



# Effect of Spring-Applied Potassium Chloride on Cured Leaf Moisture and TSNA

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CORESTA AP 2021



# Potassium Fertilization

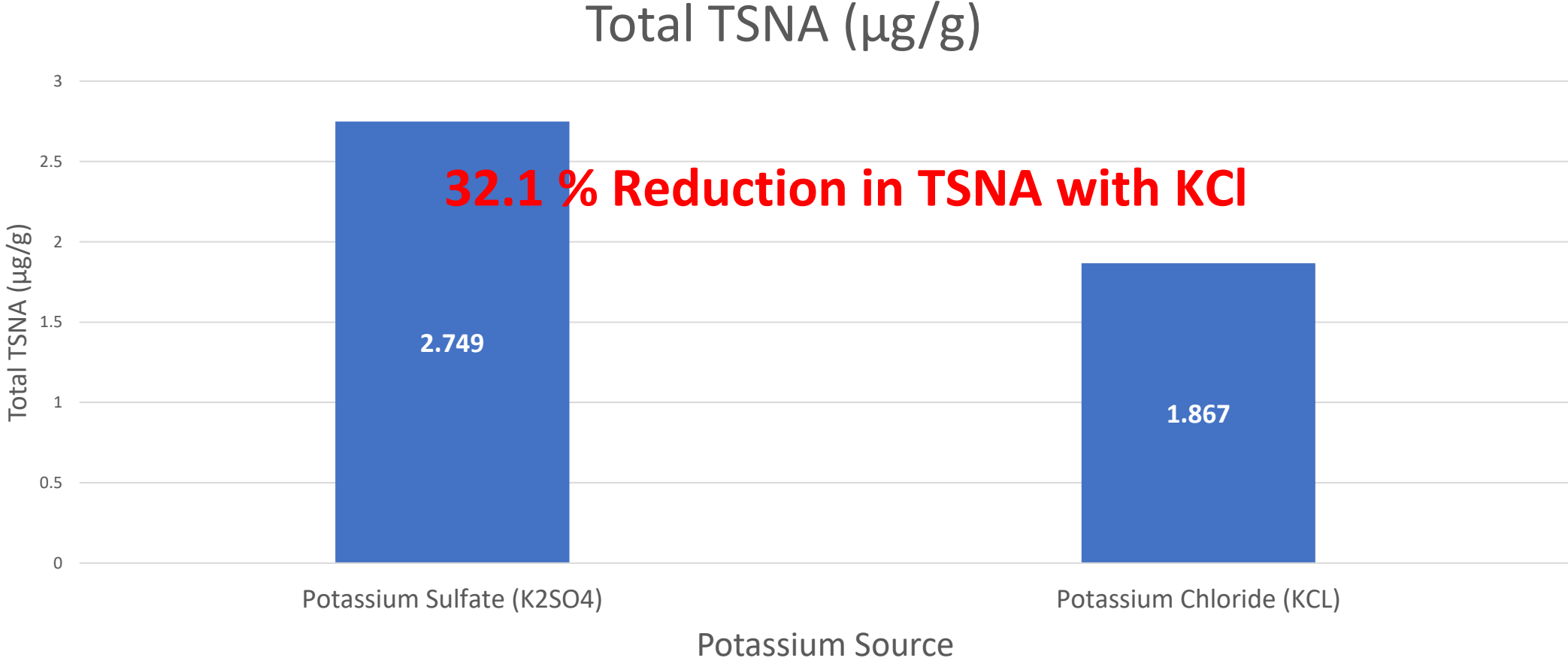
- There are two major sources available in the burley and dark tobacco belt of KY and TN:
  - Potassium Sulfate 0-0-50 ( $K_2SO_4$ )
  - Potassium Chloride 0-0-60 (KCl)
- Potassium Chloride has been shown to detrimentally impact leaf quality when used in the Spring
  - Chloride (Cl) >1 % in cured leaf:
    - Higher moisture content
    - Aroma and combustion issues
- Many producers apply KCl in the Fall due to lower price (30-50 % cheaper)

# Effect of Muriate-of-Potash on TSNA

- Past recommendations have been for all potassium sulfate (0-0-50) in spring applications for tobacco, but would allow up to 113 kg/ha (100 lbs/acre) muriate-of-potash (KCl, 0-0-60).
- Research by Andrea Keeney has shown average 32.1 % reduction in TSNA from spring applications of Muriate-of-Potash (0-0-60) at 167 to 560 kg 0-0-60/ha (187-500 lbs/acre) in dark and burley tobacco.
- Similar TSNA reductions (20-25 %) with blend of Sulfate-of-Potash and Muriate-of-Potash (0-0-50/0-0-60)
  - No more than 113 kg 0-0-60/ha (100 lbs/acre)
  - 30 % 0-0-60/70 % 0-0-50 at 224 kg potassium/ha (200 lbs/acre)

