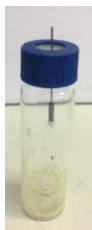


Tapping Paste is a type of metalworking oil. That is a lubricant used for cutting. Using MonoTrap RGPS TD and HandyTD TD265, we conducted a simple screen-analysis of the volatile constituents arising from Tapping Pastes and compared the volatile constituents of new and older Tapping Pastes.

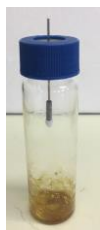
Refresh and fragrance ingredients such as pinene and limonene were detected in the new tapping paste, while these ingredients were not detected in the old tapping paste, and components such as fatty acids, which may be derived from the oxidation of the oils, were detected with high sensitivity.

Sample Preparation Procedure

New Tapping Paste



Old Tapping Paste



Place 0.5 g of tapping paste in a 40 mL vial

Sampling (Head Space)
MonoTrap RGPS TD × 1

60 °C 1 hour to
sampling

HandyTD/GC/MS



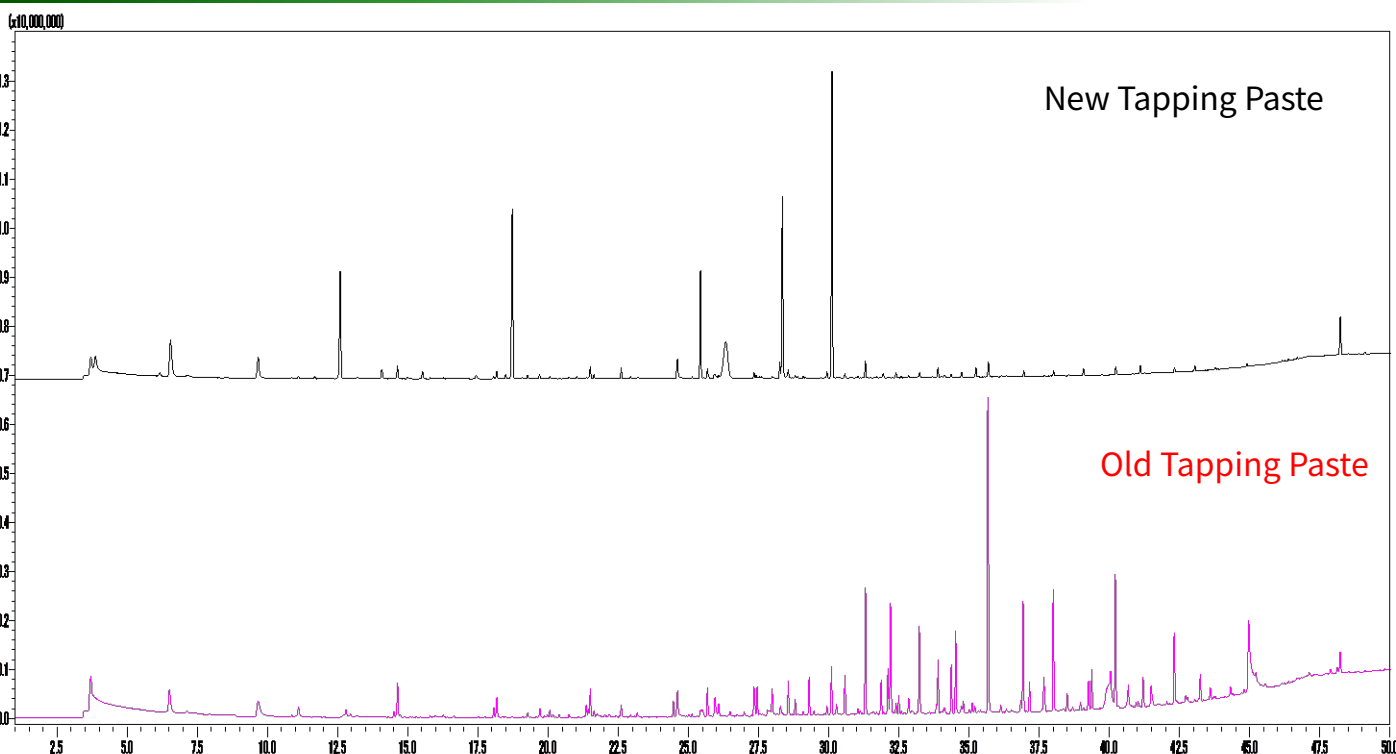
GC/MS Conditions

System : Thermal Desorption-GC/MS
(HandyTD TD265)
Column : InertCap Pure-WAX
0.25 mm I.D. × 60 m, df = 0.5 μm
Col.Cat. No. : 1010-68164
Col.Temp. : 40 °C (5 min) - 5 °C/min - 250 °C (13 min)
Carrier Gas : He, 1.38 mL/min
GC Inlet : 250 °C, Split 10:1
Detection : MS Scan (m/z 35-450)

