



Report for New Zealand Drug Decontamination & Remediation Specialists, NZ. June 2018

Report date: 10 June 2018

Version 1.0

Background: The NZ Drug Decontamination and Remediation Specialist Limited, Christchurch, New Zealand, submitted a sample of Apple Environmental Meth Remover to Hill Laboratories, Hamilton NZ for testing. The company wished to show that this product was effective in removing methamphetamine and complied with the New Zealand Standard Testing and Decontamination of methamphetamine-contaminated Properties: NZ8510:2017

Hill Laboratory undertook to [a] measure the rate of methamphetamine removal in solution, and [b] identify the methamphetamine-related compounds arising from the use of this product. This current report documents the findings of the Hill Laboratories in the revised report number 1966389 (06 June 2018). Note that Hill Laboratory uses the name 'Apple Clean' to identify the product. The correct name is 'Apple Environmental Meth Remover'.

Introduction: The standard, 'Testing and decontamination of methamphetamine contaminated properties' (NZS 8510:2017) sets out in the Scope section 1.1 the requirements to risks to well-being, information on the disposal of contaminated wash solutions and the necessary safety measures to be taken during any decontamination process. The Cleaning Products section of the Standard (4.3.7.2) describes the nature of the acceptable products to be used (safe to use, effective in removal of methamphetamine, have no long-term adverse effects and not give rise to harmful reaction products).

The NZ Drug Decontamination and Remediation Specialist Limited use Apple Environmental Meth Remover for the de-contamination of dwellings and properties that have been previously shown to contain methamphetamine. To ensure that Apple Environmental Meth Remover does meet the requirements set out in the Standard, the New Zealand company requested some additional testing to be carried out to validate the compliance with the standard.

Testing: two different types of testing were undertaken to look at separate physio-chemical properties of methamphetamine together with its breakdown products.

[1] Nuclear Magnetic Resonance Spectroscopy (NMR). The treated samples were delivered to the Crown Research Institute, Scion at Rotorua for analysis. The analysis was carried in conjunction with Dr. Stefan Hill of this organisation. Spectra were acquired on a Bruker Avance III 400 spectrometer operating at 400.13 MHz for {1H} and 61.42 for {2H}.

[2] Ultra-High-Performance Liquid Chromatography / High Resolution Mass Spectrometer (HPLC/MS) This section of the work was undertaken at Hill Laboratories' facility at Duke Street, Frankton, Hamilton. A mixture of methamphetamine and product (Apple Environmental Meth Remover) was prepared and portions were injected immediately (T0), 1-hour, 4-hours, 7 hours, 18-hours & 24 hours after mixing. A separate mixture of Apple Environmental Meth Remover alone was later injected for comparison. The separation of the components was by a C18 column at 40 deg C, using mobile phases of 0.2% acetic acid in type 1 water & 0.2% acetic acid in 95% acetonitrile with a total flow rate of 0.4ml/min. The MS used was a Thermo QExactive Orbitrap mass spectrometer (a High Resolution Accurate Mass instrument).

Results:

[1] NMR. (a) The important finding is that this instrumental technique confirms the work using HPLC/MS that all the methamphetamine is destroyed in the presence of Apple Environmental Meth Remover.

(b) The presence of methamphetamine related fragments provides some chemical information regarding the degradation pathway which is consistent with published data.

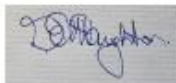
[2] HLPC/MS. (a) Finding 0.2% of the original methamphetamine 7 hours after mixing and 0.5% mono-hydroxy-methamphetamine indicates the effective removal of the applied methamphetamine. At 18 hours both the applied methamphetamine & the mono-hydroxy-methamphetamine reaction product was not able to be detected.

(b) The HPLC/MS analysis indicates that the product is destroyed at 1 hour after the start and then slowly declines indicating that the other steps of degradation are slow.

(c) The steady rise of benzoic acid levels over the 24-hours supports the supposition that the degradation rate is slow after the initial destruction of methamphetamine.

Conclusions:

- (a) These results show that the product (Apple Environmental Meth Remover) quickly destroys methamphetamine in solution.
- (b) Benzoic acid, a natural product found in fruit & used in preserving food (E211, E212 & E213), is identified as a methamphetamine degradation product when using Apple Environmental Meth Remover.
- (c) The HPLC/MS analysis indicates that the product is destroyed at 1 hour after the start and then slowly declines indicating that the other steps of degradation are slow.
- (d) When users of Apple Environmental Meth Remover apply the product as directed, wearing the recommended personal protection equipment (PPE) as set out in the Standard, there appears to be no risk to their well-being as required in the Standard (sec 1.1).
- (e) When Apple Environmental Meth Remover is used as directed, the resulting wash solutions are expected to meet New Zealand trade waste requirements and disposed via the sewage system as set out in the NZ 8510:2017 Standard (sec 4.3.7.2)
- (f) The MSDS provided for the product shows that the product complies with the NZ8510:2017 standard in that strong ammonia & oxidisers are not used (section 4.3.7.2 (e))



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Appendix.

Appendix-1 Hills Laboratories report Ref 1966389 re-issued report

'Apple Environmental Meth Remover **Methamphetamine** - Breakdown Products Tentative Identification.'



180606 Amended
Hill Lab Report1966: