

The Morphine in Your Pantry – Understanding the Overdose Risk of Home-Brewed Poppy Seed Tea

Deborah Powers M.S.*,
Stephen Erickson M.D.,
Madeleine J. Swortwood Ph.D.

*Department of Forensic Science
Sam Houston State University
Huntsville, TX, USA*



Disclaimer

- No financial disclosures or conflicts of interest.

Presentation Impact

- Understand the risks involved with poppy seed tea
- Lethal amounts of morphine possible
- Reconsider the legality of unprocessed bulk poppy seeds



Opium Poppy

- *Papaver somniferum*
 - Grown worldwide
 - Latex harvested for alkaloids
 - Morphine
 - Codeine
 - Thebaine
 - Seeds used in baking
 - Latex transfers onto seeds during harvest

Poppy Seed Tea

- Seeds not currently regulated
- Unwashed/unprocessed have a higher alkaloid content
- Source of morphine
 - Some codeine
- Internet culture propagates this practice

Poppy Seed Tea

★★★★★ ... these for poppy seed tea and the trip was pretty nice.

By Amazon Customer on April 5, 2017

Size: 1 LBs | **Verified Purchase**

I use these for poppy seed tea and the trip was pretty nice.

▶ [10 comments](#)

Was this review helpful to you?

[Report abuse](#)

★★★☆☆ These dont work as good as they should

By Ron on February 5, 2013

Verified Purchase

Ive tried a couple diff. brands of poppy seed and these are not very good. Yes they might be unwashed but if you told me they were washed i wouldnt be surprised. These did NOT do the trick, find another source.

▶ [Comment](#)

2 people found this helpful. Was this review helpful to you?

[Report abuse](#)


Poppy Seed Tea

How to make poppy seed tea

Secure | <https://www.youtube.com/watch?v=Os2TwN9bl-U>

YouTube | poppy seed tea

Sign in



1:22 / 1:49

How to make poppy seed tea

Roshambo

Subscribe 639

2,990 views

Up next

Autoplay

Poppy seed tea - An in depth tutorial
Shenanigans Shenanigans
18,200 views
8:17

How to make poppy seed tea, morphine citrate (for educational use only DO NOT TRY THIS AT)
Roshambo
6,849 views
10:01

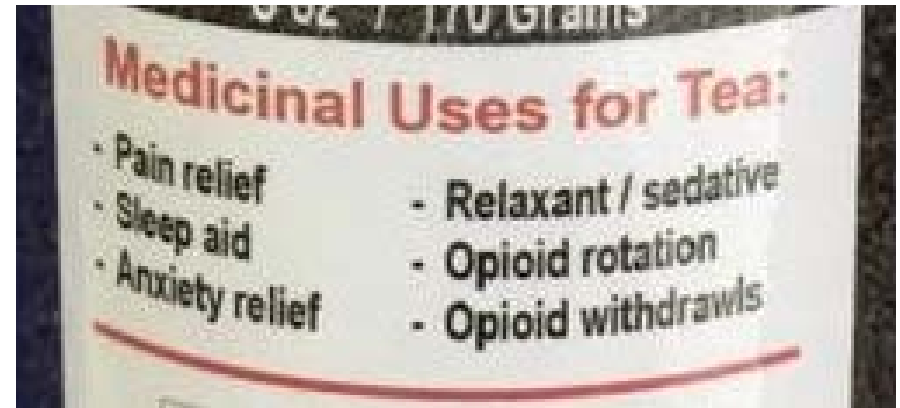
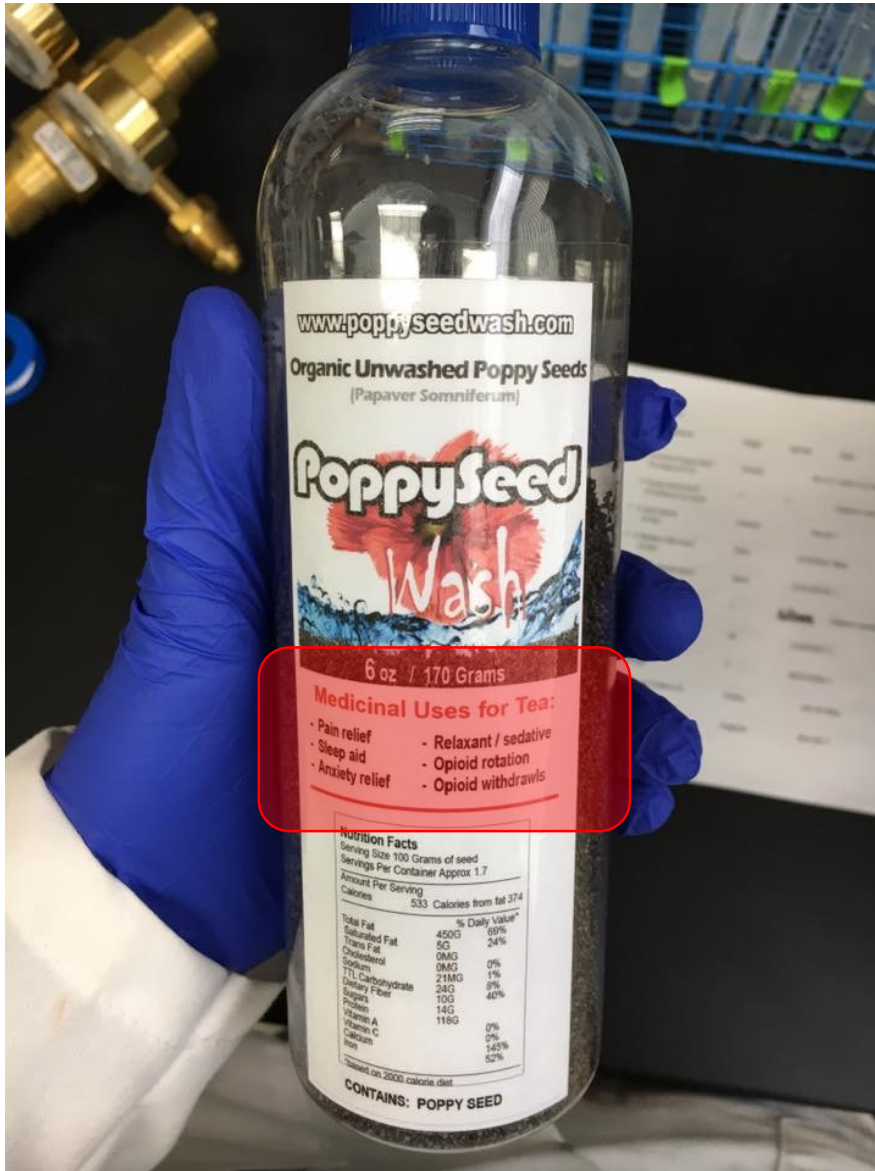
Poppy Seeds (Cold Water Extraction) (Read Description!!!)
Brandon Richards
50,802 views
5:10

The Opium bonus cup (poppy seed tea new recipe)
Roshambo
1,755 views
6:13

Overall opinion on poppy seed tea and explaining sigma receptors
Roshambo
3,498 views
3:35

Windows taskbar: 9:25 PM 4/9/2017

Poppy Seed Tea



Case Report 1

- 24-year-old male
- Morphine intoxication with aspiration pneumonitis
- Neither illicit nor pharmaceutical sources of morphine found
- Blood sample taken at autopsy
 - Morphine: 255 ng/mL
 - Codeine: 12.2 ng/mL
 - Thebaine: detected but below the reporting limit

Case Report 2

- 21-year-old male
- Pulmonary edema and early acute pneumonia
- Neither illicit nor pharmaceutical sources of morphine found
- Blood sample taken at autopsy
 - Morphine: >800 ng/mL (femoral)
 - Codeine: 260 ng/mL (femoral)

Previous Literature

- No official LD50 for morphine or codeine in humans
 - Large overlap in therapeutic, toxic, and fatal concentrations
 - Tolerance
 - Codeine commonly prescribed in mixed formulations
- Controlled poppy seed ingestion studies
- Effects of processing on alkaloid content

Forensic Significance

- No literature on rinsing opioids by home-brewing methods
- How much morphine is possible?
 - Codeine?
- Thebaine relevant for sourcing
- Poppy seed tea abuse
 - Public safety concern



Materials

- 22 samples from internet sources
 - Bulk poppy seeds (n=19)
 - Poppy seed powder (n=1)
 - Poppy seed tea bags (n=1)
 - Liquid poppy extract (n=1)
- Analyzed for morphine, codeine, and thebaine
- Morphine-d₃ (internal standard - ISTD)

Sample Inventory

Sample ID #	Origin Claimed on Packaging	Use By Date on Packaging	Plant Type Claimed on Packaging	Other Information From Vendor
1	Canada	Nov-21	California Poppy	Poppy Seed Tea Bags
2	Unknown	Unknown	<i>P. somniferum</i>	Unwashed
3	Holland	Feb-18	Unknown	---
4	Ohio	5/29/2017	Blue	---
5	Spain	11/2018	Unknown	Unwashed
6	Unknown	Unknown	<i>P. somniferum</i>	---
7	UK	2/16/2017	Unknown	Unwashed
8	Unknown	8/27/2018	Unknown	---
9	Turkey	Jan-19	Blue	---
10	England	Dec-18	Unknown	---
11	Holland	May-18	Blue	Unwashed
12	Unknown	10/27/2017	Unknown	Unwashed
13	Unknown	Unknown	Black	---
14	Unknown	Jun-17	Unknown	---
15	Unknown	Jul-21	<i>E. californica</i>	Liquid Extract (400 mg/0.7 mL)
16	Tasmania	Unknown	Tasmanian Strain	Unwashed
17	Afghanistan	Unknown	Afghan Blue <i>P. somniferum</i>	Unwashed
18	Afghanistan	Unknown	Afghan Blue <i>P. somniferum</i>	Unwashed
19	USA	Oct-19	Unknown	Poppy Seed Powder
20	UK	2/11/2017	Unknown	Unwashed
21	Spain	3/28/2018	Unknown	---
22	UK	8/2/2017	Unknown	Unwashed

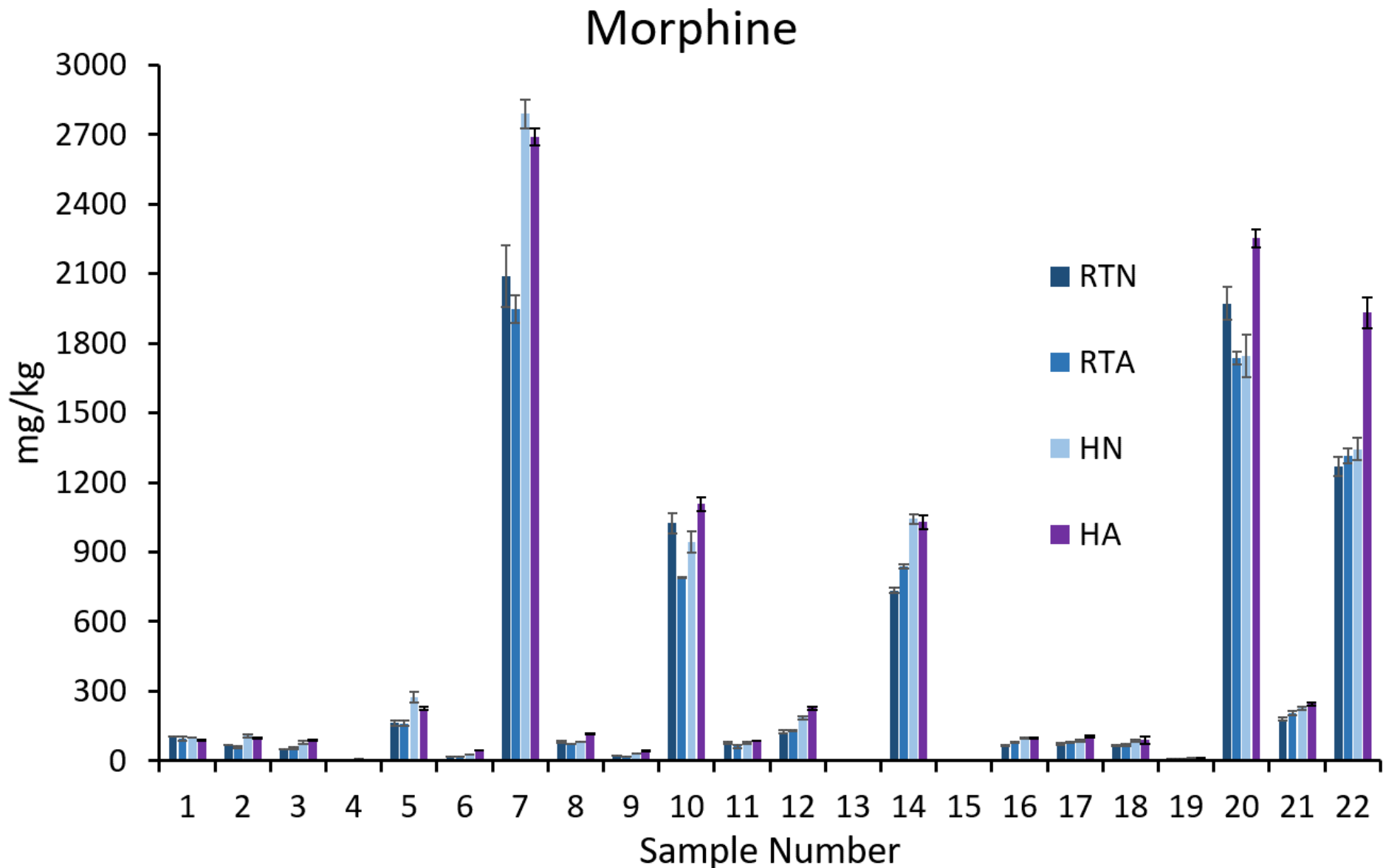
LC-MS/MS Parameters

- Agilent 1290 Infinity II liquid chromatograph
- Agilent 6470 triple quadrupole mass spectrometer
 - Electrospray ionization (+ mode) with multiple reaction monitoring
- Agilent ZORBAX Eclipse Plus C18 column
 - 1.8 μm particle size, 2.1 x 50 mm
- Mobile Phase A: 0.1 % formic acid in water
- Mobile Phase B: 0.1 % formic acid in acetonitrile
- Flow Rate: 0.4 mL/min
- Gradient elution: hold 95:5 A:B from 0-1 min, 30 % B from 1-3 min, 95 % B from 3-3.1 min, hold until 4.4 min, decrease to 5 % B from 4.4-5 min

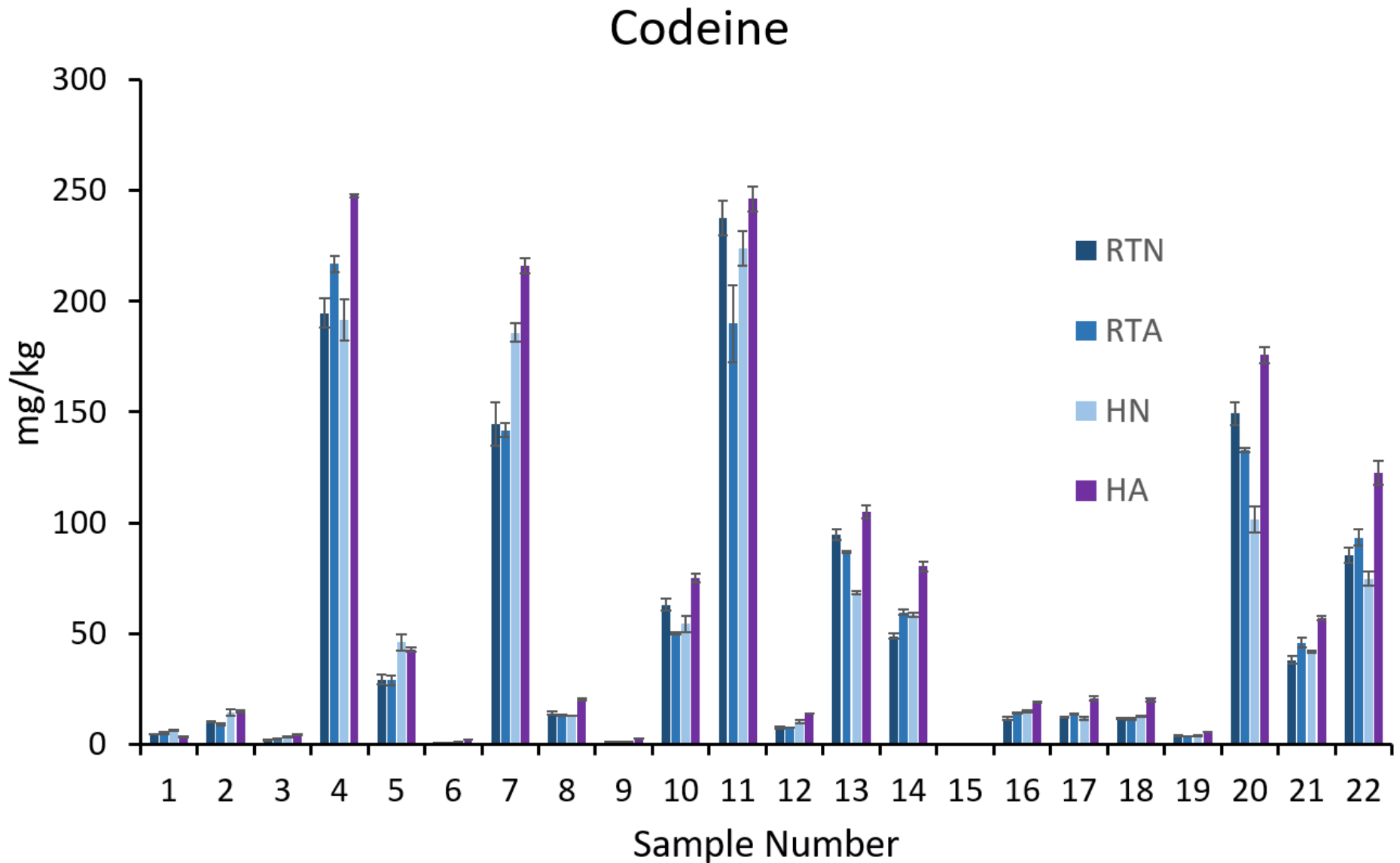
Sample Preparation

1. Tea = 85 g seeds + 150 mL water
 - 35 g powder in 100 mL, 6 g tea bags in 30 mL, and 7 mL extract [4 g] in 13 mL
2. Gently agitated for 10 minutes
 - room temperature neutral (RTN), room temperature acidified with 5 % lemon juice (RTA)
 - preheated to 94 °C and neutral (HN), preheated to 94 °C and acidified (HA)
3. Aliquots of extracts filtered
 - Luer Lock syringes with PTFE filters
4. Triplicate dilutions at 1:2,000 in 95:5 (v/v) MP
 - Other dilutions when needed
5. Addition of ISTD at 100 ng/mL
6. Analyzed by validated LC-MS/MS method (SWGTOX)
 - Quantified for morphine, codeine, and thebaine from 1 – 500 ng/mL

