PCCA UniFlow™ **TECHNICAL REPORT**

Chemical Stability of Powder Triturates for T3/T4 Mixed with the New Excipient Base Using Variable Methods: Mortar and Pestle, FlackTek™ and PCCA RAM™

SUMMARY: Powder triturates for T3/T4 mixed with PCCA UniFlow™ remained chemically stable for 6 months at room temperature and refrigerated conditions, regardless of the mixing method: M&P, FlackTek™ or PCCA RAM™.

Introduction:

Thyroid hormones (liothyronine T3 and levothyroxine T4) are potent and low-dose active pharmaceutical ingredients (APIs), often measured in micrograms (µg) per dosing unit. As such, even slight chemical degradation can lead to clinically significant under- or overdosing, risking hypo- or hyperthyroidism. Compatibility with the new excipient base (PCCA UniFlow™) must be ensured when compounding solid dosage forms (tablets and capsules) to guarantee that there is no chemical interaction responsible for degradation of the APIs.

The chemical stability of powder triturates for T3/T4 mixed with the new excipient base and stored at room temperature and refrigerated conditions was evaluated. The powder triturates were prepared using three different methods for comparison purposes: mortar & pestle (M&P), FlackTek™ and PCCA RAM™.

Methodology:

T3 and T4 were extracted using 80% ethanol in purified water through a combination of vortex-mixing, sonication and centrifugation before transferring to HPLC vials for analysis. Standard solutions were prepared to achieve a known concentration of about 0.4 mg/mL stock, then diluted to various concentrations. The mobile phases consisted of 0.1% trifluoroacetic acid (TFA) in water (Mobile Phase A) and 0.1% TFA in acetonitrile (Mobile Phase B). Chromatographic analysis was conducted using a Waters Acquity UPLC system with reverse-phase gradient elution and a detection wavelength of 300 nm over a 2.5-minute run time. Assay determination was performed using a Waters separation module (QSM), a Waters column manager heater/cooler (CM), a Waters Acquity photodiode array (PDA) detector and a Waters auto sampler (FTN).

Results and Discussion:

The potency of the T3/T4 powder triturates remained within the specifications of +/-10% of the initial concentrations, as displayed in Tables and Figures 1, 2 (A, B).

The new excipient base (PCCA UniFlow) maintained the chemical stability of the T3/T4 powder triturates over 6 months, when stored at both room temperature and refrigerated conditions. The three mixing methods tested — M&P, FlackTek and PCCA RAM — yielded comparable results, supporting the suitability of PCCA UniFlow when compounding T3/T4 solid dosage forms, regardless of the compounding equipment used.

A

Day	M&P	FlackTek™	PCCA RAM™
0	100.00%	100.00%	100.00%
27-29	99.97%	98.72%	94.31%
59	98.70%	97.01%	97.18%
91	96.96%	95.94%	95.69%
120	98.15%	96.72%	95.80%
150	99.46%	97.96%	95.48%
182	97.20%	96.37%	95.41%

B

Day	M&P	FlackTek™	PCCA RAM™
0	100.00%	100.00%	100.00%
27-29	100.50%	98.74%	98.69%
59	99.09%	97.92%	97.18%
91	97.26%	97.64%	96.47%
120	98.87%	98.61%	96.47%
150	99.52%	99.37%	97.78%
182	97.66%	97.22%	95.77%

Tables 1A and 1B. Potency (% initial) of **T4** powder triturates obtained using the three mixing methods, stored for 6 months at room temperature (A) and refrigerated conditions (B).

Please refer to page 2 for additional Tables and Figures.

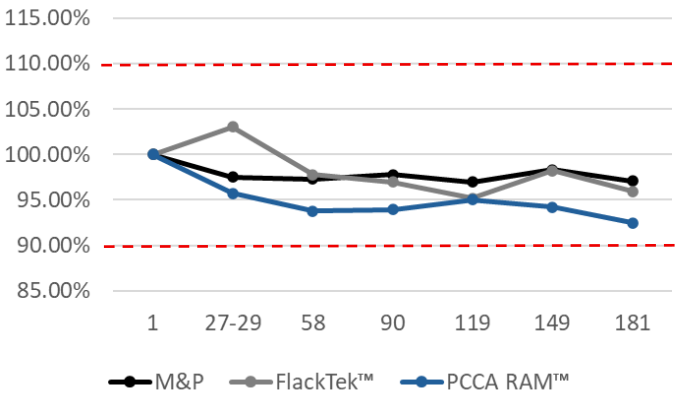
Chemical Stability of Powder Triturates for T3/T4 Mixed with the New Excipient Base Using Variable Methods: Mortar and Pestle, FlackTek™ and PCCA RAM™

