

OdourScan Application Note 1: Cooking Oil Assessment using the OdourScan Electronic Nose

Introduction:

3 bottles of cooking oil used to assess the reproducibility and selectivity of the OdourScan odour sensing system. The cooking oil samples include one bottle of canola oil that had a reasonable smell of early rancidity. The other two samples were Extra Virgin Olive Oil produced in Turkey. These samples had no perceptible rancid odour, yet the Sandhurst Olive Oil had a sweeter smell than the Green Hill sample. The difference in odour of the three samples was a test to see if the OdourScan using 6 standard sensors could reliably detect the difference between the three samples.

Procedure:

40 ml of oil was poured into a 100ml sealable jar. The jar was allowed to sit for several minutes so that the headspace could equilibrate with any volatile components that would be produced from the oil sample. Each jar was opened and secured into the sampling port of the OdourScan. Air was extracted from the jar for 3 minutes while readings were collected in the PICA software supplied with the OdourScan. The OdourScan was allowed to equilibrate with air from the laboratory between each reading.

Three measurements were made for each oil sample in series, i.e., Canola, followed by Sandhurst and followed by Green Hill. The intention was to assess whether the measurements would be reproduced across the three samples. The total period of time to collect the data was approximately 30 minutes.

Results:

Table 1. shows the response from the 6 sensors for each of the three measurements for each of the three samples of oil.

	Channel 1 mV	Channel 2 mV	Channel 3 mV	Channel 4 mV	Channel 5 mV	Channel 6 mV
Canola 1	140.39	120.01	-43.6	612.99	66.68	95.26
Canola 2	138.44	121.69	-62.26	672.01	65.5	90.87
Canola 3	119.44	104.18	-114.29	642.33	80.3	86.67
Sandhurst 1	40.06	31.36	-109.72	207.17	62.41	24.07
Sandhurst 2	45.09	28.99	-71.41	132.22	12.1	7.71
Sandhurst 3	45.89	11.29	-244.22	185.05	78.09	30.94
Green Hill 1	46.54	60.84	50.13	188.6	77.06	27.84
Green Hill 2	61.76	40.24	-193.75	285.54	77.25	45.93
Green Hill 3	49.9	45.36	-219.04	251.77	76.56	33.42

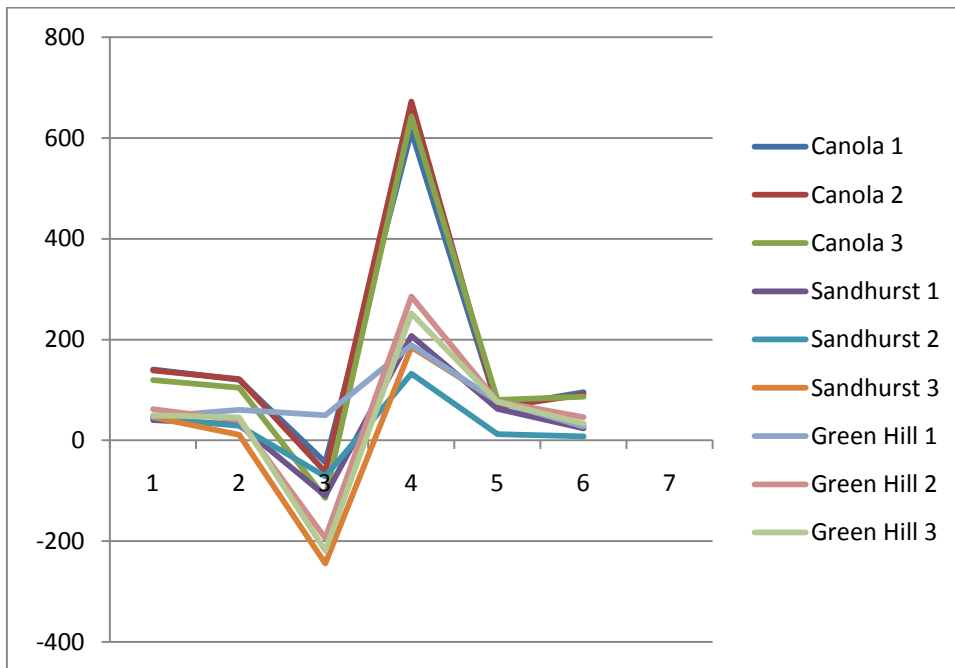


Figure 1. shows the data in a graphical form.

Table 2. shows the average, the spread and the % spread for each set of measurements.

	Channel 1 mV	Channel 2 mV	Channel 3 mV	Channel 4 mV	Channel 5 mV	Channel 6 mV
Canola						
Average	132.8	115.3	-73.4	642.4	70.8	90.9
Spread	20.9	17.5	70.7	59.0	14.8	8.6
%	15.8%	15.2%	96.3%	9.2%	20.9%	9.4%
Sandhurst						
Average	43.7	23.9	-141.8	174.8	50.9	20.9
Spread	5.8	20.1	172.8	22.1	66.0	23.2
%	13.3%	84.0%	121.9%	12.7%	129.8%	111.0%
Green Hill						
Average	52.7	48.8	-120.9	242.0	77.0	35.7
Spread	15.2	20.6	269.2	96.9	0.7	18.1
%	28.9%	42.2%	222.7%	40.1%	0.9%	50.6%
Average	19.3%	47.1%	147.0%	20.6%	50.5%	57.0%

Discussion:

This experiment was a relatively simple exercise designed to get a rough assessment of the ability of the OdourScan to detect an odour that can obviously be detected by a human nose. Table 2. shows that sensors, i.e., channels 1, 2, 4 and 6, demonstrate a relationship between the OdourScan measurements and the human measurement of rancidity. Channel 4 exhibits the best sensitivity, where as channel 1 exhibits reasonable sensitivity but slightly better reproducibility as determined by the least % spread. Channels 2 and 6 also exhibit some sensitivity to the smell but not with poorer reproducibility.

The reproducibility of the measurements is of concern. However the setup for the experiment was not sufficient and as such the OdourScan may not be the cause of the poor precision. The duration of exposure and the background odours would have some influence on the measurements.

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