

SHINWA EXPRESS

*Application*2015
J u n e

VOL. 61

Quantification of nicotine in e-cigarette liquid using NeedlEx®

E-cigarette liquids are easily obtainable in many countries and pose potential health risks due to the presence of compounds such as nicotine. Shown below is an example of a quantitative analysis of nicotine in an e-cigarette liquid. Using the sample extraction needle NeedlEx and dynamic headspace sampling (DHS), quantification of nicotine is possible.



① Experimental method

Sampling device: NeedlEx (Amine type)
Sample: E-cigarette liquid containing nicotine
(main component: vegetable glycerin)
Standard solutions: Nicotine aqueous solutions (0.5, 1, 2%)
Internal standard: 5% (v/v) aqueous solution of 1-methyl-2-pyrrolidone

1. 100 μ L of the sample and 900 μ L of the internal standard solution were placed in a 20 mL septum vial, which was then heated at 60°C for 10 minutes.
2. A NeedlEx was then inserted through the septum, and 10 mL of headspace gas was sampled (See Fig. 1).
3. After completion of sampling, the NeedlEx was injected into a GC injection port followed immediately by desorption of nicotine using 0.5 mL of helium.
4. The standard solutions were measured in the same manner, a calibration curve prepared, and the concentration of nicotine in the e-cigarette liquid calculated.

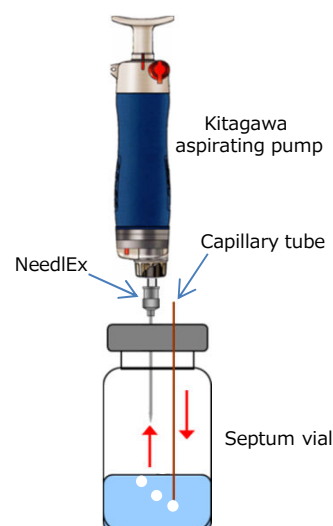


Fig. 1 Headspace sampling using the NeedlEx

**SHINWA CHEMICAL INDUSTRIES LTD.**

50-2 Kagekatsu-cho, Fushimi-ku
Kyoto 612-8307 Japan

TEL: +81-75-621-2360 FAX: +81-75-602-2660

E-mail: info@shinwa-cpc.co.jp

Website: <http://shinwa-cpc.co.jp/en/>

② Analytical conditions

- Analytical system: Shimadzu GC-2010 plus – QP-2010
- Column: ULBON HR-52 30 m x 0.25 mm I.D. df. = 0.25
- Column temp.: 200°C
- Carrier gas: 30 cm/sec He
- Interface temp.: 250°C
- Monitoring mode: TIC (m/z 20-200), SIM (m/z 84, 133, 161)

- Injection port temp.: 200°C
- Split ratio: 20:1
- Ion source temp.: 200°C

③ Results

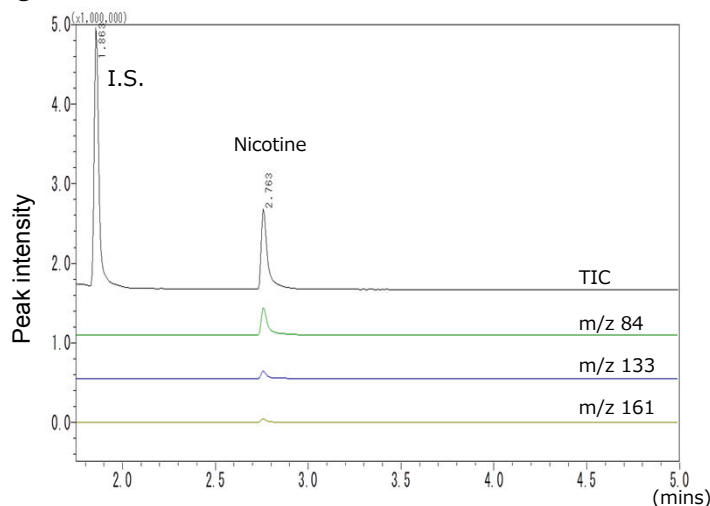


Fig. 2 GC-MS chromatogram of e-cigarette liquid headspace gas

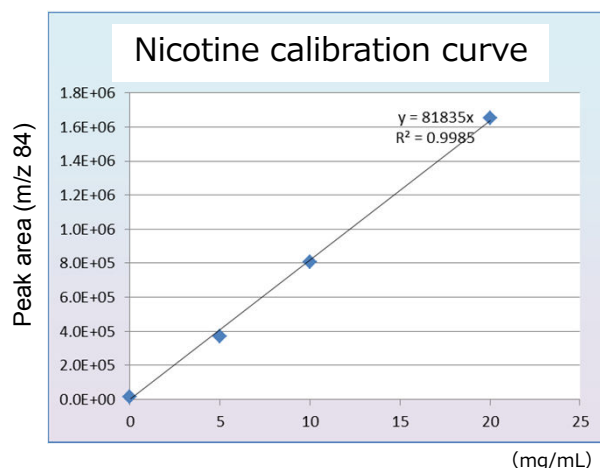


Fig. 3 Nicotine calibration curve

From the calibration curve above, the nicotine concentration in the sample was found to be 11.6 mg/mL.

Using an amine type NeedEx and dynamic headspace sampling, quantification of nicotine contained in e-cigarette liquid was found to be possible.

Price lists

Product	Quantity	Price
NeedEx Amine type	3 pc (in 1 case)	24,000 JPY
NeedEx Alcohol type	3 pc (in 1 case)	24,000 JPY
NeedEx Organic solvent type	3 pc (in 1 case)	24,000 JPY
NeedEx Fatty acid type	3 pc (in 1 case)	24,000 JPY



Accessories



Kitagawa aspirating pump

Product	Price
Kitagawa aspirating pump AP-20 (Sampling volumes: 50, 100 mL)	20,000 JPY
Kitagawa aspirating pump AP-20N (Sampling volumes: 10, 50, 100 mL)	24,000 JPY
SGE Luer lock gastight syringe 1 mL	7,500 JPY



*NeedEx video QR code