CONFIDENTIAL REPORT

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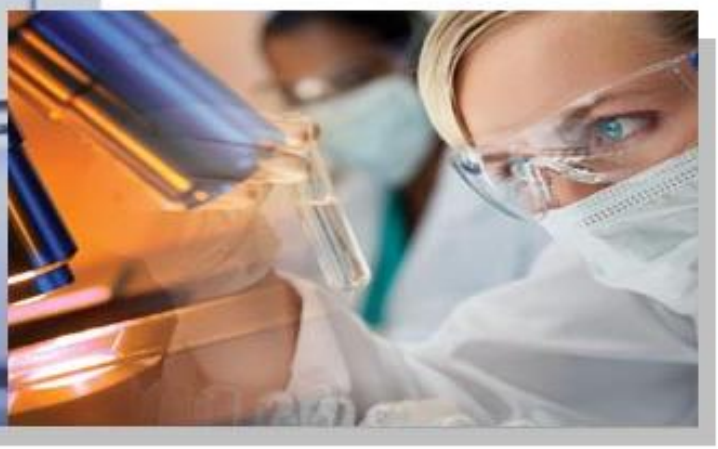

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Alcohol Vapor Analysis

Thank you for contacting Avomeen Analytical Services for the analysis of alcohol content when using your Vaportini product. Following are the results, methodology, and data associated with our analysis.

Table 1. Sample Descriptions

Avomeen ID	Sample Description
031814372981	Vaportini Kit
NA	Black Velvet Whiskey – 80 Proof

Figure 1. Image of Vaportini Apparatus (031814372981) and Test Liquor

Executive Summary

The goal of this analysis was to identify and quantify the different volatiles present in the sphere of a Vaportini kit when using an 80 proof alcohol. Specifically, the analysis was supposed to quantify the ethanol content and then calculate the number of inhalations necessary to reach a BAC (blood alcohol content) level at or above the legal limit. Based on total alcohol content in the Vaportini apparatus, the number of drinks necessary to increase the estimated BAC content to above the legal limit is going to be comparable to that of a standard beer, glass of wine, and/or shot of liquor (80 proof). The difference between alcohol inhalation (Vaportini) and alcohol ingestion (standard drinking methods) will be in the estimated uptake of alcohol into the body. The alcohol content in one inhalation of the Vaportini apparatus was, on average, lower than the alcohol content immediately absorbed into the body through the stomach and higher than the alcohol content from an average size sip of a mixed drink/beer.

Analytical Testing

GC-FID Analysis

The sample apparatus was tested using Black Velvet (80 proof) whiskey. A volume of approximately 44.4mL was added to the sphere and placed over the lit candle inside the pint glass. The sample was allowed to heat for 10 minutes before a 10µL sample of the gases in the sphere was extracted and injected into the GC-FID for analysis. Multiple samples were analyzed with fresh samples of the whiskey each time. An additional test was performed to see if the average alcohol content inside the sphere increased after a 40 minutes time period of being exposed to the heat from the candle.

Calibration standards of >99.5% (200 proof) ethanol were made at approximately 10,000ppm, 1,000ppm, 100ppm, and 10ppm and injected via the auto sampler to develop a calibration curve for measuring the ethanol content. The standards were diluted in water and were injected in 1µL volumes. The signal was then calculated as total µg of alcohol related to peak area in the GC-FID chromatograms.

Instrument Parameters

Instrument:	Agilent 6890N GC with Flame Ionization Detector
Column:	DB-5 (30m × 0.25 mm)
Temperature Program:	50 °C for 5 min. > 20 °C/min. to 280 °C > 280 °C for 5 min.

Results

In order to calculate the total alcohol content inhaled through use of the Vaportini apparatus, measurements of the alcohol content were taken and a calibration curve relating micrograms of alcohol to peak area was measured. A sample GC-FID chromatogram for the Vaportini apparatus when using Black Velvet whiskey is shown in Figure 2. A sample chromatogram of the ethanol standard is shown in Figure 3. The calibration curve for ethanol is shown in Figure 4. Using this calibration curve and the average area of the ethanol peak in the test for the Vaportini apparatus, the average concentration of ethanol inside the sphere was measured at 0.52µg/µL of vapor after a 10 minute exposure time to the candle heat source. There was a large amount of variation between measurements giving a relative standard deviation of 13%. There were also high concentrations of alcohol content measured in some of the analyses, including a sample extraction that was performed after the whiskey was heated for approximately 40 minutes, which measured ethanol concentrations at roughly 3 times the average concentration found.