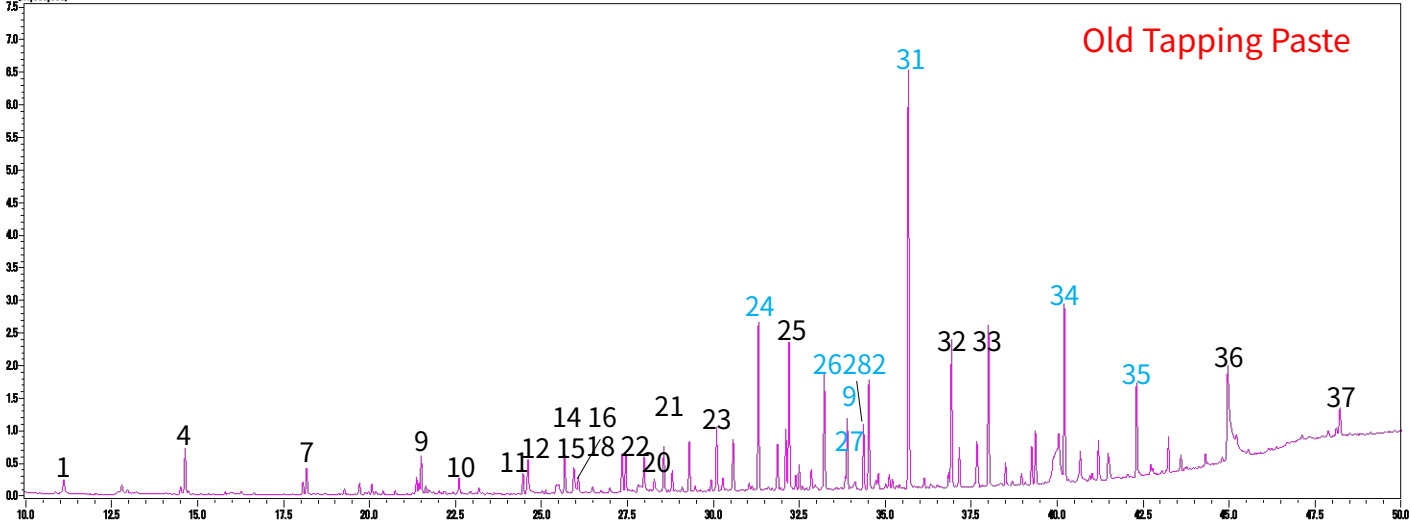
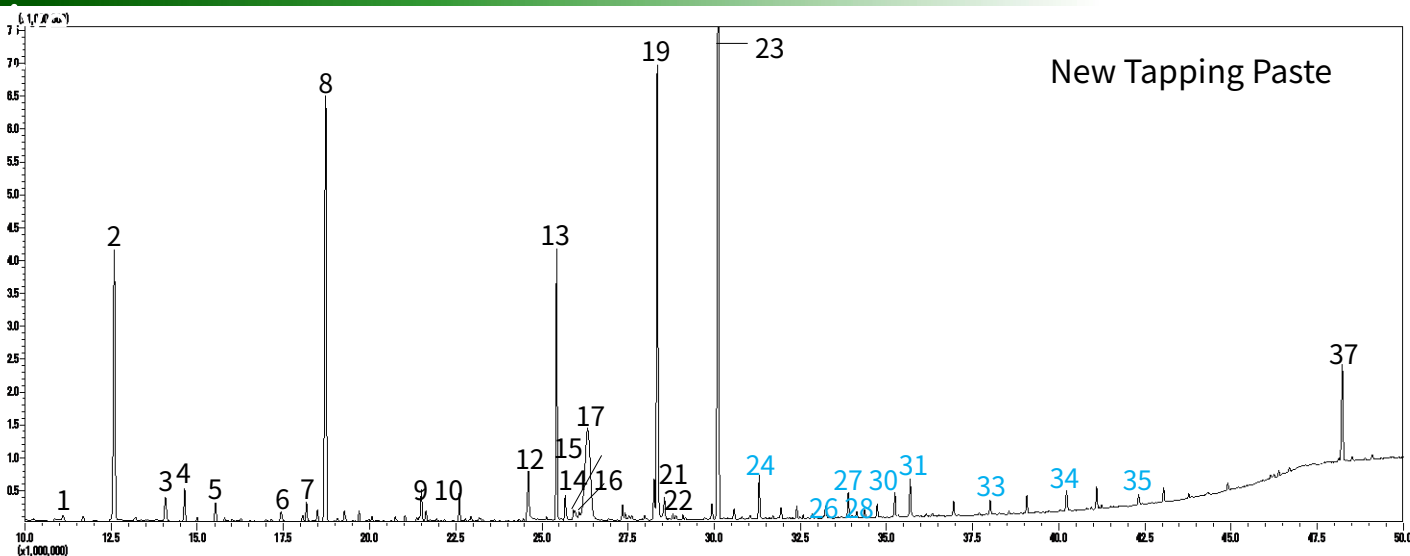
HandyTD Conditions

