

The Flame Sanitizer

A Poultry House Sanitation Tool

S.E. Watkins

Center of Excellence for Poultry
Science

University of Arkansas
Fayetteville, Arkansas

Broiler Production



- **Average farm size is 3.23 houses for Tyson Foods**
- **Tyson Foods has 5,852 broiler farms with 18,901 houses**
- **Median number of flocks placed per farm is 5-6**
- **Median number of broiler farms per complex is 150-199**
- **Broiler farms with more than 100,000 birds per farm make up 93% of production for all of industry**





Introduction:

Heat Sterilization, An Old Idea

- Louis Pasteur first to recommend surgeons flame hands to prevent contamination
- Heat widely used in sterilization
- Heat very forgiving
 - no residues, no resistance
- Blow lamp tested in 1940 for effectiveness against coccidia

Heat Sanitation: New Application

- Most chemical disinfectants limited effectiveness in organic matter
- Bacterial spores, viruses, worm eggs and fungi resistant to many of chemical disinfectants
- Turkey company first to develop flamer in attempt to “burn out” corona virus

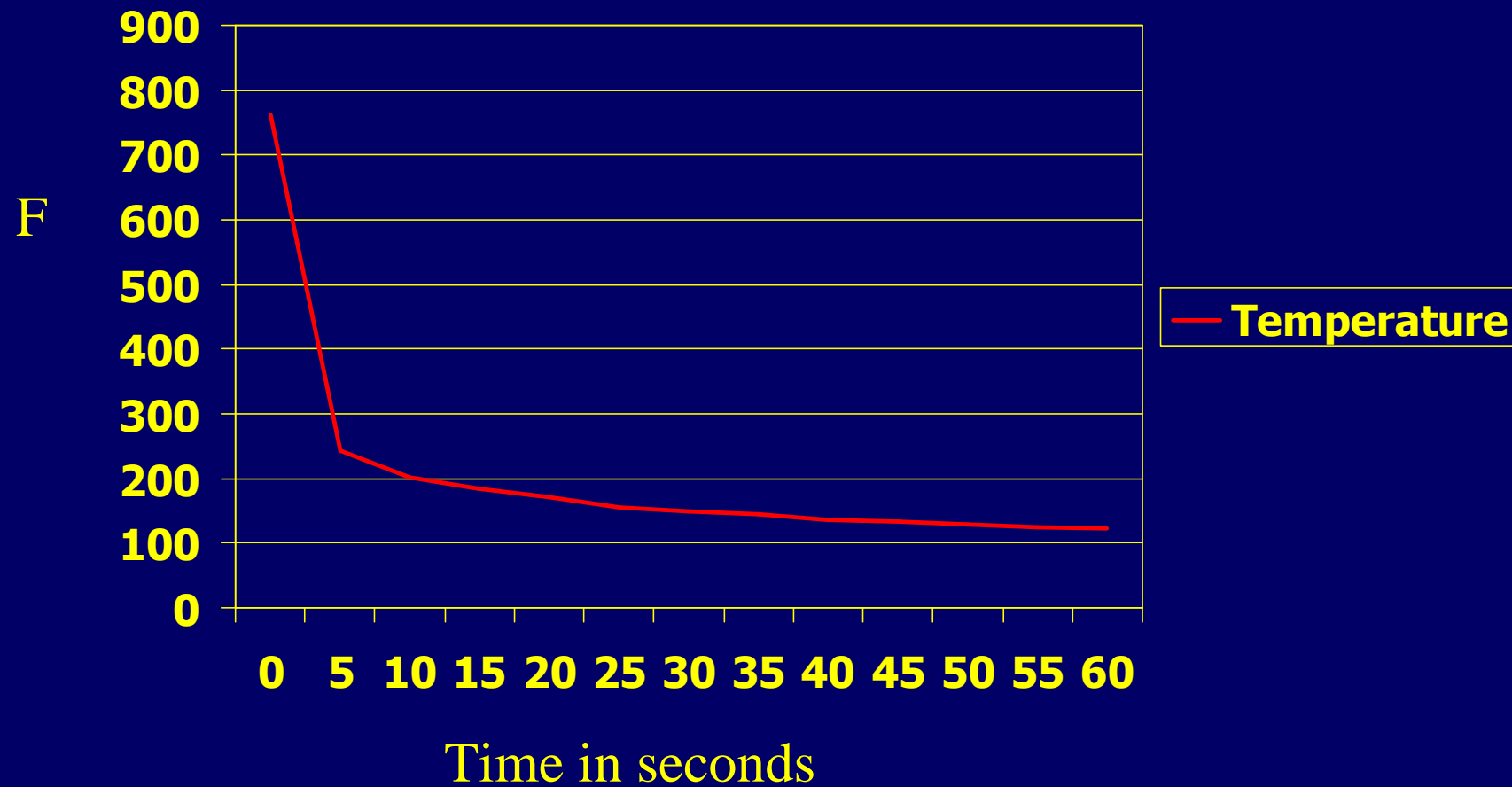


Flame Engineering Flame Sanitizer





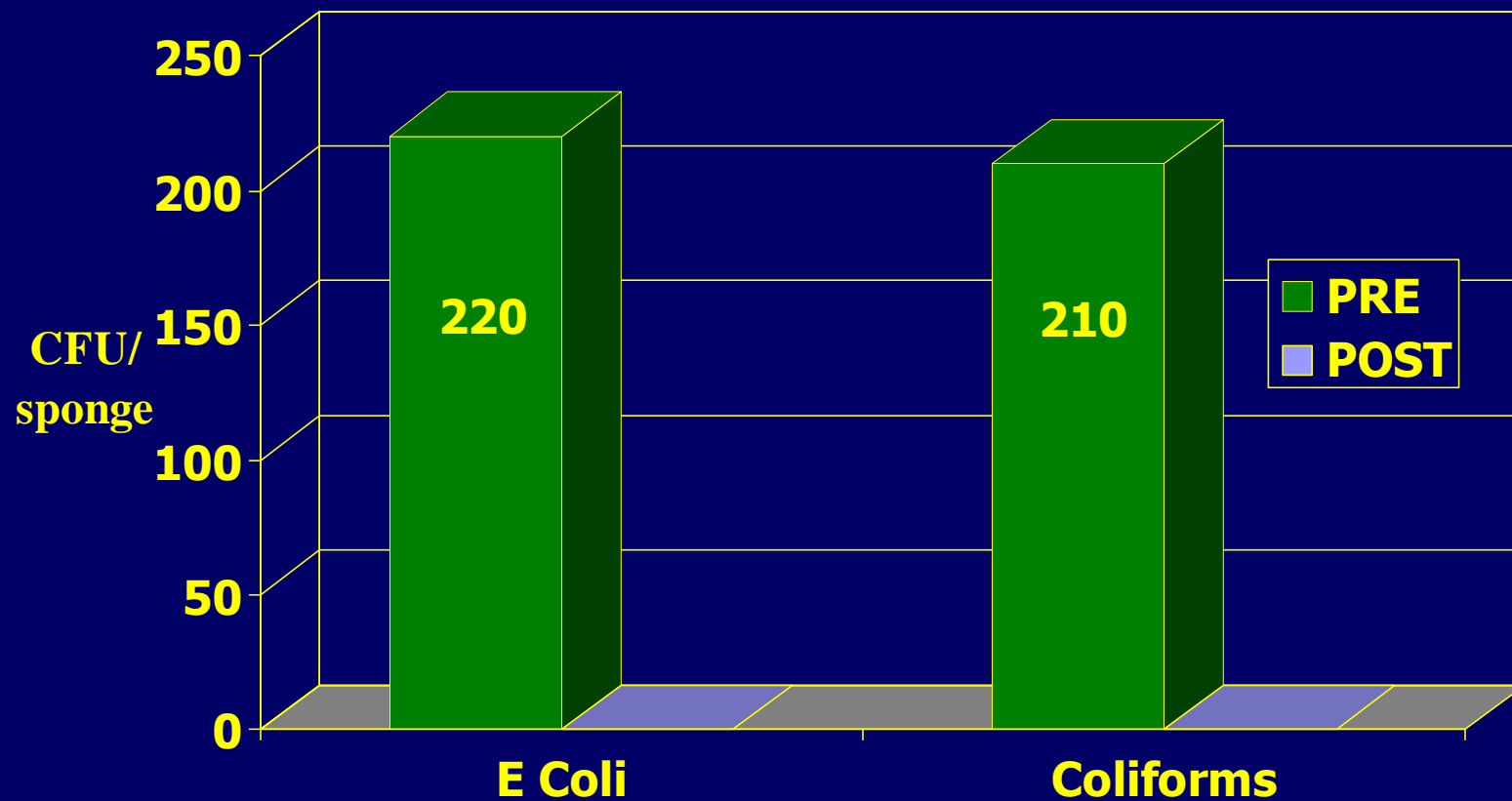
Change in Floor Temperature Post Flaming



Poultry Sanitizer Evaluations

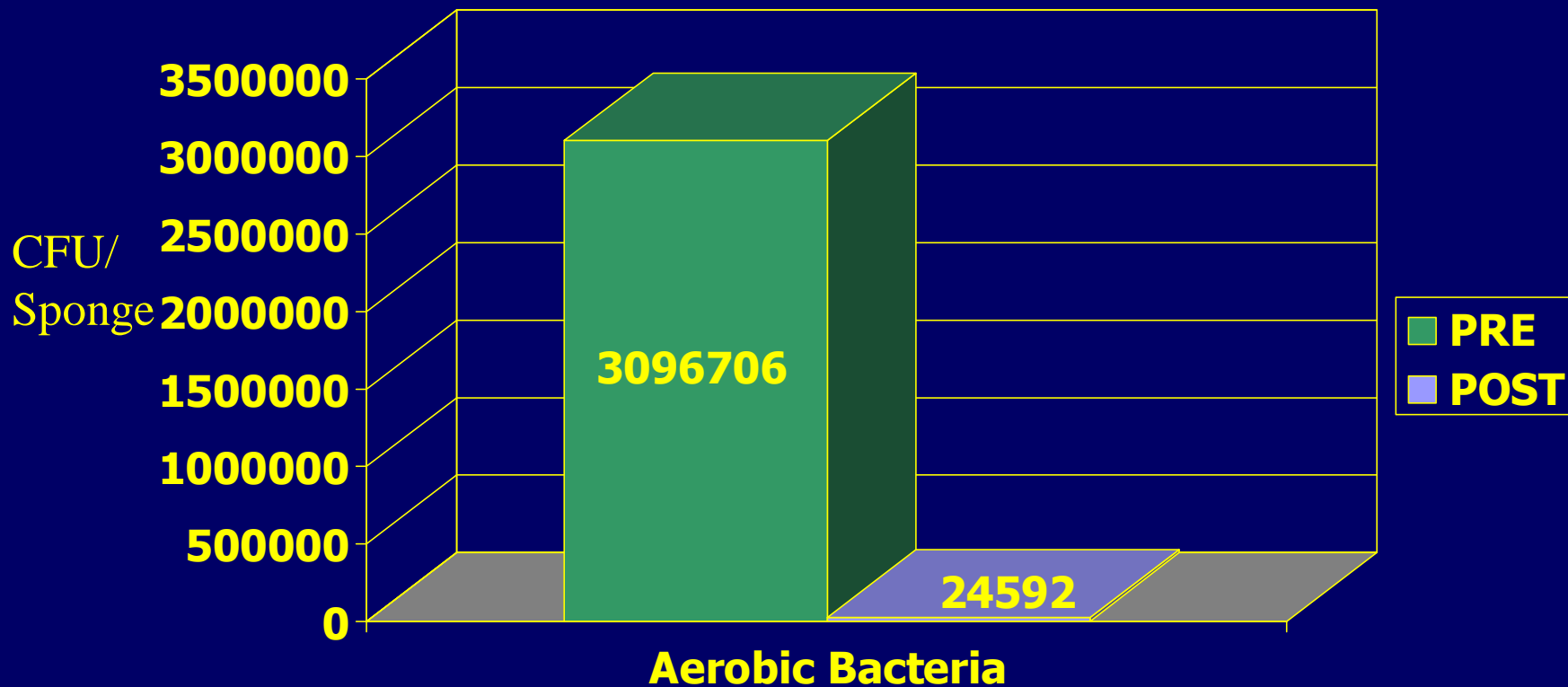
- Turkey Brood House
 - Litter removed
 - Washed and disinfected
- Sterile drag swabs
 - Zig-zag through house on both sides
- Pre and post Flame samples
 - CFU/sponge E. coli, coliforms
 - Incidence of Salmonella