Using the measured ethanol content of the vapors inside the sphere, calculations were performed in order to assess the total amount of alcohol inhaled by a male or female of average stature and physical health. In order to do the calculations, we calculated values based on the maximum potential alcohol inhalation by assuming that the concentration stays constant through the full volume of air inhaled by a male or female consumer. Using the reported average inspiratory reserve volumes for both male and female, 3.0 liters and 1.9 liters respectively, the amount of alcohol inhaled per inhalation (in grams), the resulting blood alcohol content (BAC) level, the total number of inhalations necessary to reach the legal BAC limit (0.08% or g/dL), and the total number of drinks necessary to reach the legal BAC limit were calculated. The results are shown in Table 2. For comparison, BAC online calculation sites (such as http://www.globalrph.com/bac.cgi and http://www.ou.edu/oupd/bac.htm) were used to assess the estimated number of drinks it would take for a male and female of average weight and average body composition to reach the legal BAC limit (Table 3). Based on the estimation calculations, it was found that there is no difference in the number of drinks necessary to reach the legal BAC limit. For both methods of consumption, the number of drinks to reach the legal BAC level was approximately 5 for males and approximately 3 for females. In Table 3, the estimate BAC was recorded in two ways. Acute ingestion indicates the BAC value assuming no time has lapsed and that the full alcohol content has been absorbed into your system without metabolizing any of the alcohol. BAC after 1 hour takes into account the average rate of alcohol metabolism at 0.01% or g/dL per 40 minute time period.

Table 2. Alcohol Inhalation Measurements using Vaportini and 80 proof Whiskey

Measurements	Average Measurement		Highest Measurement	
	Male	Female	Male	Female
Grams of Alcohol Inhaled per breath	1.56	0.99	3.90	2.47
dL in Body that absorb alcohol	635.03	399.16	635.03	399.16
BAC Content (g/dL)	0.0025	0.0025	0.0061	0.0062
Number of total Inhalations required to reach BAC of 0.08	32.6	32.3	13.0	12.9
Number of drinks	4.3532	2.7363	4.3532	2.7363

Calculations based upon average American male and female body weights and the average percentage of a male and female body that can absorb alcohol.

Table 3. Estimated Drinks Necessary to Reach Legal BAC Limit

Gender	Average Weight (lbs)	# of Drinks Necessary to Reach Legal BAC Limit	Estimated BAC (Acute Ingestion)	BAC after 1 hour
Male	200	5	0.097	0.082
Female	160	3	0.092	0.077

While the total number of drinks and alcohol content necessary to reach the legal BAC limit was no different in overall application of the two drinking methods, inhalation using Vaportini and consumption. Further investigation into the alcohol absorption rates through a person's stomach/small intestine versus their lungs yielded different results. Based on standard consumption of alcoholic beverages through the stomach and small intestine, calculations were made using standard drink recipes and the documented average sipping volume for males and females.[1] Standard recipes for each drink were taken from the website:

[1] Lawless et al., "Gender, Age, Vessel Size, Cup vs. Straw Sipping, and Sequence Effects on Sip Volume."

http://rethinkingdrinking.niaaa.nih.gov/toolsresources/cocktailcalculator.asp

Based upon this information, Table 4 shows the estimated grams of ethanol consumed per sip of and the estimated amount of alcohol absorbed into the body within 1 minutes. Through consumption, it has been reported that approximately 20% of the ethanol content is absorbed into the body within the first minute. The rest of the alcohol is then absorbed through the small intestine. Based on person to person variation, the maximum BAC level per drink is not reached until 30-90 minutes after drink consumption. Due to differences in the lung cellular structure[2], there is a much more rapid uptake of drug related chemicals in the body when inhaled versus consumed and digested. Using this fact to correlate to ethanol content as there has been no specific study found relating alcohol uptake in lungs, it was assumed that 100% of the alcohol taken into the lungs would first be absorbed into the body and the processed out through primarily the liver, and then through the lungs and sweat glands.[3] Table 4 also shows the estimated content of ethanol absorbed into the body based on the documented higher absorption rate of drugs when inhaled versus digested. As the numbers show, inhalation through the vaportini apparatus, in theory, speeds up the uptake of alcohol and eliminates the time period after drink consumption that is necessary to observe the maximum BAC level as it is directly absorbed through the walls of the lungs and not slowed through the digestion process.