Desorb Temp. : 40 °C - 45 °C/sec - 250 °C (5 min)
Desorb Press. : 180 kPa

Comparison of Analysis Results



Qualitat



Library search results. The components that were more sensitively detected in older Tapping Pastes compared to the new are shown in blue letters.

- | | | | |
|----------------|----------------------------|---|--|
| 1. Pentanal | 11. 2-Nonanone | 21. 2-Nonenal | 30. 2, 4-Decadienal |
| 2. Pinene | 12. Nonanal | 22. 1-Octanol | 31. Hexanoic acid |
| 3. Camphene | 13. 3,7-Dimethyl-3-octanol | 23. Isobornyl acetate | 32. Diethoxyhexane |
| 4. Hexanal | 14. 2-Octenal | 24. 2-Decenal | 33. Heptanoic acid |
| 5. Pinene | 15. Acetic acid | 25. 1,3-Dioxolane-4-methanol | 34. Octanoic acid |
| 6. Myrcene | 16. 1-Heptanol | 26. Pentanoic acid | 35. Nonanoic acid |
| 7. Heptanal | 17. Ethyl acetoacetate | 27. 2-Undecenal | 36. Glycerin |
| 8. Limonene | 18. Decadiene | 28. Dibutylformamide | 37. 2-Propenoic acid, 3-(2-hydroxyphenyl)- |
| 9. Octanal | 19. Benzaldehyde | 29. Butanoic acid, 2-methyl-, hexyl ester | |
| 10. 2-Heptenal | 20. Propanoic acid | | |

GL Sciences disclaims any and all responsibility for any injury or damage which may be caused by this data directly or indirectly. We reserve the right to amend this information or data at any time and without any prior announcement.

GL Sciences Inc. Japan

22-1 Nishishinjuku 6-chome
Shinjuku-ku, Tokyo
163-1130, Japan

Phone: +81-3-5323-6620
Fax: +81-3-5323-6621
Email: world@glsc.co.jp
Web: www.glsciences.com

GL Sciences Inc. USA

4733 Torrance Blvd. Suite 255
Torrance, CA 90503
USA

Phone: +1-310-265-4424
Fax: +1-310-265-4425
Email: info@glsciencesinc.com
Web: www.glsciencesinc.com

GL Sciences B.V.

Dillenburgstraat 7C
5652AM, Eindhoven
The Netherlands

Phone: +31-40-254-9531
Email: info@glsciences.eu
Web: www.glsciences.eu

GL Sciences (Shanghai) Limited

Tower B, Room 2003
Far East International Plaza
No.317 Xianxia Road, Changning District
Shanghai, China 200051

Phone: +86-21-62782272
Email: contact@glsciences.com.cn
Web: www.glsciences.com.cn



International Distributors

Visit our Website at www.glsciences.com/distributors