



# Analysis of nitrosamine content, moisture, and pH in pouched smokeless tobacco products: a comparison of constituents in the intact product, tobacco, and pouching material

Gene Gillman, PhD

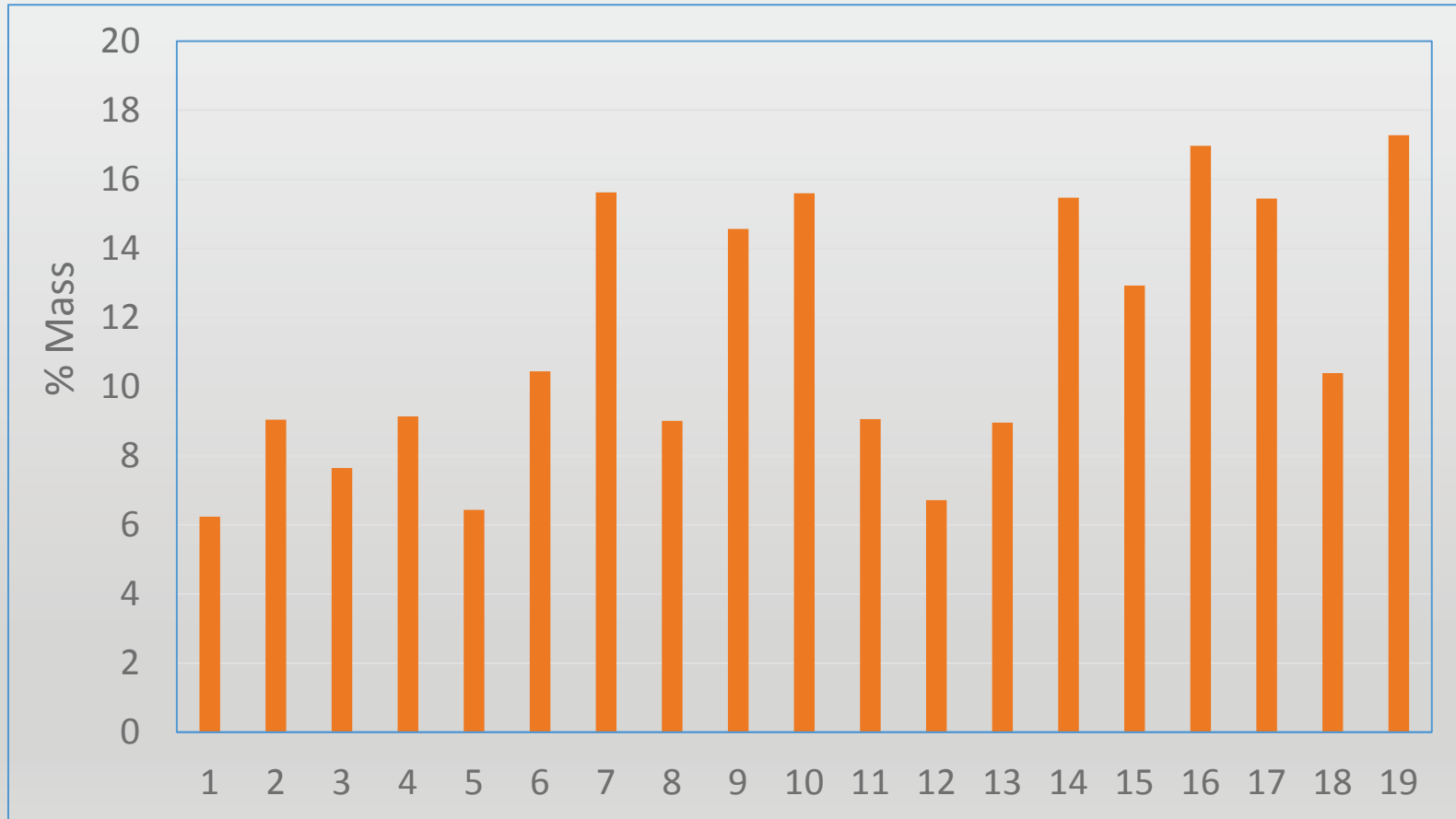
# Background

- Several common methods:
  - The pouch material is separated from the tobacco and ground. The tobacco and the ground pouch are combined before analysis. (CDC Method for pH)
  - Tobacco is separated from the pouch, analyze tobacco only. (CDC Method for Nicotine and OV)
  - Analyze intact product by cutting the pouch in half and adding the tobacco and pouch material to the extraction vessel. (CRM 79)
  - Add intact product to extraction vessel along with grinding media and extraction solution. (EA internal procedure)