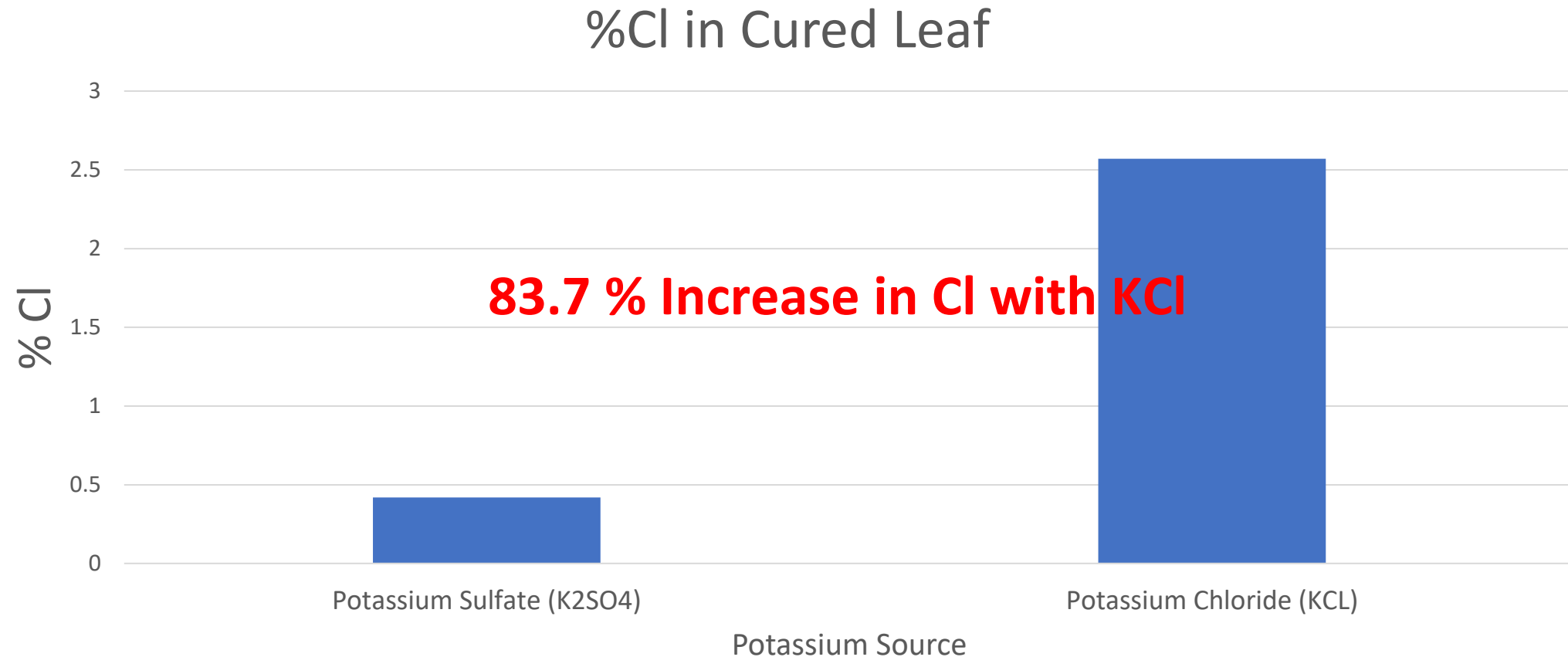
# Effect of Spring-Applied Potassium Source on Total TSNA

Andrea Keeney, M.S. Research  
Average of 12 trials (DAC, DFC, and Burley), 2016-2018



# Effect of Spring-Applied Potassium Source on Chloride Content in Cured Leaf

Andrea Keeney, M.S. Research  
Average of 7 trials (DAC, DFC, and Burley), 2016-2018