Effect of Floor Flaming on E. coli and Coliform Levels



Pr > .0001 N= 4 Pr > .0001
2 Log Reduction 99% Kill

Effect of Floor Flaming on Total Aerobic Bacteria



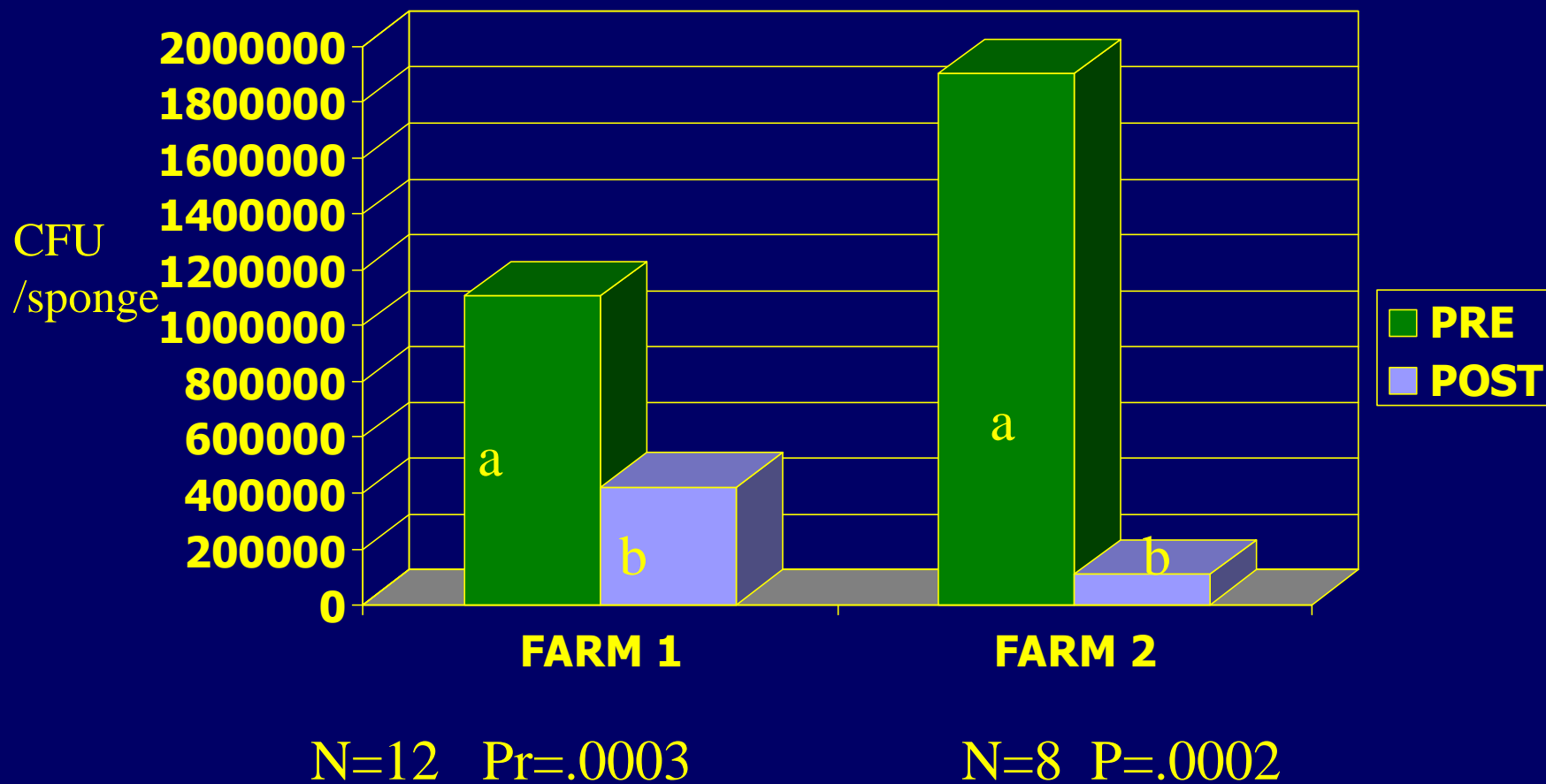
N= 4 Pr > .0001

2 Log Reduction 99 % Kill

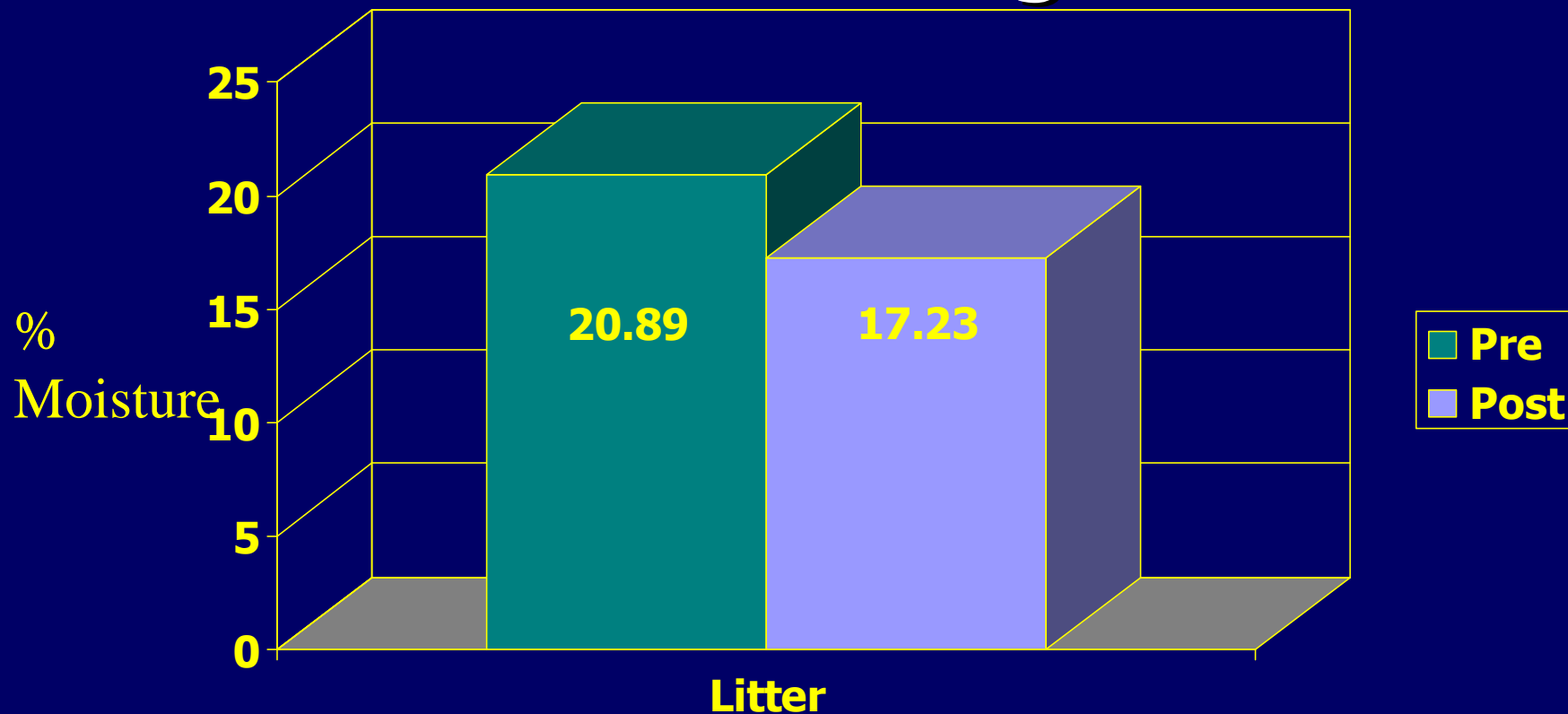
Effect of Flamer on Litter Microbial Populations

