# Certificate of Analysis

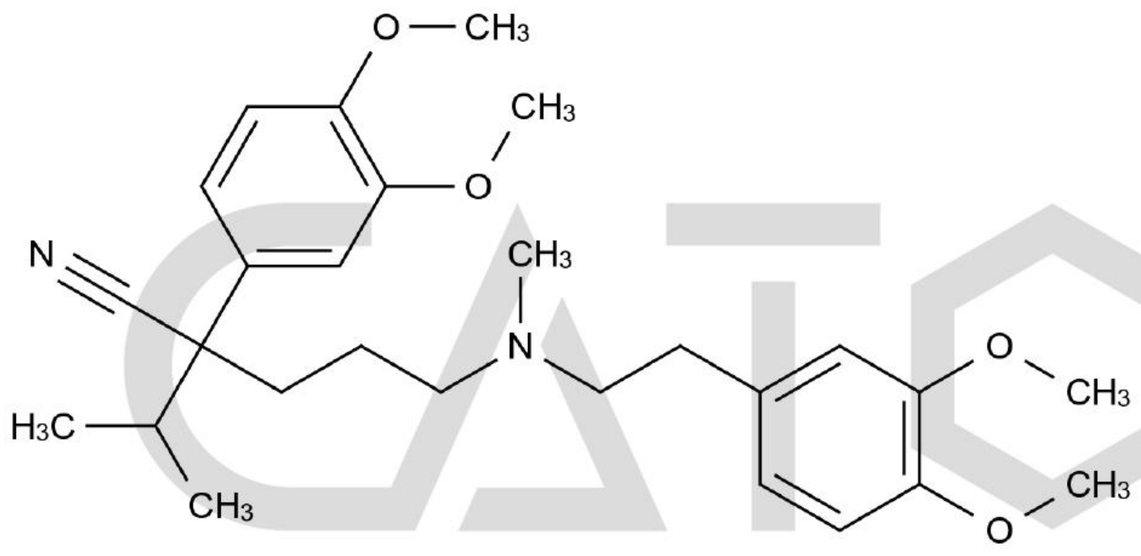
## Reference Material & Standard

| | | | |
|---|---|---|---|
| **Product Name:** | Verapamil | **Catalogue Number:** | CCAD302566 |
| **Synonyms:** | N/A | **Lot Number:** | 0924-RF-0018 |
| **CAS Number:** | 52-53-9 | **Expiry Date:** | Sep 25, 2028 |
| **Molecular Formula:** | $C_{27}H_{38}N_2O_4$ | **Storage:** | -20°C±5°C Protected from light and Sealed |
| **Molecular Weight:** | 454.60 | | |

**Warning:**



**Chemical Structure:**




| Test Items | Method | Results |
|---|---|---|
| **Appearance** | Visual inspection | Colourless Sticky Solid |
| **Identification** | LCMS&HNMR | Confirmed |
| **Purity** | HPLC | 99.453% |
| **Loss on Drying** | TGA | 0.2617% |
| **Assay** | | 99.2% |
| **Uncertainty** | | ±2.0% |

## Comment:

*1. The calculation of the mass balance method follows the formula (calculated on the non-dried basis):*
*Assay (%) = (100%-Loss on Drying) * Purity HPLC (%) /100%*
*Loss on Drying is considered as absolute effect, HPLC purity is considered as relative effect.*
*2. The uncertainty values are the expanded uncertainty and represent an estimated standard deviation equal to the positive square root of the total variation of the uncertainty of components. A normal distribution is assumed and a coverage factor of K=2 is chosen using approximately a 95% confidence level.*

**Signature:**

Prepared by: Alice Date: Sep 26, 2024

Reviewed by: Lisa Date: Sep 26, 2024

Approved by General Manager: David Date: Sep 26, 2024

CATO Research Chemicals Inc.