# 2020 Leaf Moisture Trial

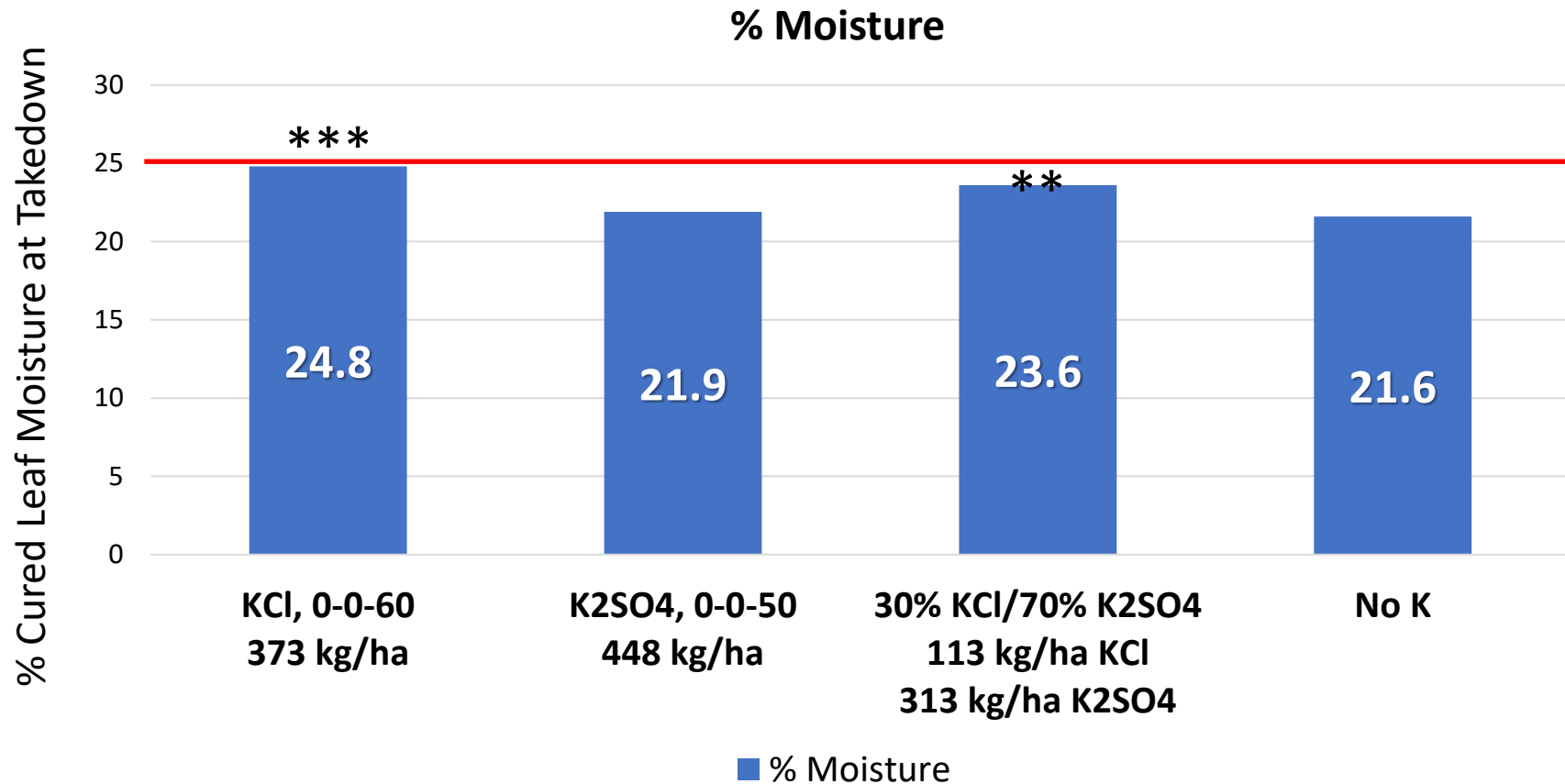
- 2016-2018 research focused on KCl effects on TSNA with very little focus on moisture
- Follow-up trial focused on cured leaf moisture at the time of stripping
- 4 treatments: 224 kg potassium/ha (200 lbs/acre)
  - All KCl (373 kg KCl/ha)
  - All K<sub>2</sub>SO<sub>4</sub> (448 lbs K<sub>2</sub>SO<sub>4</sub>/ha)
  - Blend of 112 kg KCl + 313 kg K<sub>2</sub>SO<sub>4</sub>/ha
  - No potassium
- Supported by Kentucky Tobacco Research and Development Center(KTRDC) Grant