- Farm 1- flamed litter surface in four broiler houses
- Litter used for 6 flocks
- Pre and post drag swabs, 2 sites/house
- Farm 2-flamed litter surface in two houses
- Determined CFU/sponge
 - Total aerobic bacteria, E. coli, coliform
- Incidence of Salmonella

Total Aerobic Bacteria Count in Litter Surface of Broiler Houses



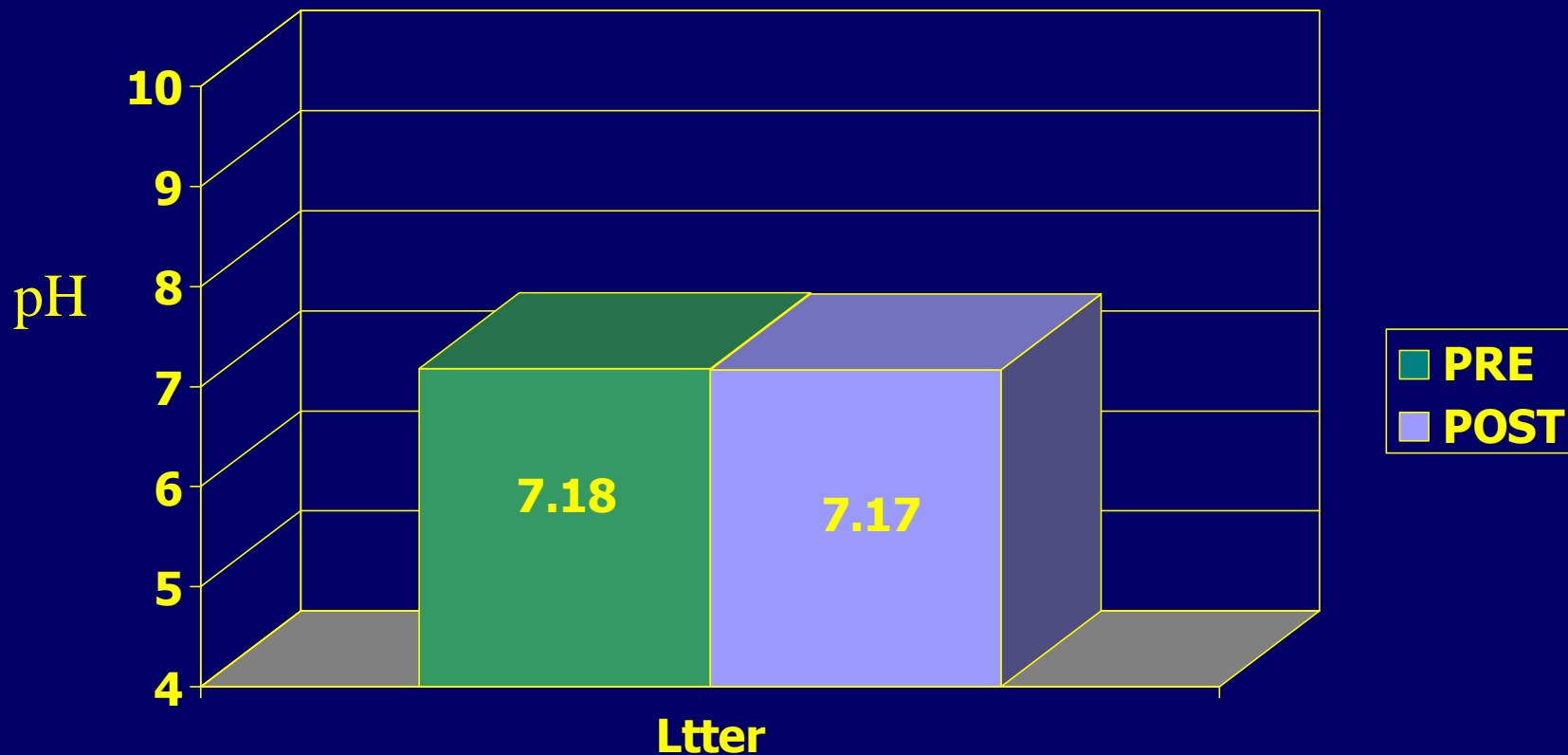
Moisture Level in Shallow Litter Samples Pre and Post Flaming



