8.9 (SD 0.14)	101.02 (SD 2.42)
D	3.20 (SD 0.00)	2.2 (SD 0.28)	75.27 (SD 3.92)
E	0.24 (SD 0.056)	1.8 (SD 0.28)	79.28 (SD 1.02)
F	1.60 (SD 0.00)	1.3 (SD 0.14)	121.34 (SD 0.67)
G	0.50 (SD 0.14)	5.2 (SD 0.00)	193.25 (SD 6.66)
H	1.90 (SD 0.14)	6.8 (SD 0.00)	125.55 (SD 10.44)
I	0.70 (SD 0.14)	3.3 (SD 0.14)	130.65 (SD 1.08)
J	1.90 (SD 0.14)	3.7 (SD 0.14)	130.65 (SD 1.96)
K	3.20 (SD 0.28)	6.1 (SD 0.14)	129.95 (SD 5.56)
L	1.22 (SD 0.17)	20.3 (SD 0.99)	59.66 (SD 1.08)

From the results it is clear that the quality of oil is very variable across all the samples indicating variations in the composition and extent of degradation of the oils. For example, samples B, C, D and K show high acid values indicative of oil degradation. In addition, sample L recorded the an unusually high level of peroxide value which together with a low iodine value indicates high levels of oxidative rancidity. These oils may have different effects on the health of consumers. Future work will concentrate on the analysis of the fatty acid profile (including trans-fatty acids) and acrylamide level by GC-MS. The Healthy Business Award Team is working with businesses to improve frying practice in the Borough. The present study highlights the need for regulation with respects to oil quality to protect public health.

1. AOCS (1989) Method No Cd 8b-90 in *Official Methods and Recommended Practices of the American Oil Chemists Society*, D. Firestone ed, 4th edn, Washington DC, USA.
2. Fox, R (2001) Frying oils. In *EU food law: A practical guide*. Goodburn, K., Ed., CRC, Boca Raton, FL, USA.
3. FSA (2011) Tips on Chips, available at: <http://www.food.gov.uk/foodindustry/guidancenotes/>