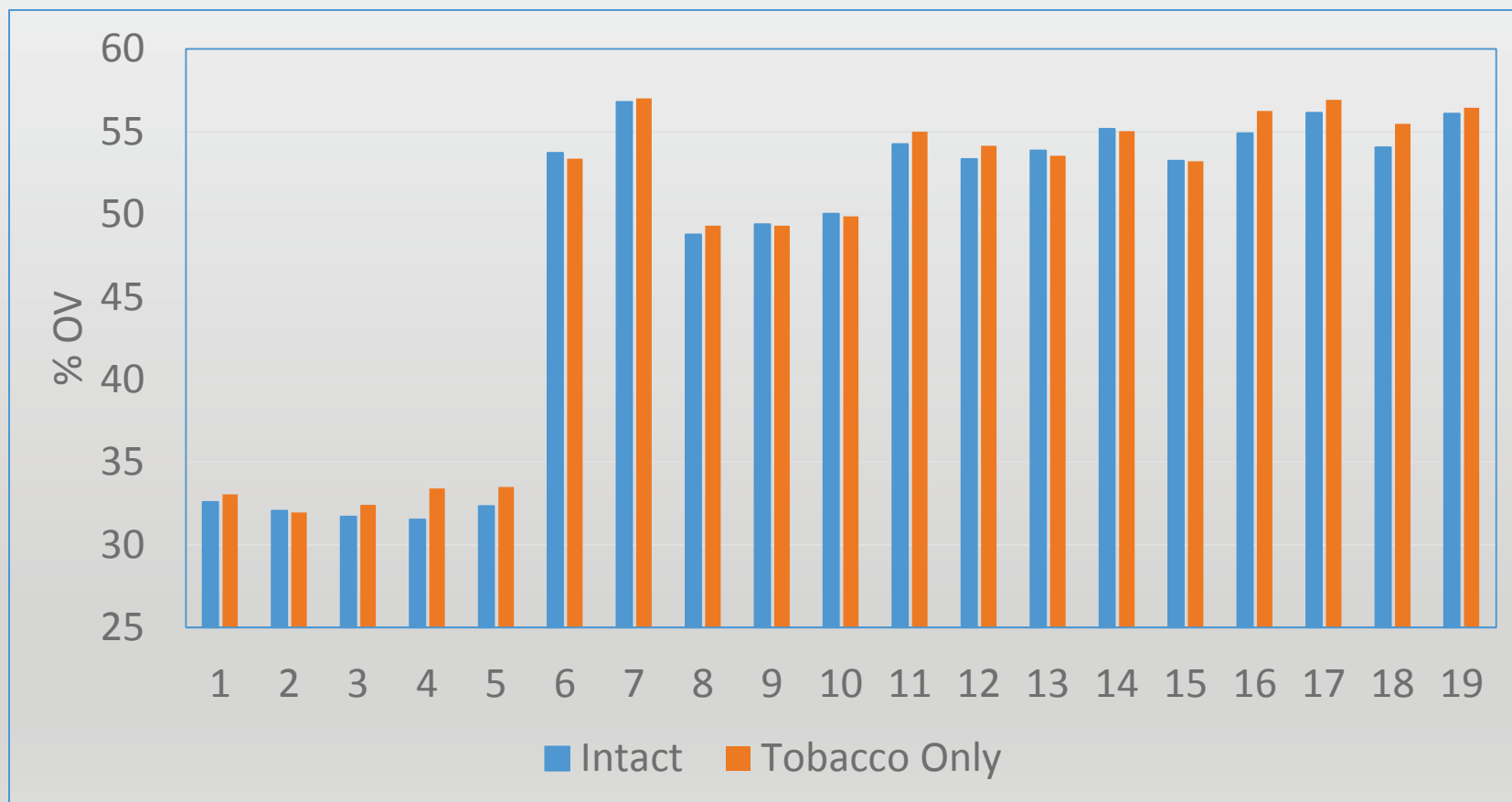
# Experimental Design

- 19 commercially portioned smokeless tobacco products were purchased in Durham NC, August, 2012. 5 snus products and 14 US MST products.
  - Products 1-5, 6-7, 8-10, 11-13, 14-15, and 16-19 were from the same brand family.
- All products were analyzed for pH, oven volatiles, and volatile and tobacco-specific nitrosamines.
- Products were analyzed intact (as received), pouch with tobacco removed, and tobacco with pouch removed.
  - OV on intact and tobacco only.
- Weights were recorded for intact products, pouch with tobacco removed, and tobacco with pouch removed.