N=12 samples

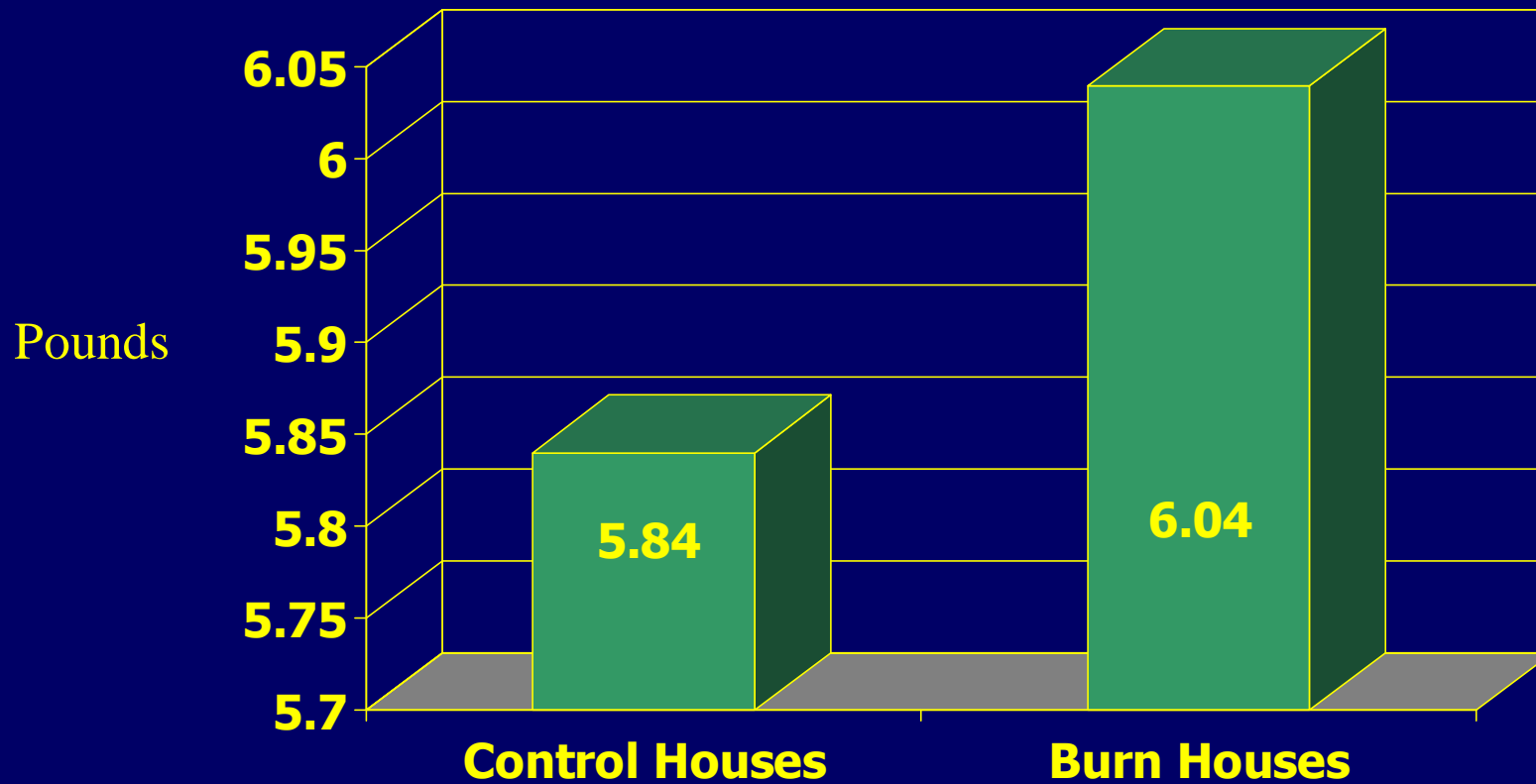
Pr =.07

Effect of Floor Flaming on Litter pH



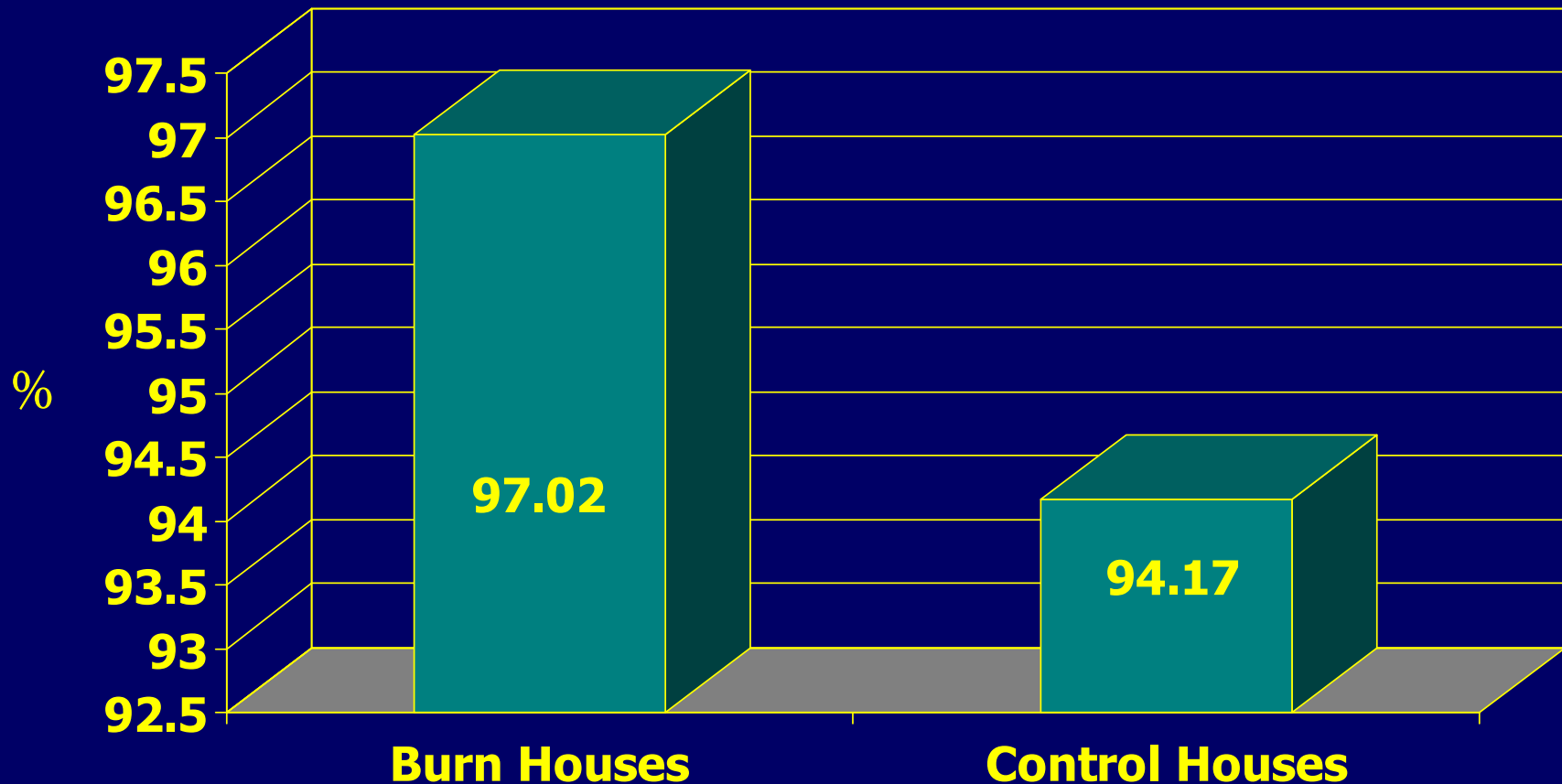
Pr > .7951

Flock Performance



Average market weight of birds N=8 houses

Flock Livability For Birds Reared on Flamed Litter