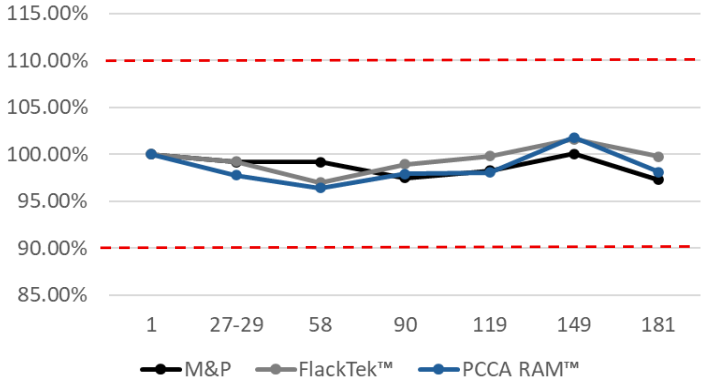
A

Day	M&P	FlackTek™	PCCA RAM™
1	100.00%	100.00%	100.00%
27-29	97.52%	103.05%	95.72%
58	97.30%	97.77%	93.77%
90	97.81%	96.96%	93.95%
119	96.96%	95.21%	95.03%
149	98.33%	98.23%	94.24%
181	97.07%	95.97%	92.49%

B

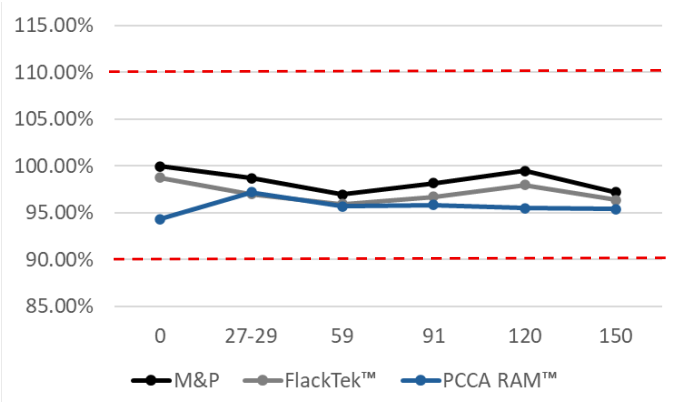
Day	M&P	FlackTek™	PCCA RAM™
1	100.00%	100.00%	100.00%
27-29	99.19%	99.26%	97.76%
58	99.17%	97.01%	96.41%
90	97.49%	98.93%	97.94%
119	98.28%	99.83%	98.06%
149	100.07%	101.61%	101.83%
181	97.30%	99.75%	98.10%



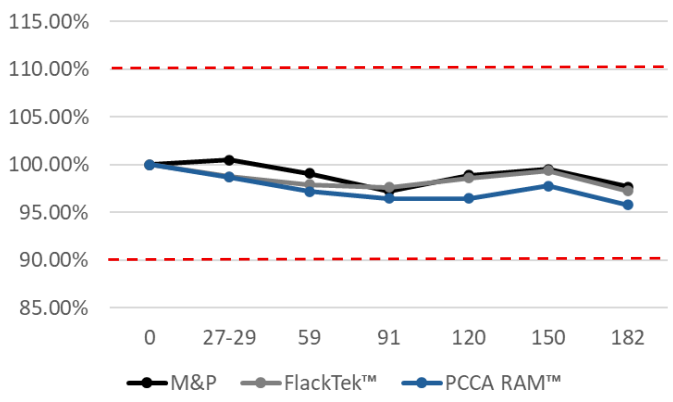


Tables and Figures 2A and 2B. Potency (% initial) of **T3** powder triturates obtained using the three mixing methods, stored for 6 months at room temperature (A) and refrigerated conditions (B).

A



B



Figures 1A and 1B. Potency (% initial) of **T4** powder triturates obtained using the three mixing methods, stored for 6 months at room temperature (A) and refrigerated conditions (B).