

Stability of the certified 1R6F reference cigarette

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INTRODUCTION

University of Kentucky, Center of Tobacco Reference Products (CTRP), has provided reference cigarettes for almost 50 years. These reference cigarettes are widely used as control samples in tobacco research including analytical method development and modified risk tobacco product development. In 2014, CTRP obtained a service agreement with the US Food and Drug Administration (FDA) to produce a certified reference cigarette. The first certified reference cigarette, 1R6F, was manufactured in March, 2015. However, there are no data showing the stability of 1R6F during long-term storage. In this study, the cigarette tobacco filler and the resulting mainstream cigarette smoke of 1R6F have been tested during one-year storage period.

OBJECTIVE

To study the stability of the cigarette tobacco filler and the resulting mainstream cigarette smoke of 1R6F

MATERIALS and METHODS

Instrument: Cerulean SM450 linear smoke machine

Material: 1R6F certified reference cigarette

Sample preparation: 1R6F were stored at -20°C, 4°C and room temperature (~22°C) for 1, 2, 3, 6, 9 and 12 months. Before they were analyzed, cigarettes stored in -20°C were transferred to 4 °C for 24hr then room temperature for at least 2hr. The reference cigarettes were conditioned for 48hr at 22°C and 60% relative humidity prior to smoking. The analysis of smoke included the measurements of alkaloids, TSNAs, CO and TPM under ISO smoking condition and smoking regime. Five replications of 20 cigarettes in a single smoking machine run (smoking five cigarettes per port, four ports per replicate) were done. Five replications were run on the same day with a total of 100 cigarettes. Physical parameters, as well as moisture, alkaloid and TSNA contents of the filler tobacco were determined on a second group of cigarettes at the time of smoking.

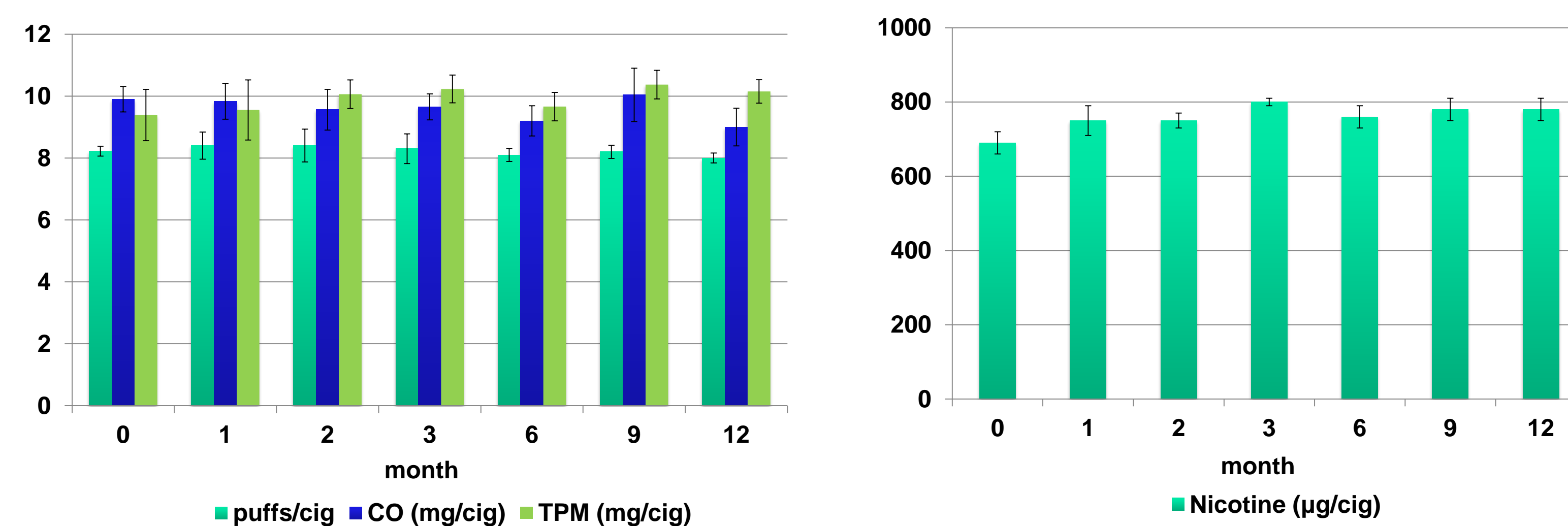


Figure 1: Smoke data after 1R6F were stored at freezer (-20°C)

RESULTS AND DISCUSSION

- ❖ There were no significant changes for puff/cigarette, CO, TPM, alkaloids in mainstream smoke of cigarettes under -20°C, 4°C and room temperature storage conditions for one year. The results are shown in Figure 1 ~ 3.
- ❖ There were no significant changes for the oven volatiles and nicotine in the filler at 4°C and -20°C storage conditions (Figure 4 and Figure 5). However, oven volatiles decreased ~ 35% when cigarettes were stored at lab ambient temperature for one year (Figure 6).

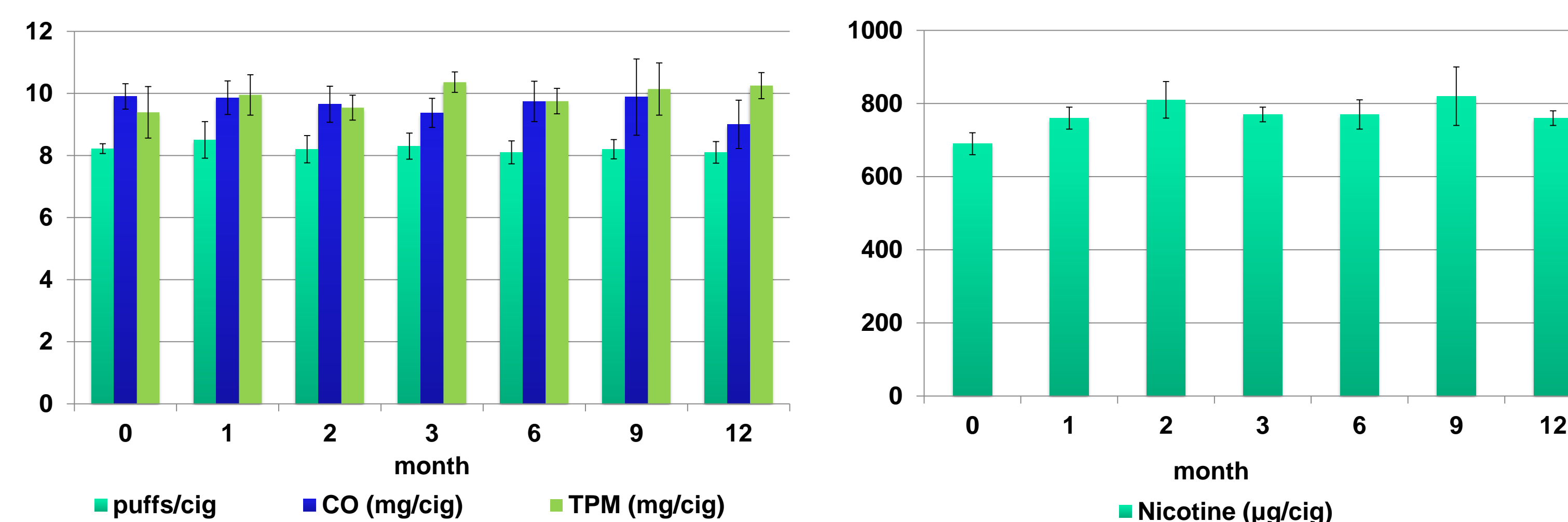


Figure 2: Smoke data after 1R6F were stored at cool room (4°C)

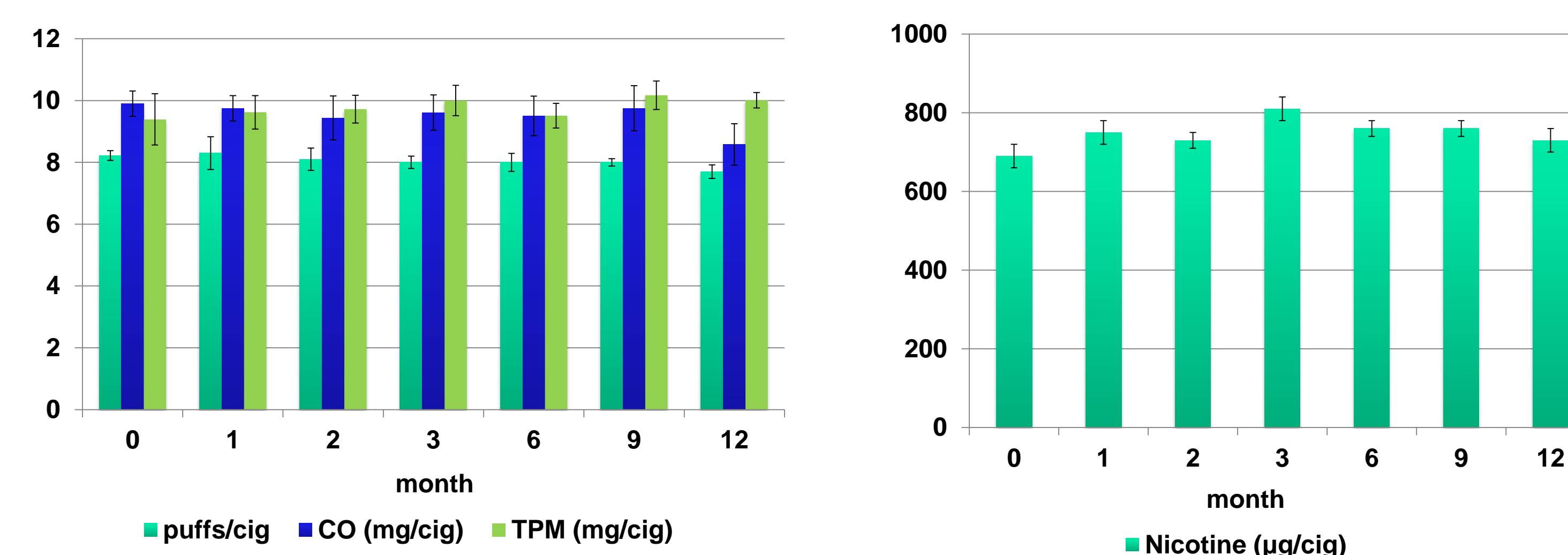


Figure 3: Smoke data after 1R6F were stored in ambient temperature

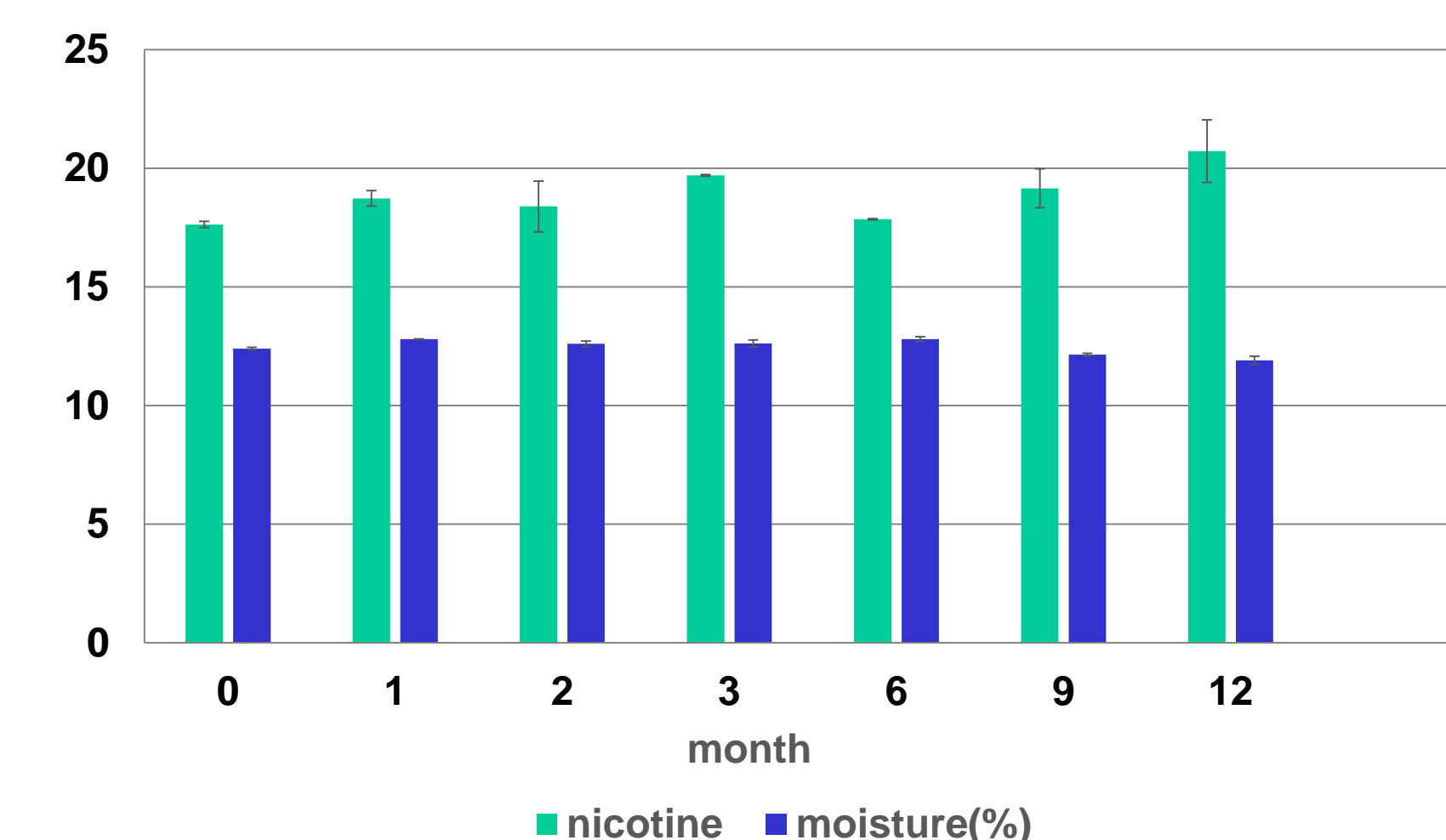


Figure 4: Filler data after 1R6F were stored at freezer (-20°C)

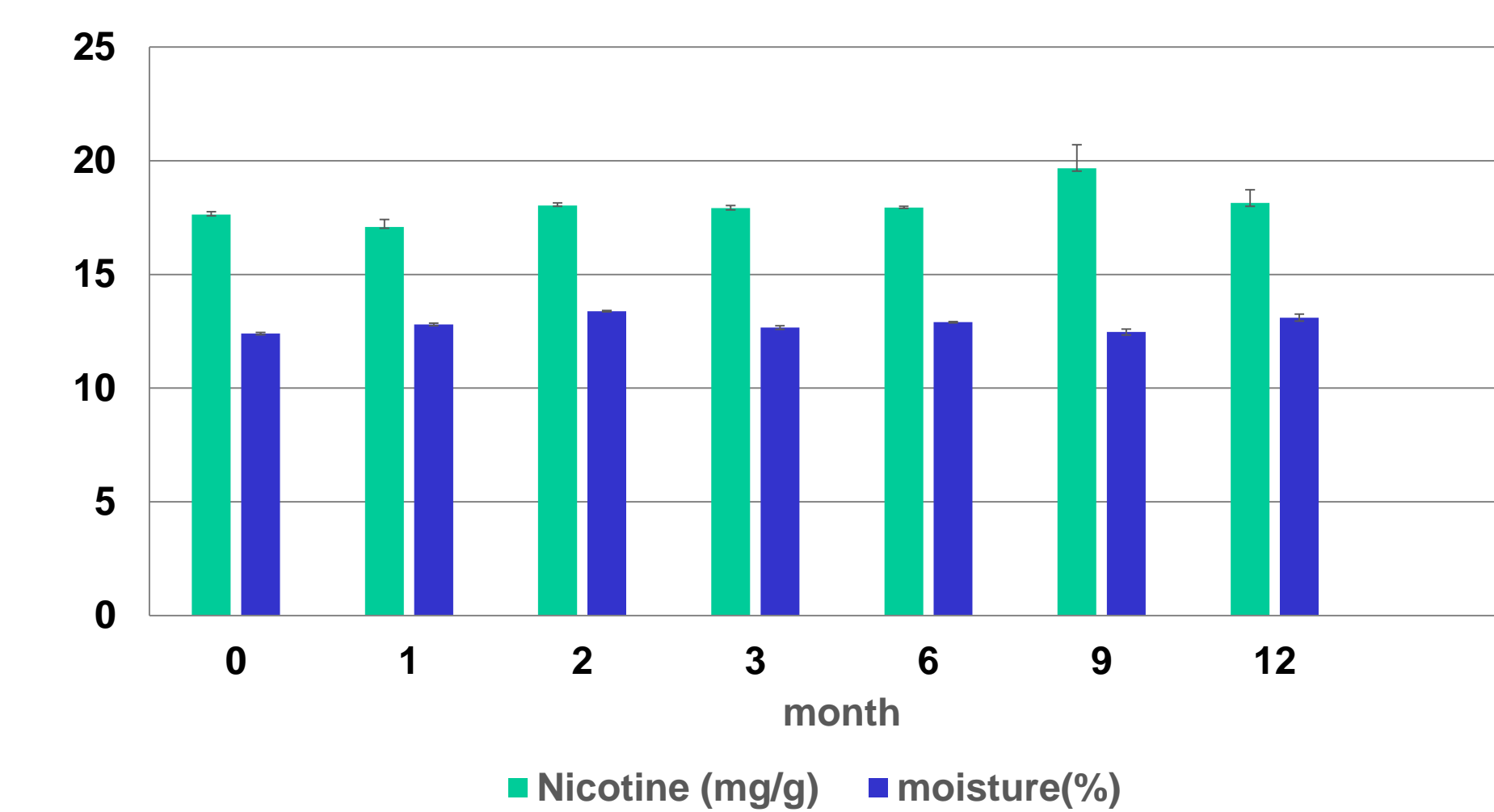


Figure 5: Filler data after 1R6F were stored at cool room (4°C)

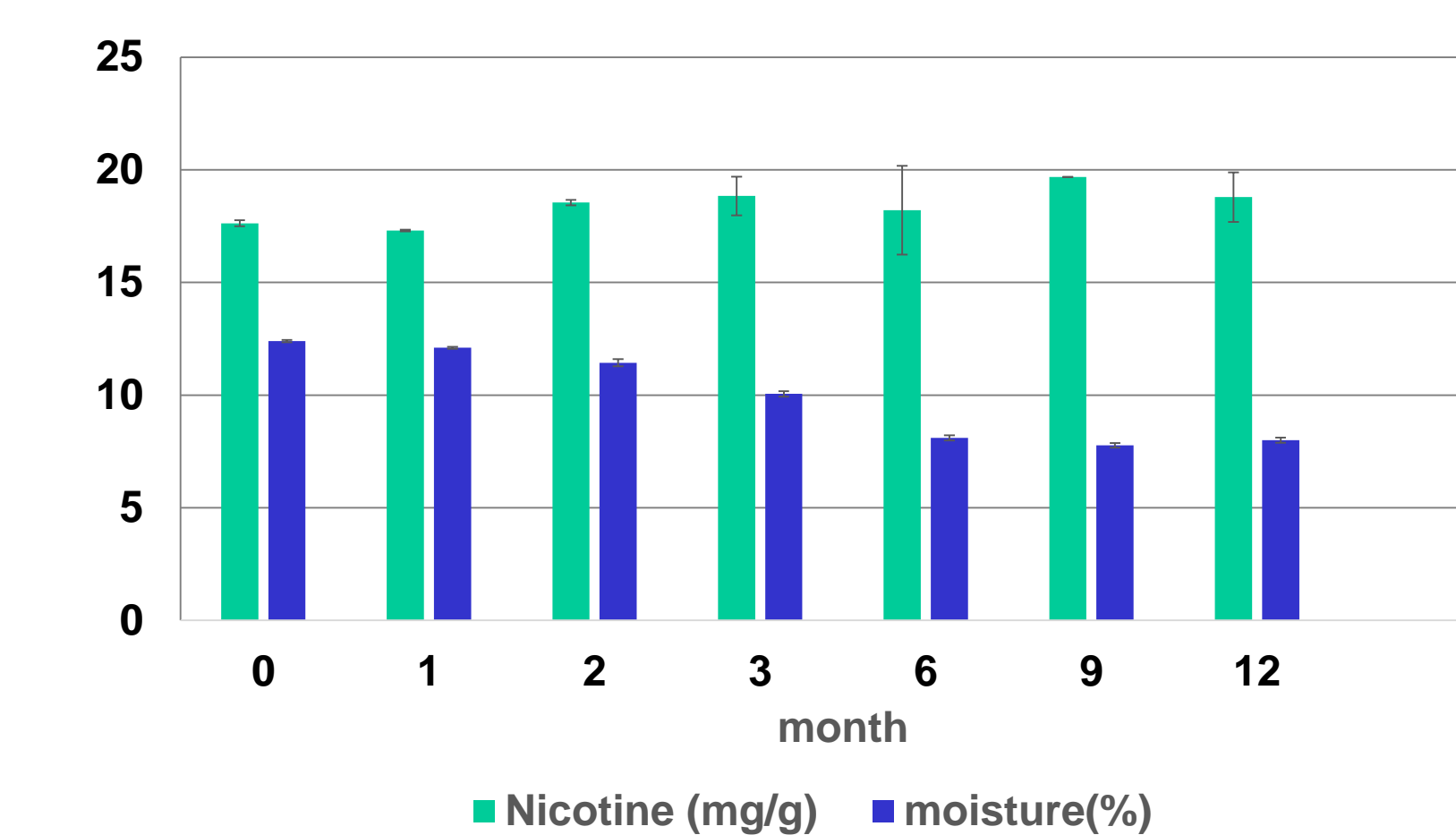


Figure 6: Filler data after 1R6F were stored in ambient temperature

- ❖ Even though our experiment indicated puff/cigarette, CO, TPM, alkaloids in the mainstream smoke of 1R6F didn't have significant changes after stored at ambient temperature for one year, but the moisture content did decrease. It is not recommended to store 1R6F at room temperature for a long term storage, because cigarette beetle might be destructive to cigarette tobacco at ambient temperature.

CONCLUSION

Our experimental data demonstrated that after conditioned for 48hr before analysis, the parameters (alkaloids, CO and TPM) of 1R6F in mainstream smoke were stable for cigarettes under all storage conditions (12 months at cool room, lab ambient temperature or freezer). The results are comparable under these storage conditions.

The oven volatiles of 1R6F fillers were stable for one year for cool room and freezer storage, however, they decreased significantly after the cigarettes were stored in lab ambient temperature for one year.

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