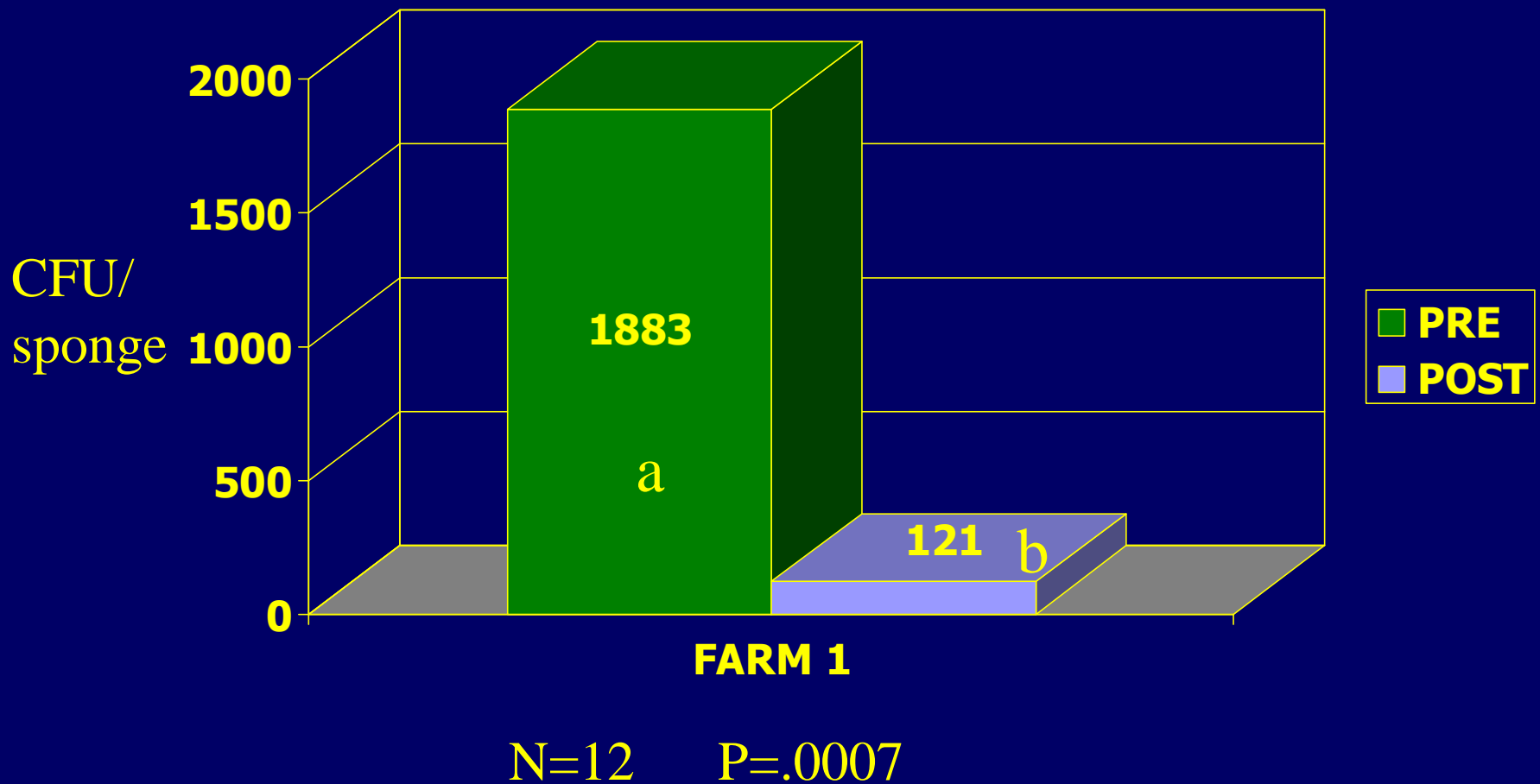


Flamed House livability reflects high first week mortality for one house

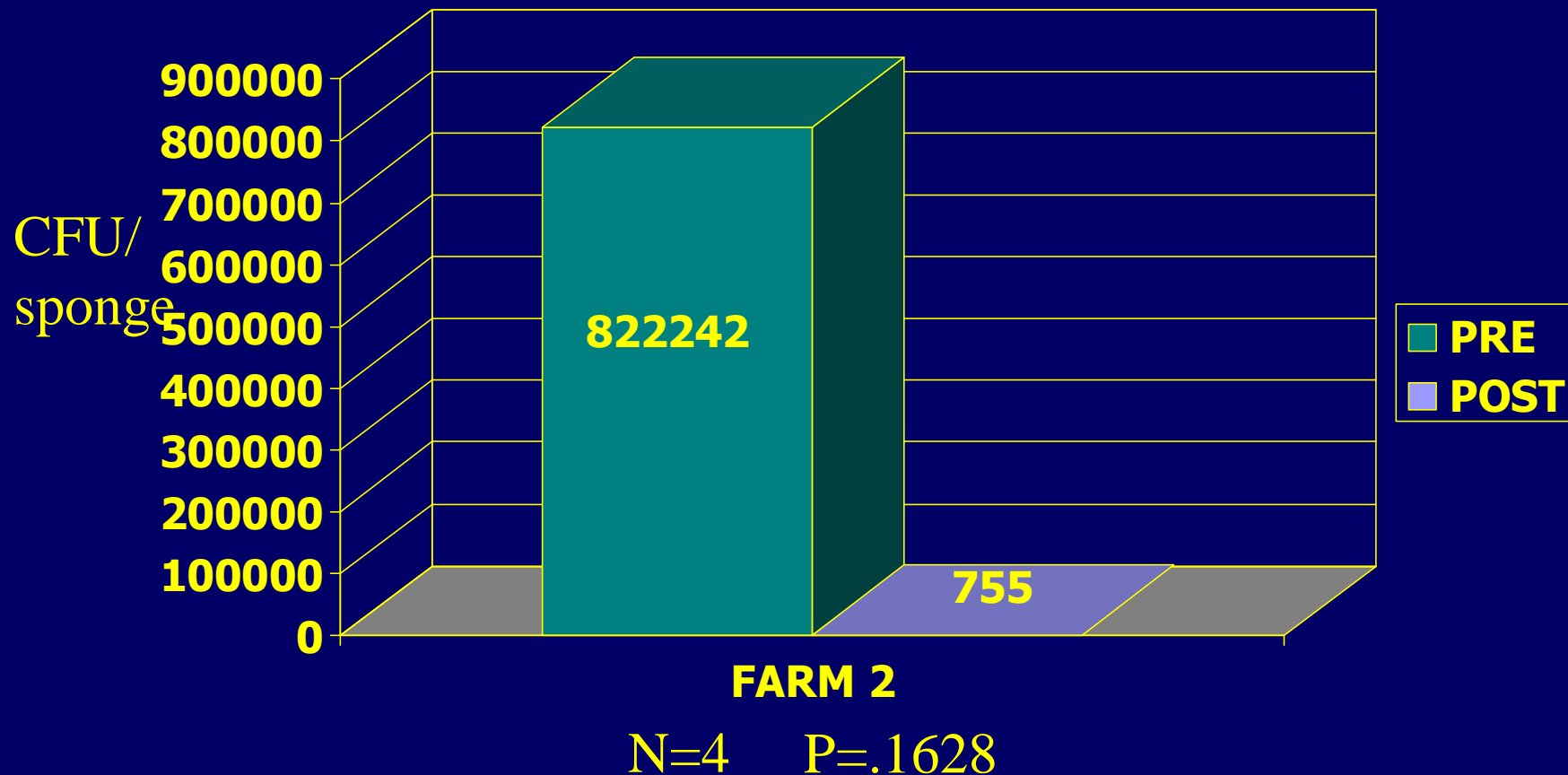
Clostridium Evaluation

- Farm 1 was broiler house with gangrenous dermatitis outbreak
6 areas sampled