# 2020 Leaf Moisture Trial

- Treatments applied 1 week before transplanting
- KTD17LC, dark-fired
- Cured leaf samples collected at stripping (3<sup>rd</sup> leaf from top)
- 12 leaves per plot, each sample weighed immediately
- Put in oven dryer for 3 days until dry and re-weighed to calculate % moisture

# Effect of Potassium Source of Dark-Fired Cured Leaf Moisture

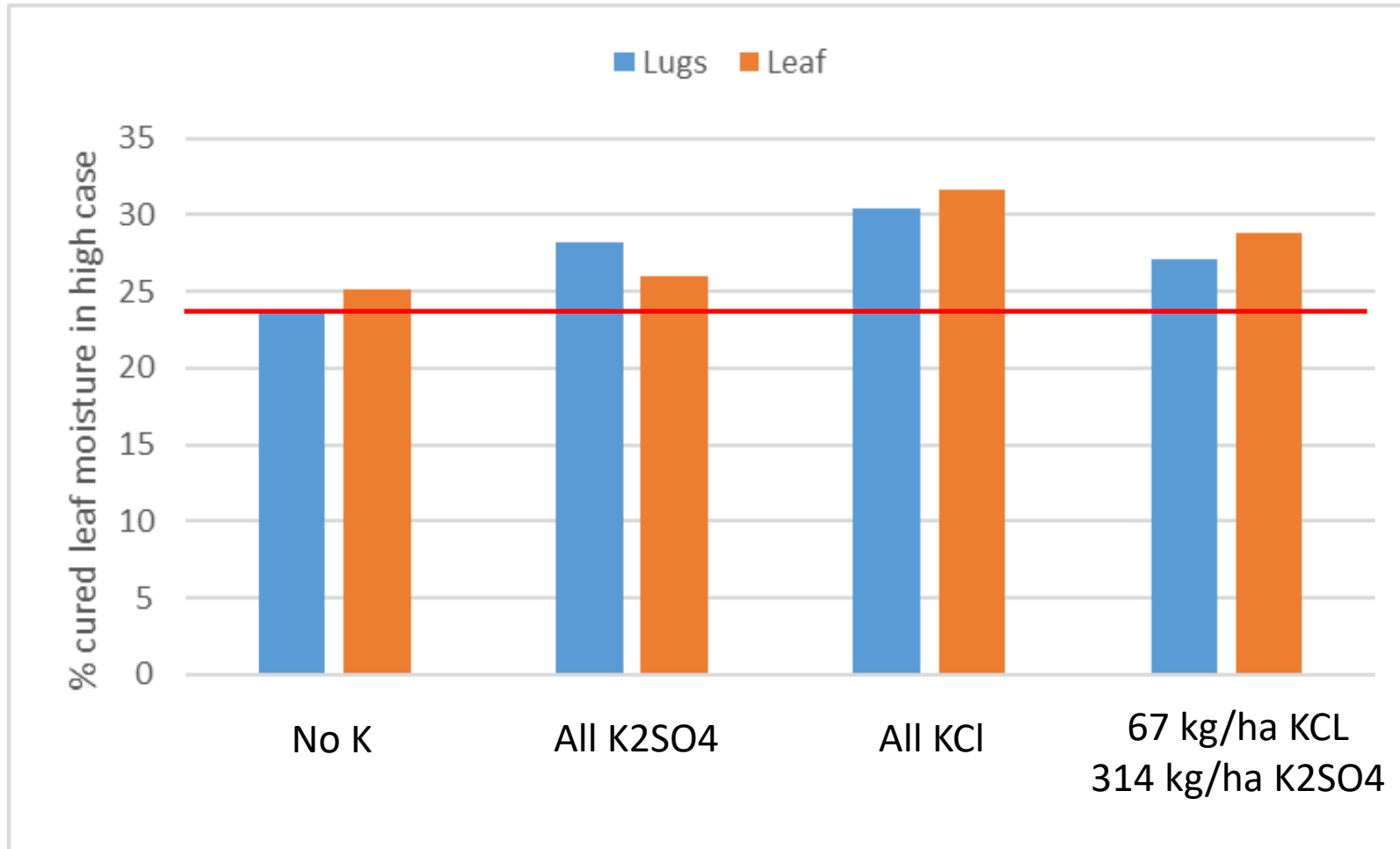
UKREC, Princeton KY - 2020



\*KT D17LC, 200 lbs potassium (K) per acre preplant. General moisture limit is 25 % for dark fired.