Drink Type	Weight EtOH Injested (g)	Weight EtOH Absorbed (g) within 1 minute
1.25oz Shot (80 Proof)	11.67	2.33
Mojito/Vodka-Tonic	2.62	0.52
Pina Colada	2.62	0.52
Screw Driver	2.25	0.45
Martini	6.31	1.26
Gin-Tonic	2.68	0.54
Cosmo	5.38	1.08
Margarita	6.57	1.31
Beer (4.5% ABV)	0.89	0.18
Vaportini - Men	1.56	1.56
Vaportini - Women	0.99	0.99

Calculations based upon drink type, average volume ingested at one time, and estimated alcohol content based off of standard recipes found on http://rethinkingdrinking.niaaa.nih.gov/toolsresources/cocktailcalculator.asp

Please note that these calculations are estimates based upon drug uptakes and that no direct measurements or studies could be found relating ethanol uptake in the human lung. Further studies, including monitored human trials, would need to be performed to provide more accurate measurements of BAC content in relation to ethanol inhalation.

[2] Hickey, *Inhalation Aerosols*; Patton and Byron, "Inhaling Medicines"; ibid.
[3] Lieber, "Metabolism of Alcohol."

Figures

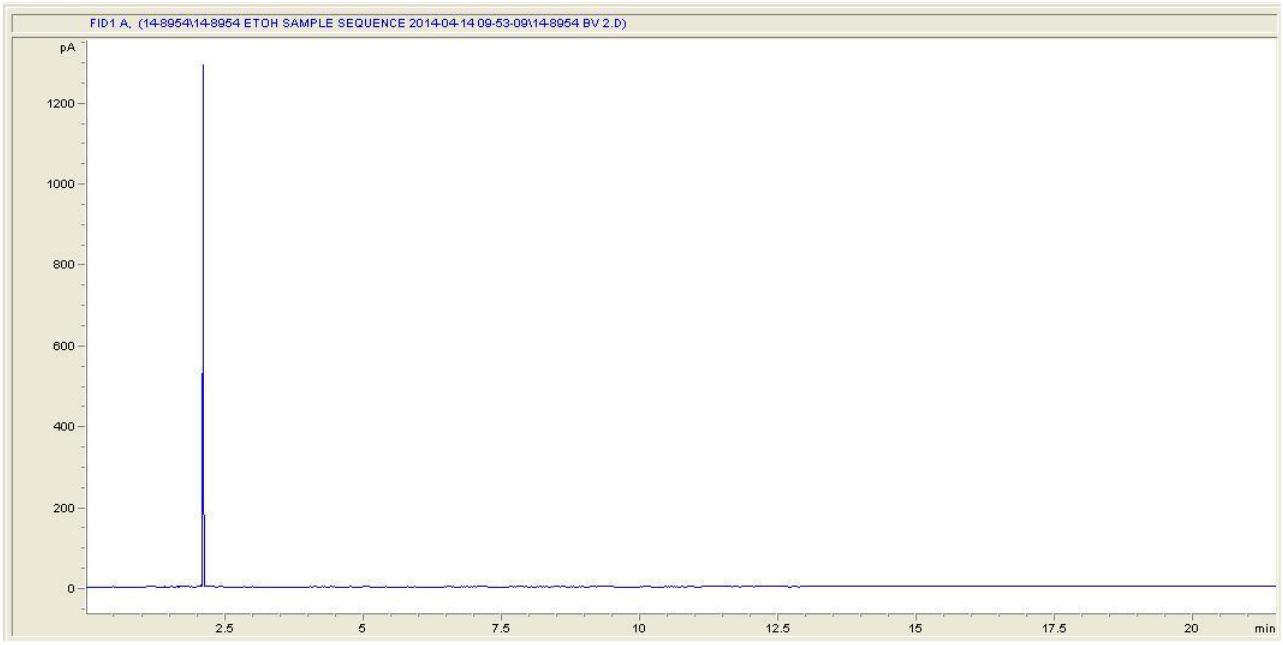

Figure 2. GC-FID Chromatogram of Black Velvet Whiskey Vapor Extracted from Vaportini Apparatus