- Farm 2 had a botulism problem
2 areas sampled
- Flamed floor after clean out
- Drag swab pre and post burn

Effect of Flaming on Clostridium Levels in Broiler House Floor



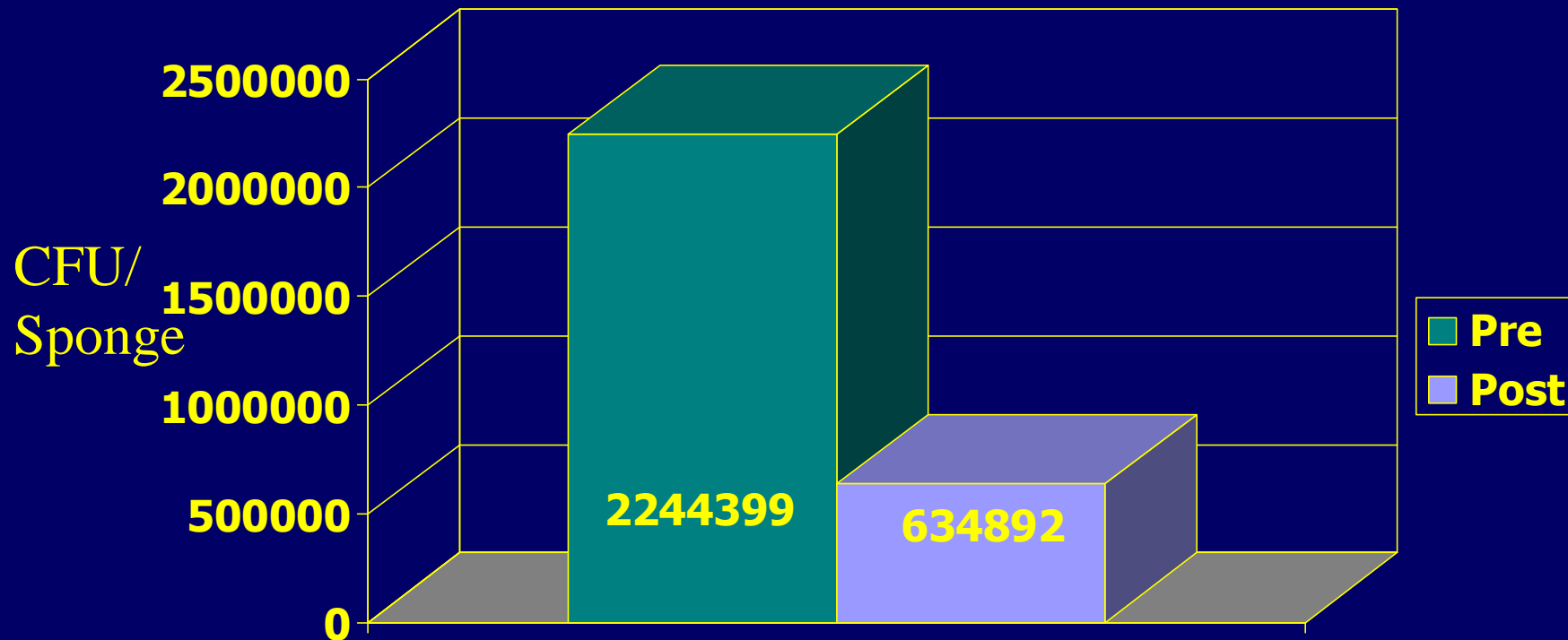
Effect of Flaming on Clostridium Levels in a Broiler House Floor