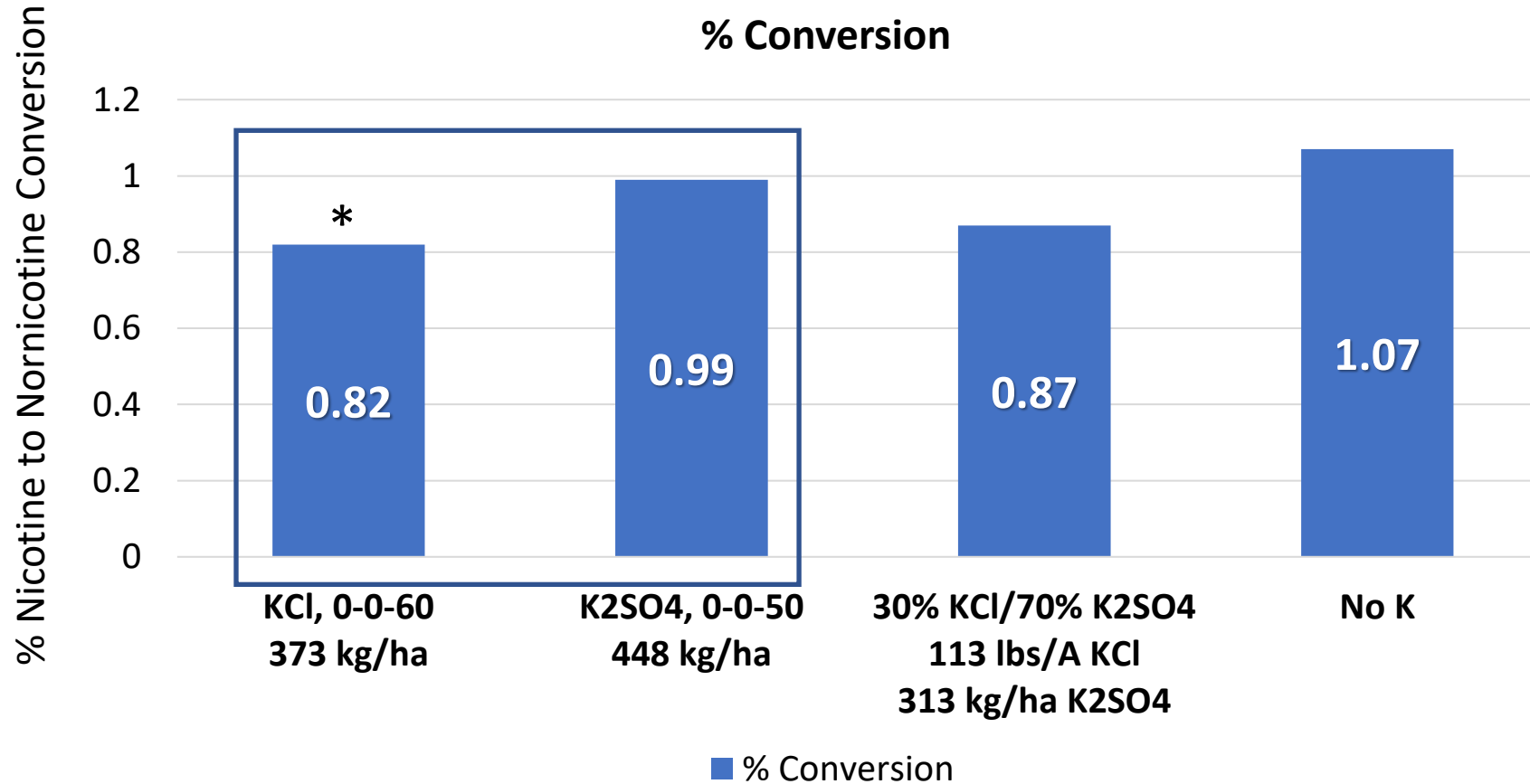
# Potassium Source Trial – Cured Leaf Moisture Burley (KT215) – Lexington 2020



381 kg potassium per ha (340 lbs/acre). General moisture limit for burley is 23 to 24 %.  
Moisture data collected when tobacco was in high case.