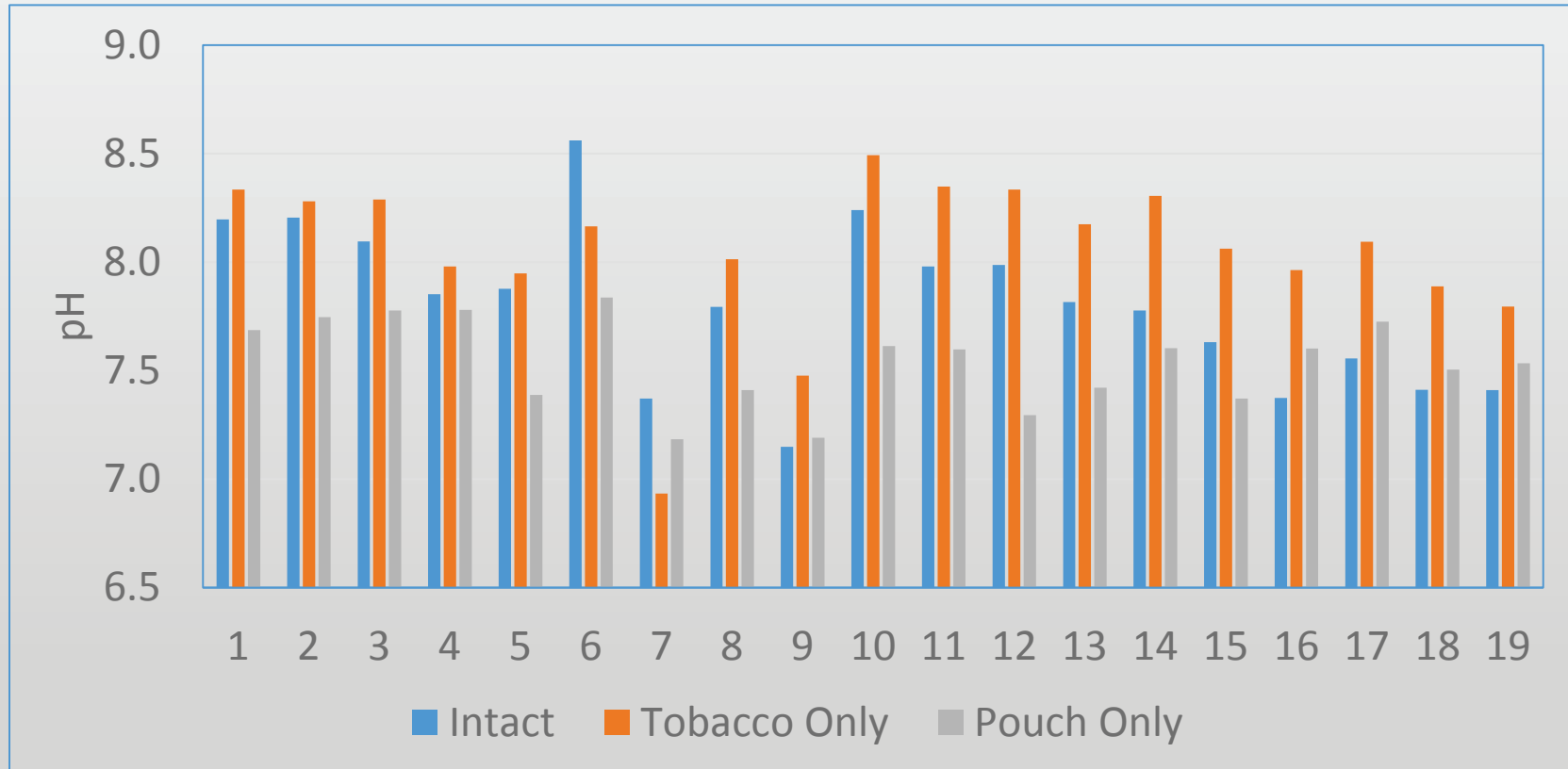
# % Pouch by Mass



# Moisture Content



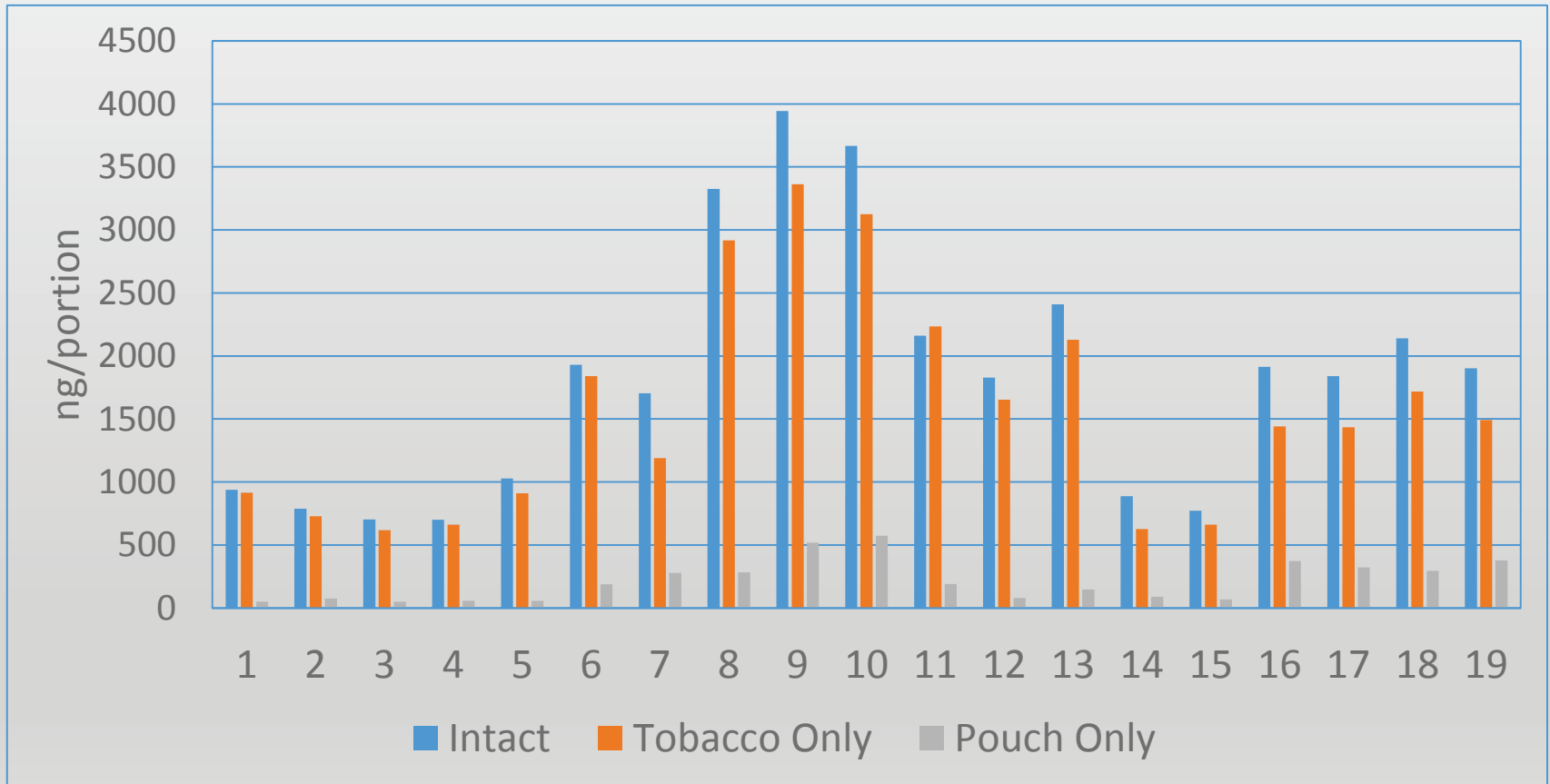
# pH of Intact, Tobacco, and Pouch



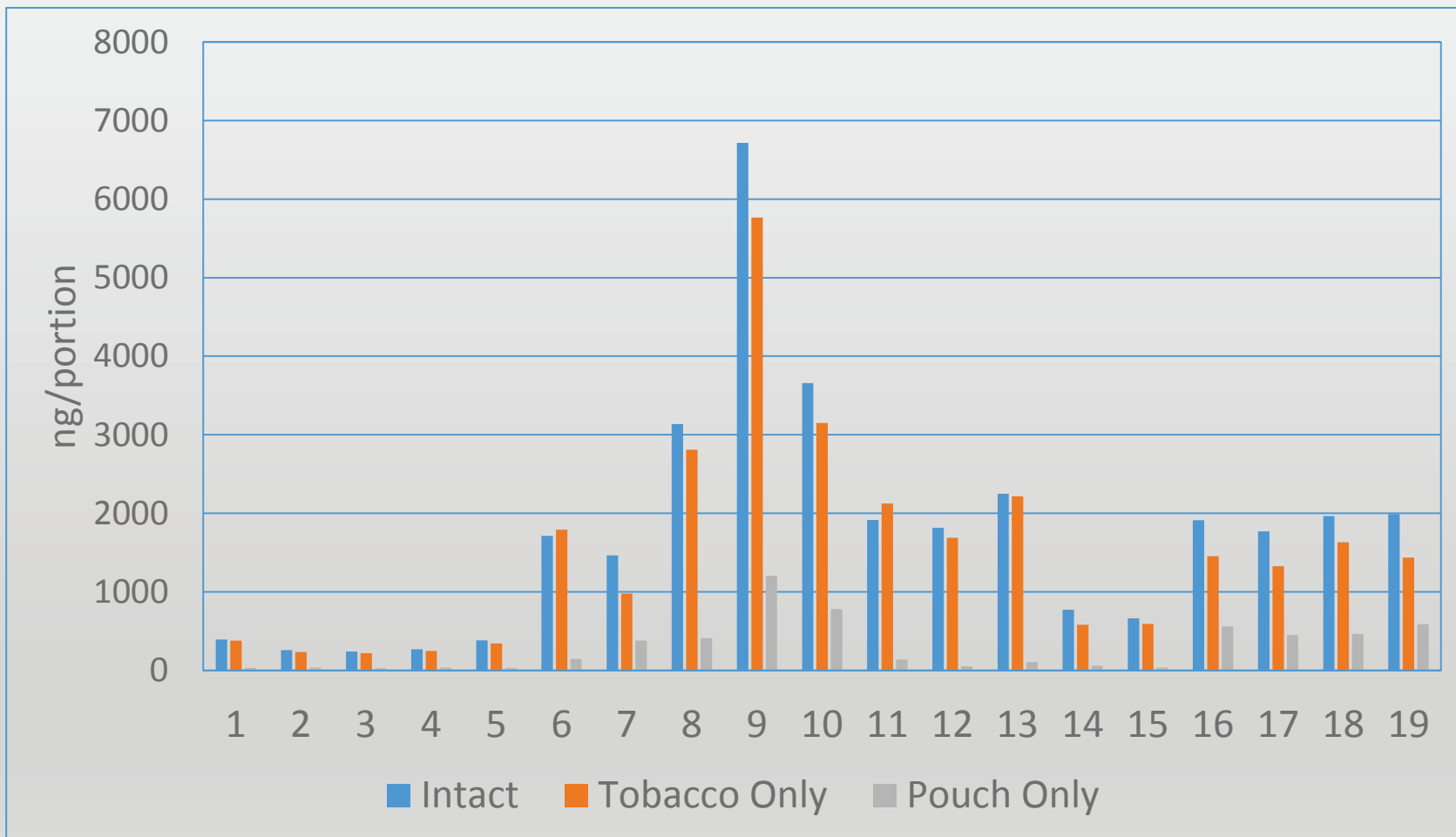
Tobacco Only = 2 g

Intact and Pouch Only = number of intact pouches required for at least 2 g

# NNN: Intact, Tobacco, and Pouch

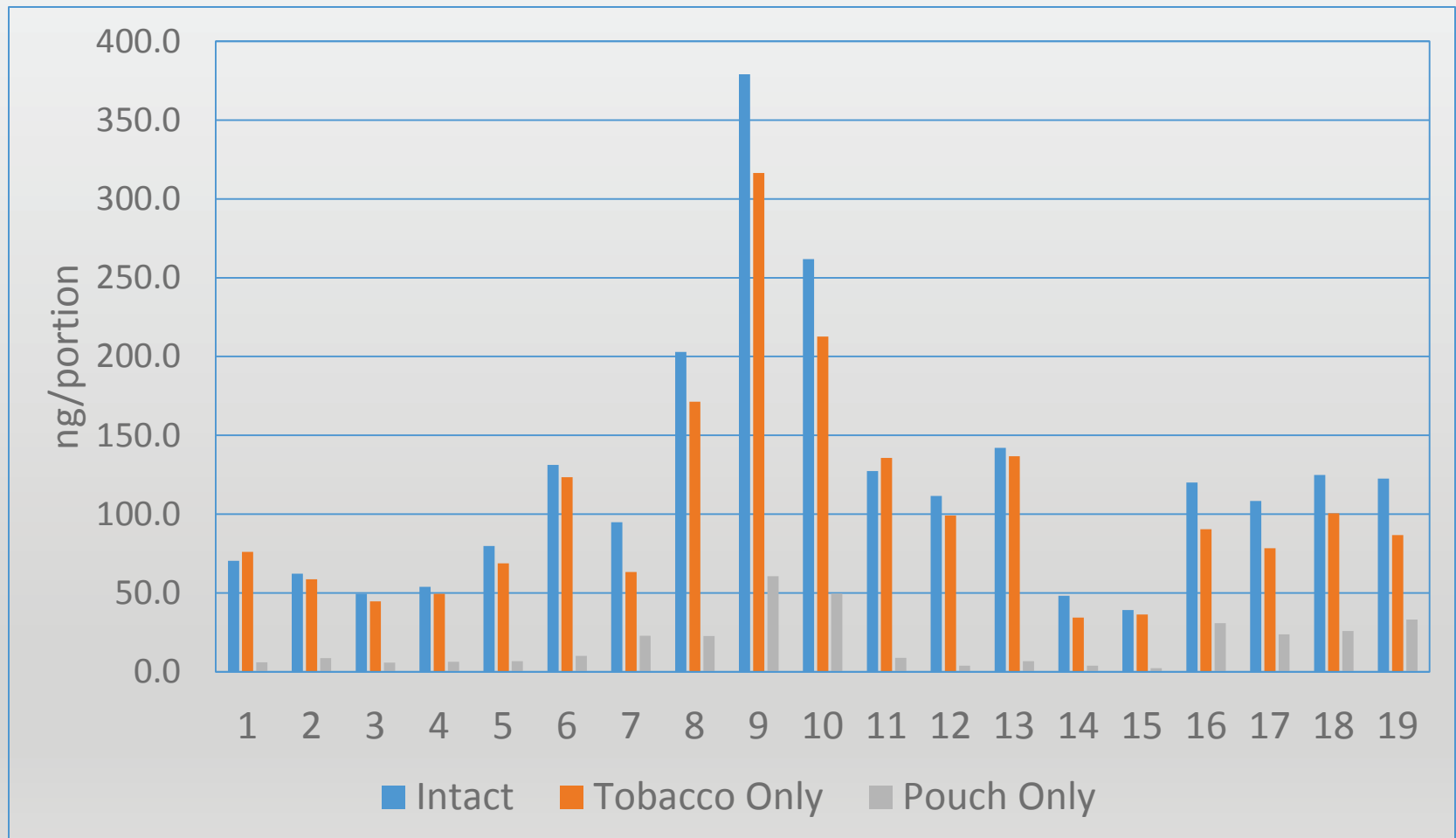


# NAT: Intact, Tobacco, and Pouch

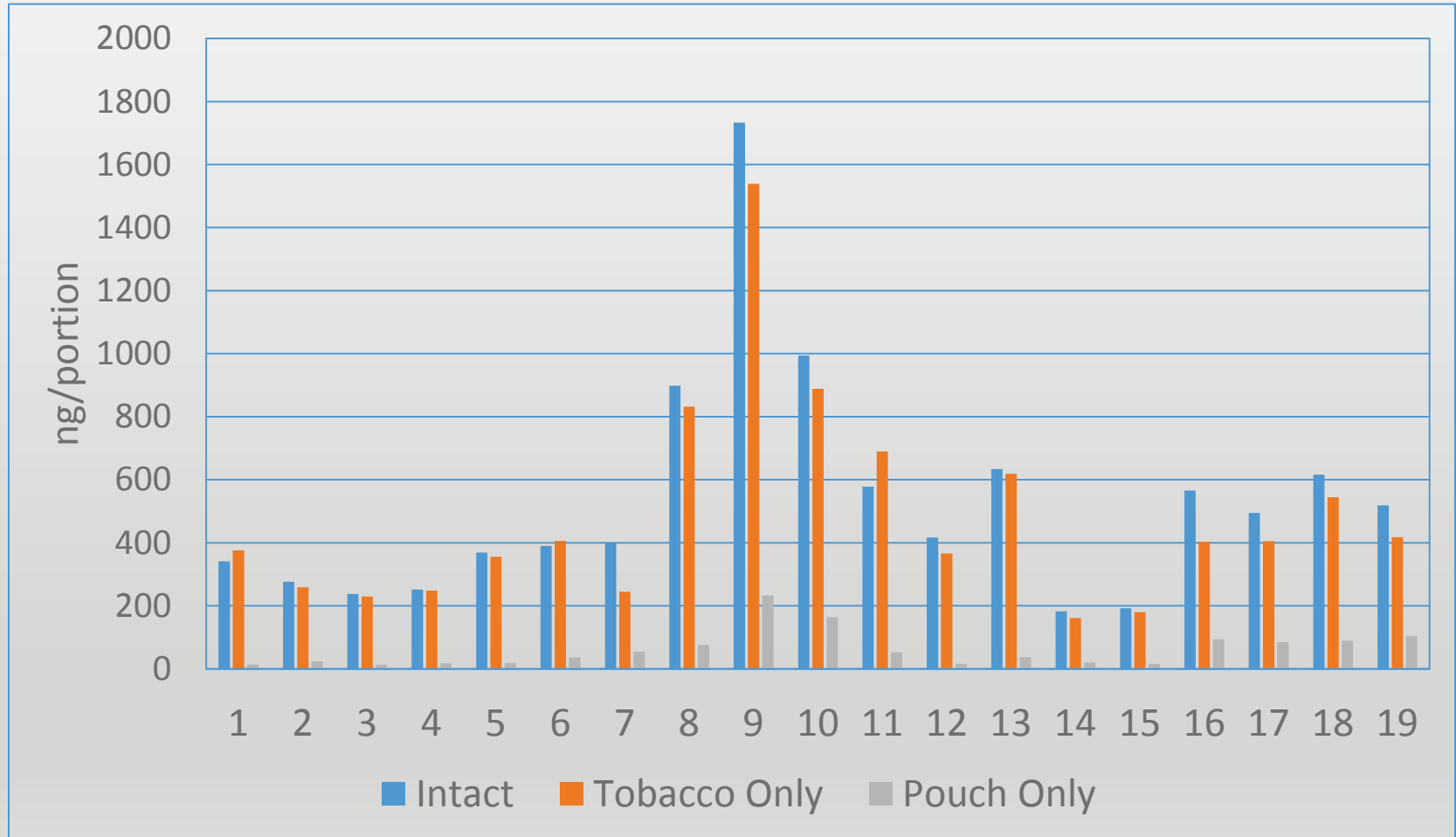




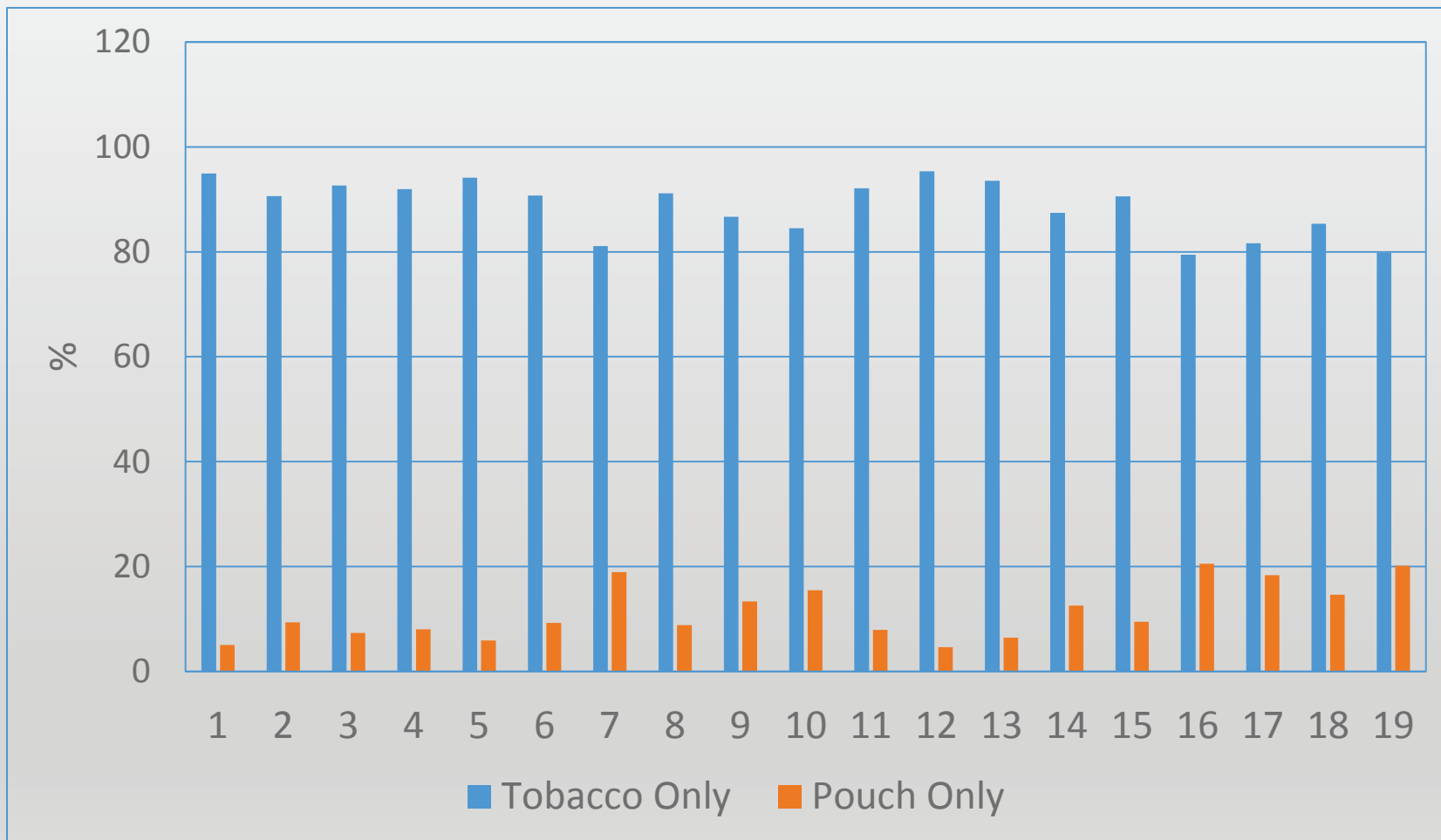
# NAB: Intact, Tobacco, and Pouch



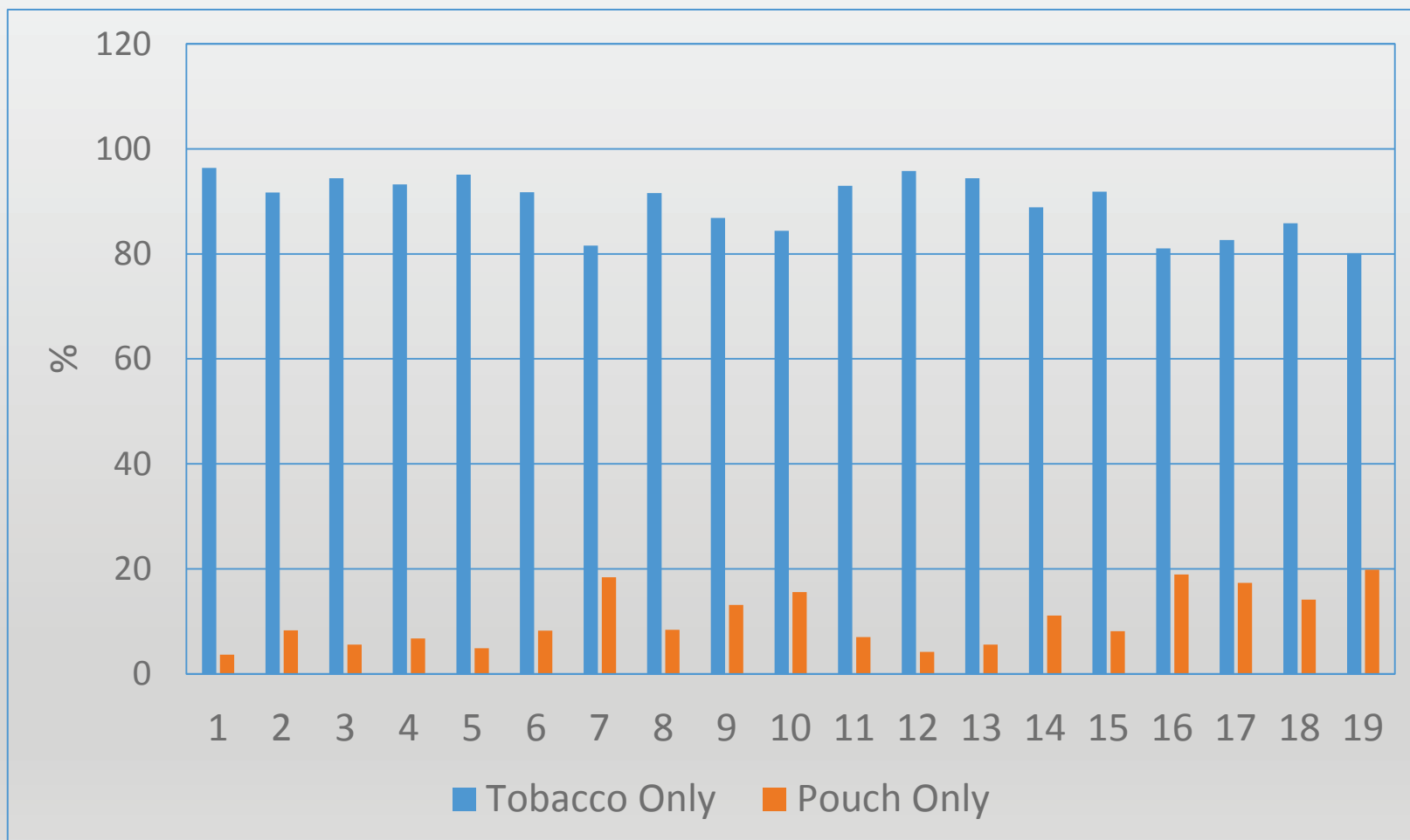
# NNK: Intact, Tobacco, and Pouch



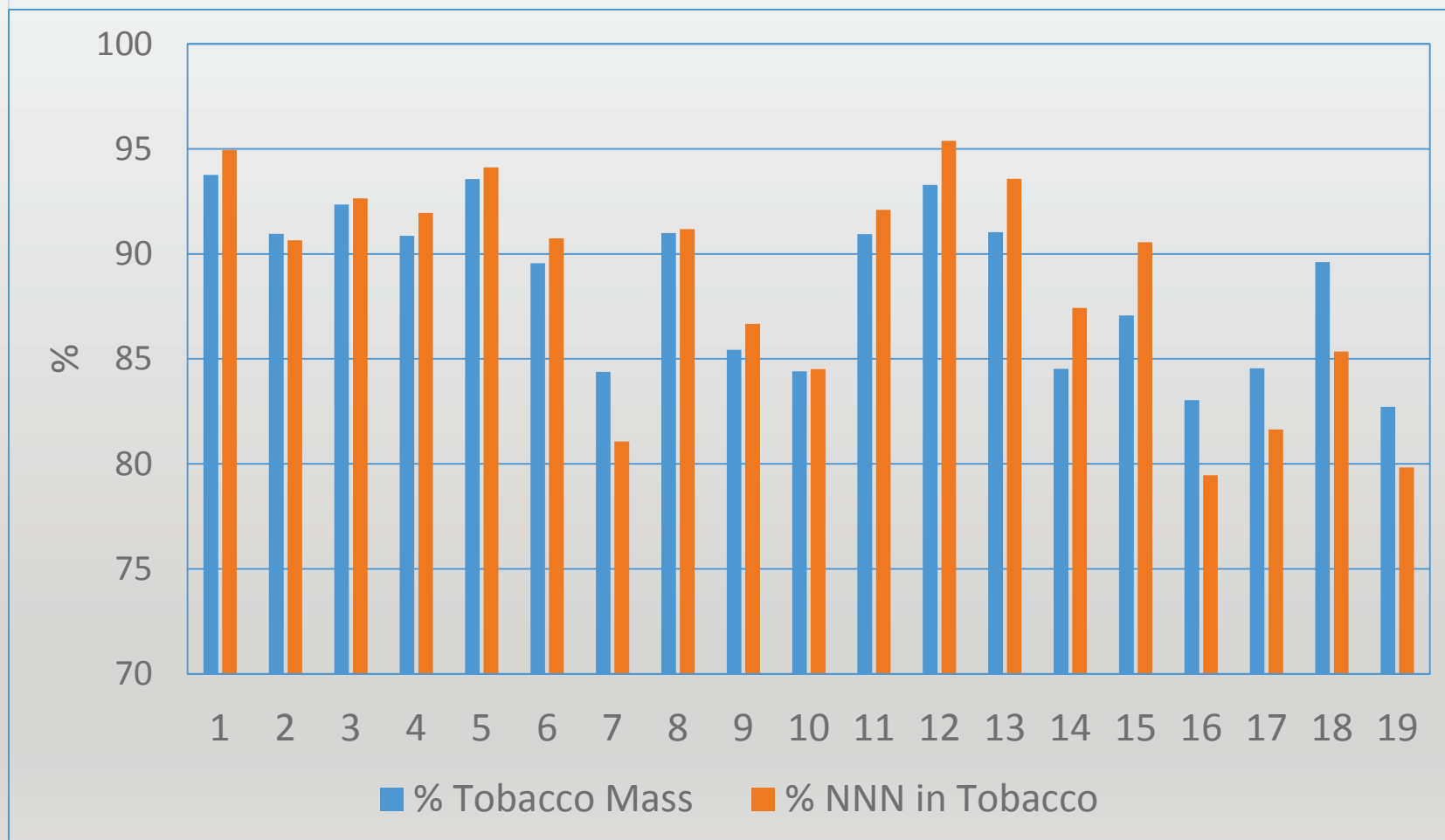
# NNN: Tobacco versus Pouch



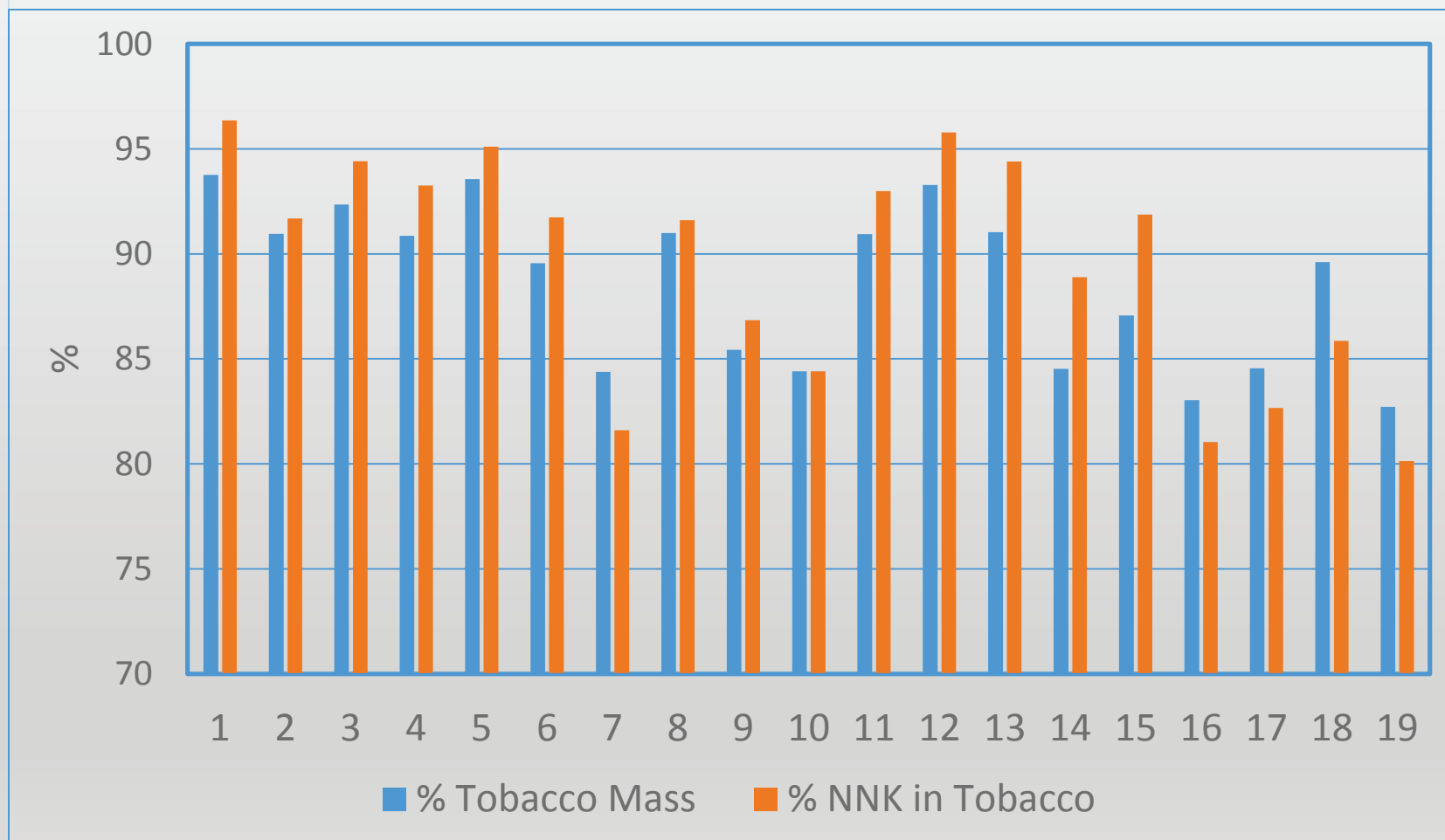
# NNK: Tobacco versus Pouch



# NNN Distribution



# NNK Distribution



# Summary of Results

- Pouching material was between 6% to 17% of intact product's mass.
- Water content of the tobacco and intact product differed on average by 1.4%. Largest difference found was 5.7%.
- pH differences were seen in all products
  - The pouch of 14 of the 19 products had lower pH than intact products.

# Summary of Results

- TSNA's were evenly distributed across pouch and tobacco in all products.
- There was less than 5% error in predicting total TSNA's per portion using ng/gram TSNA content and tobacco mass.
- Volatile nitrosamines were only detected in three products. Levels in all pouches were below method LOQ.



# Conclusion

- Pouching material is a significant percentage of the product's total mass.
- Water and TSNAs are evenly distributed between tobacco and pouching material.
- Analysis of pouch and tobacco products is recommended.
- Care should be taken during analysis to minimize handling or separation of pouch material from tobacco.