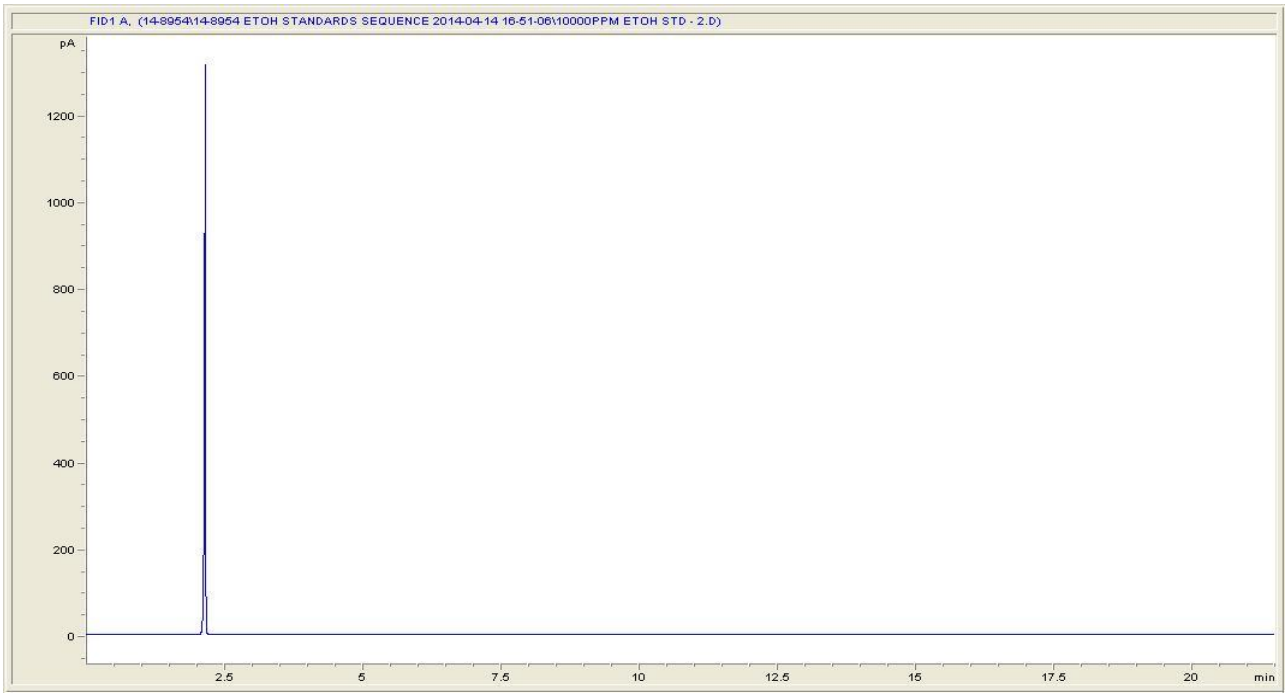

Figure 3. GC-FID Chromatogram of 10000ppm Ethanol in H_2O

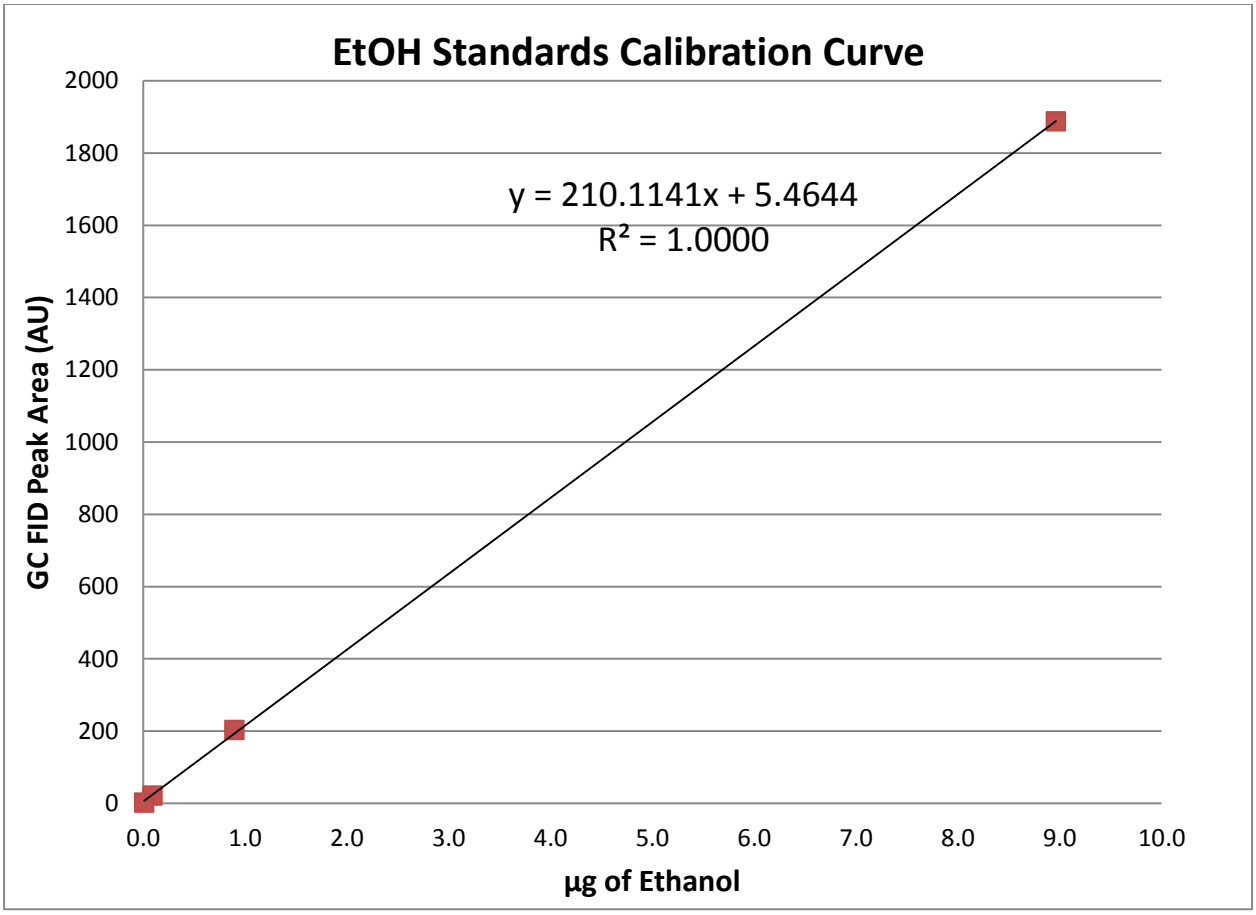

Figure 4. Ethanol Calibration Curve (µg of Ethanol vs GC-FID Peak Area)

Description of Instrumentation Used

Gas Chromatograph (GC): GC analysis is commonly used to separate and analyze vaporized volatile compounds. This system uses an inert gas to carry the sample through a separatory column, and then detects the retention time of different compounds in the column. Avomeen's scientists often use gas chromatography to help in the identification of an unknown compound, or mixture of compounds. Avomeen's Gas Chromatography capabilities include autosampling, pyrolysis, flame ionization detection, thermal conductivity detection, and the use of a range of polar and non-polar columns.

Wrap Up

Testing results relate only to items tested. Test report shall not be reproduced, except in full, without approval from Avomeen, LLC in writing.

Thank you for consulting with Avomeen Analytical Services. If you have any questions regarding this analysis, or if we can be of any further assistance, please call us at (800) 930-5450. Following the receipt of this final report, a final invoice indicating the remaining payment will be sent to you. We will safely and securely dispose of all samples and confidential information in our possession in 30 days, unless otherwise instructed by your company.

It has been a pleasure working with you and we look forward to serving you again.

Sincerely,
Avomeen Analytical Services

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