# Effect of Potassium Source of Dark-Fired Percent Nicotine to Nornicotine Conversion

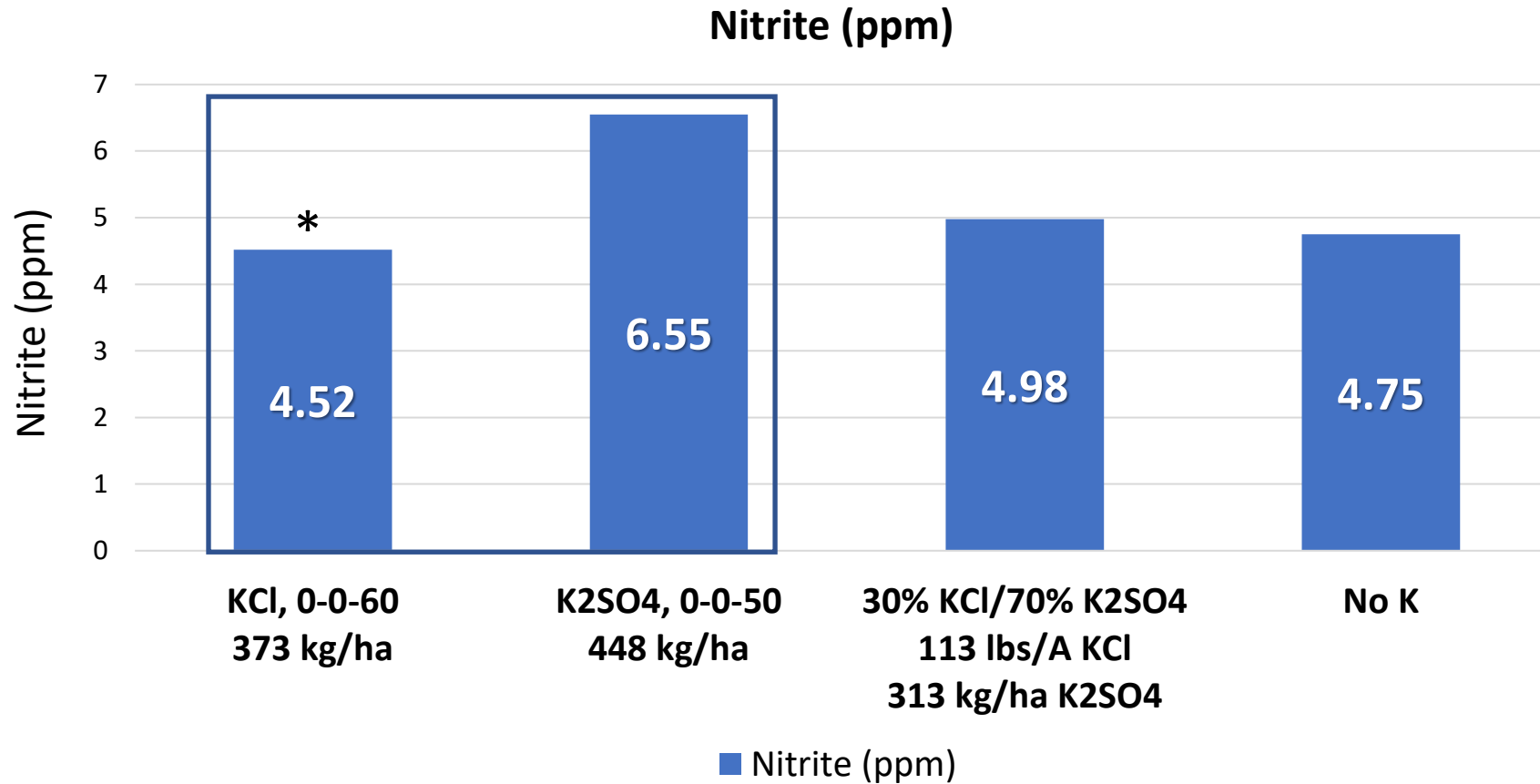
UKREC, Princeton KY - 2020



\*KT D17LC, 224 kg potassium (K) per ha preplant.