Morphine in Seeds

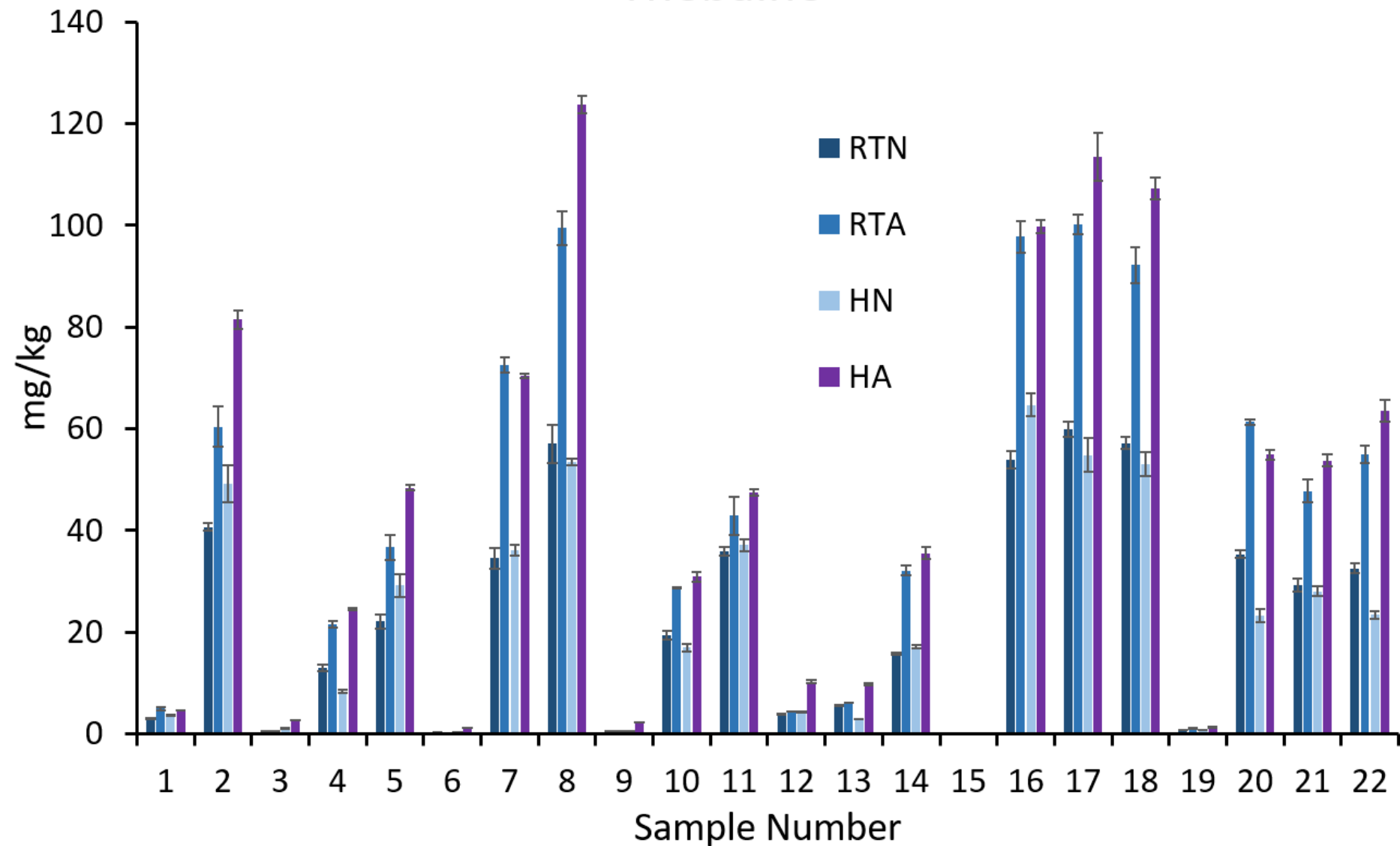


Codeine in Seeds



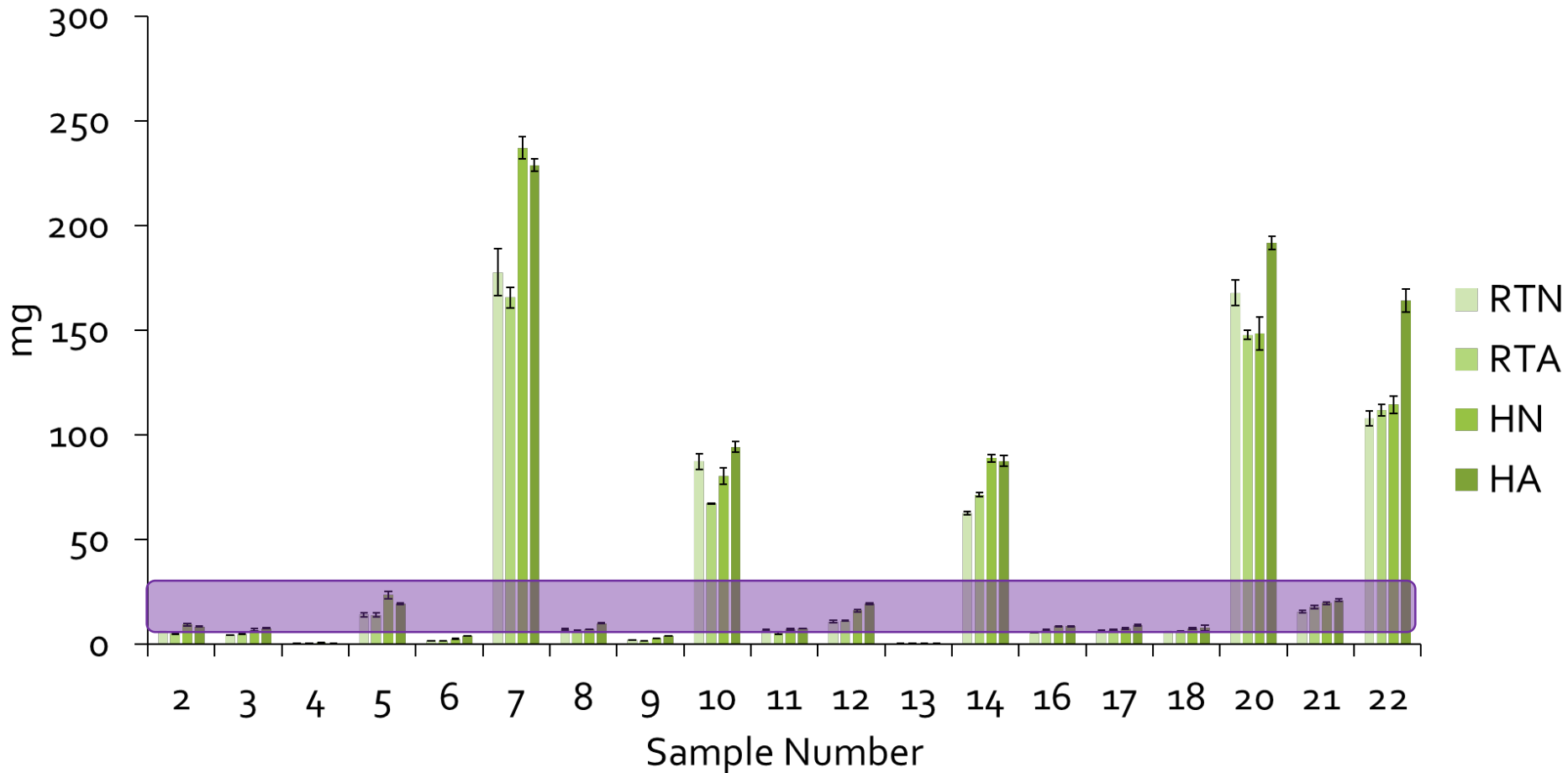
Thebaine in Seeds

Thebaine



Morphine in 85 g Seeds in 150 mL Tea

Morphine in 85 g seeds in 150 mL tea



Conclusion

- Alkaloid content varies
 - Between vendors
 - Between harvests
- Codeine overdose unlikely
 - About 1/10th the potency of morphine
 - Lethal amounts possible, but morphine poses greater risk
- Moderate volumes → Lethal morphine
 - Dependent on individual tolerances
 - However, no guarantee of safety
- Heating & acid modifier could increase alkaloid content in tea

PAPER

J Forensic Sci, 2017
doi: 10.1111/1556-4029.13664
Available online at: onlinelibrary.wiley.com

TOXICOLOGY

Deborah Powers,¹ M.S.; Stephen Erickson,² M.D.; and Madeleine J. Swortwood,¹ Ph.D.

Quantification of Morphine, Codeine, and
Thebaine in Home-Brewed Poppy Seed Tea
by LC-MS/MS

Acknowledgements

- Sam Houston State University Department of Forensic Science
- Dr. Gayle Suzuki, Virginia Office of the Chief Medical Examiner
- Dr. Stephen Erickson, Office of the Chief Medical Examiner, Arkansas State Crime Lab
- The Hacala Family

Questions

Deborah Powers

deborah.powers.42790@gmail.com

Dr. Madeleine J. Swortwood

mjs079@shsu.edu