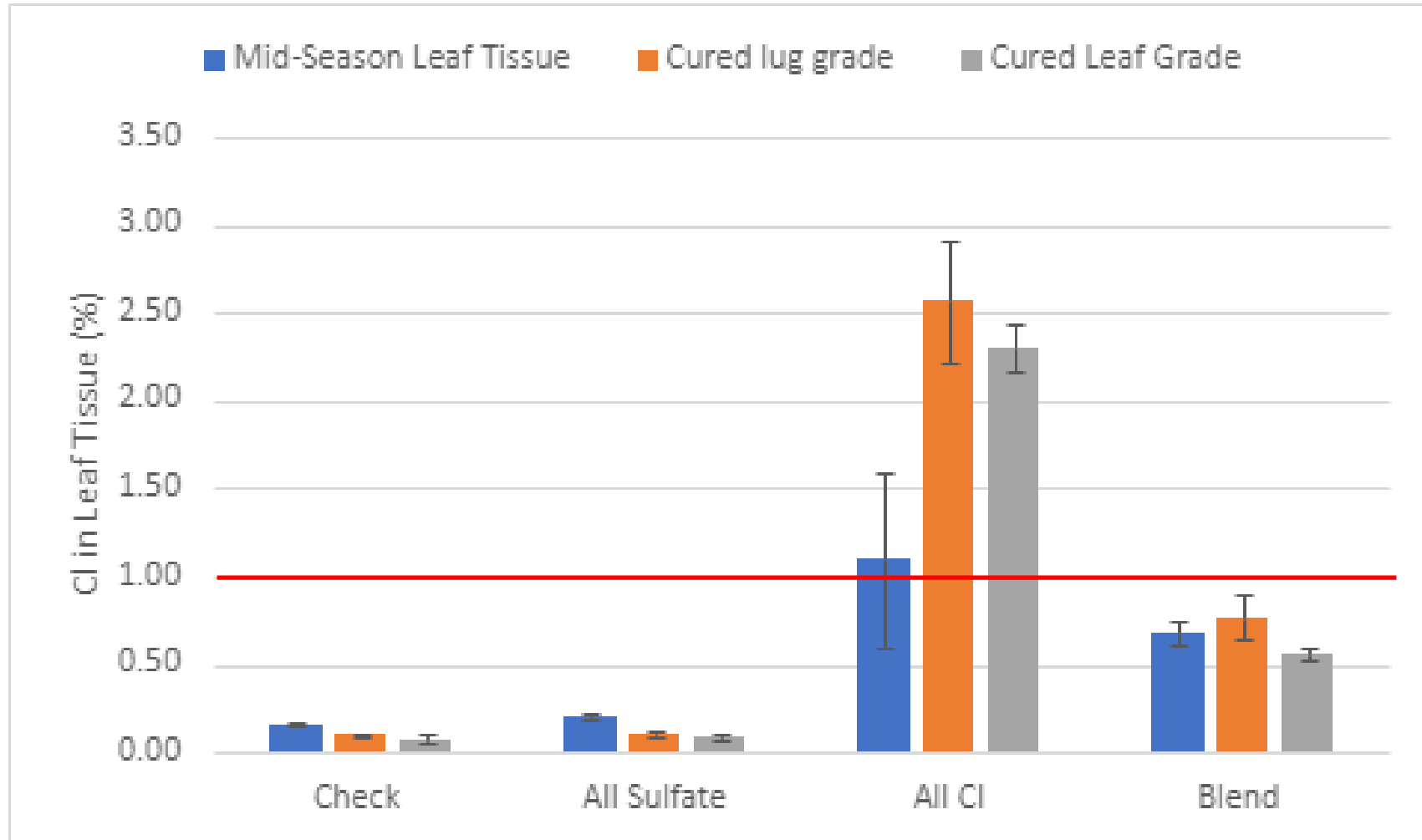
# Effect of Potassium Source of Dark-Fired Cured Leaf Nitrite Content

UKREC, Princeton KY - 2020



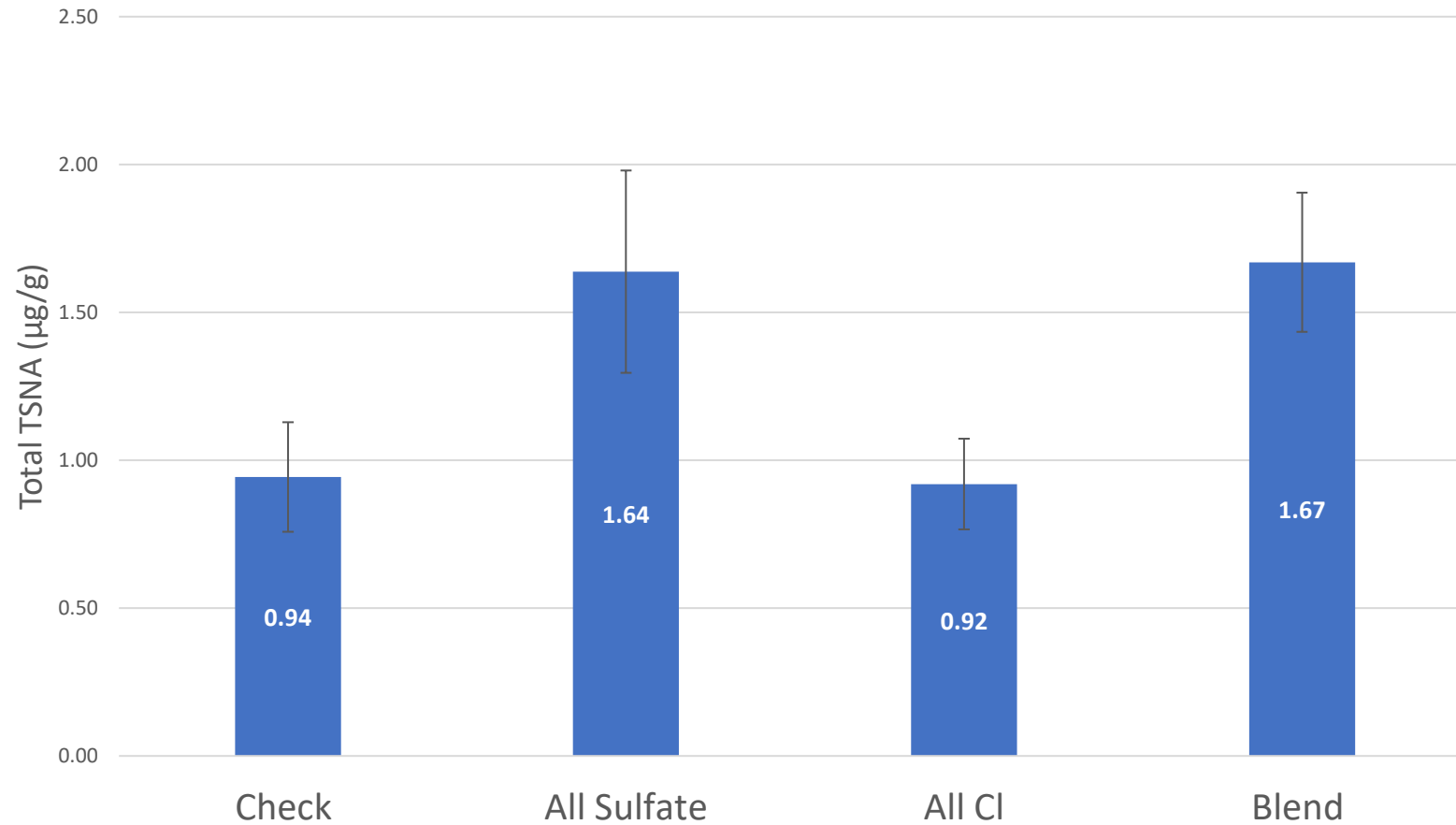
\*KT D17LC, 224 kg potassium (K) per ha preplant.

# Chloride in Burley (KT215) Leaf Tissue



# TSNA in Burley Cured Leaf

Total TSNA in Burley Cultivar KT215





# Subtle Change in Potassium Source Recommendation - 2021

2021-2022 Burley and Dark Tobacco Production Guide. *Fertilization*. p. 31

## Phosphorus and Potassium

Phosphorus (P) and potassium (K) are relatively stable in soils so fertilizer additions should be determined by soil testing. Soil test procedures and recommendations are optimized for the soil types in each state so you should use the recommendations provided by a land grant university or the department of agriculture in your state (Table 1).

Summaries of soil test results in several tobacco growing states have revealed relatively high levels of P and K in many fields with a history of tobacco production. Some fields may only require N for the current crop due to high levels of residual P and K. Growers are encouraged to take full advantage of soil nutrients to help reduce their fertilizer expenses and reduce potential environmental concerns associated with nutrient runoff.

Spring applications of potassium fertilizer for tobacco should ideally be made using a combination of muriate of potash (0-0-60) and sulfate of potash (0-0-50). One hundred pounds per acre of 0-0-60 supplying 60 pounds per acre of potash can be applied without negative impacts on leaf quality. Recent research has suggested that including muriate of potash can help reduce TSNAs in the cured leaf for both burley and dark tobacco. The balance of the potash requirement should be supplied by sulfate of potash because spring applications of chloride-containing fertilizers at rates greater than 50 lb of chloride per acre, can lead to excessive levels of chloride in cured leaf. Extremely high chloride levels in leaf lead to increased moisture retention, curing and storage problems, decreased combustibility, and ultimately, reduced quality and usability. Some tobacco company contracts specifically limit the amount of muriate of potash that can be applied during a growing season.

Thank you for your time! Questions or Comments?