Sanitizer Used on Farm With E. Coli Outbreak

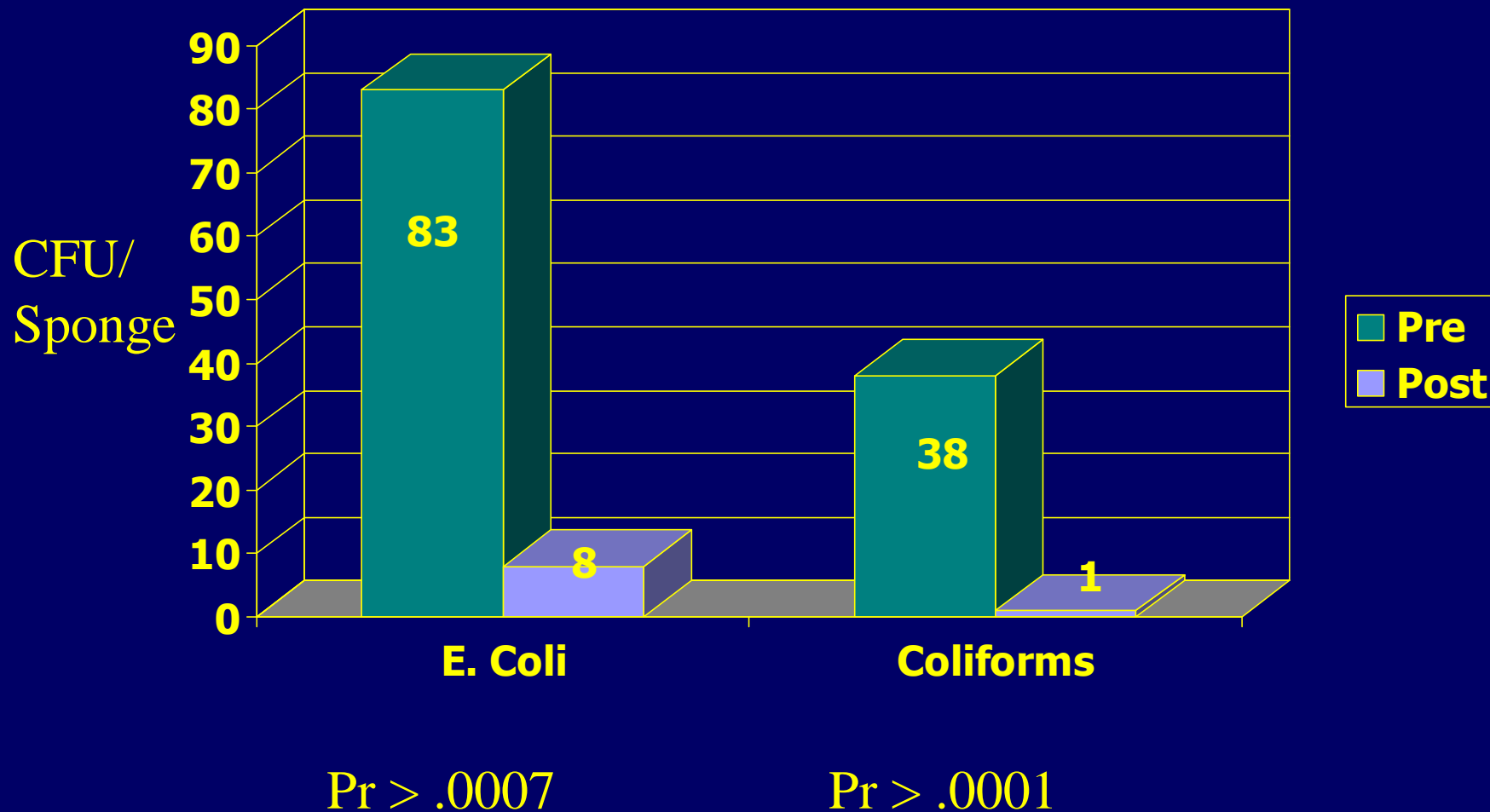
- First flock on new litter
- High incidence of E. Coli beginning week one
- Litter surface for two houses was flamed immediately after flock loadout
- Drag swabs taken pre and post flaming
- Measured total aerobic bacteria, E. coli, coliform, yeast and mold

Total Aerobic Bacteria in Litter Surface

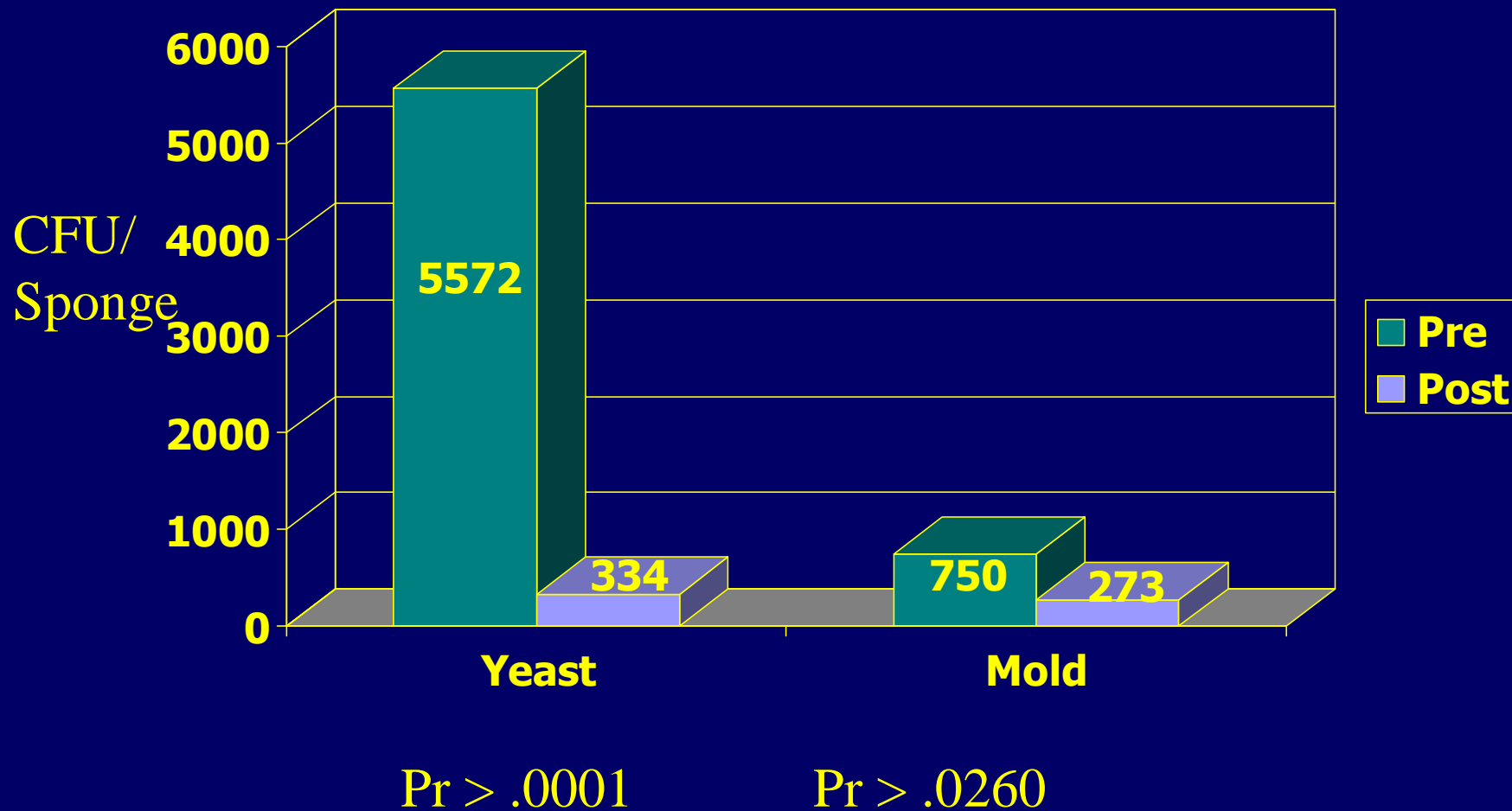


$Pr > F=.0001$

Effect of Flaming Litter Surface on E. coli and Coliform Levels

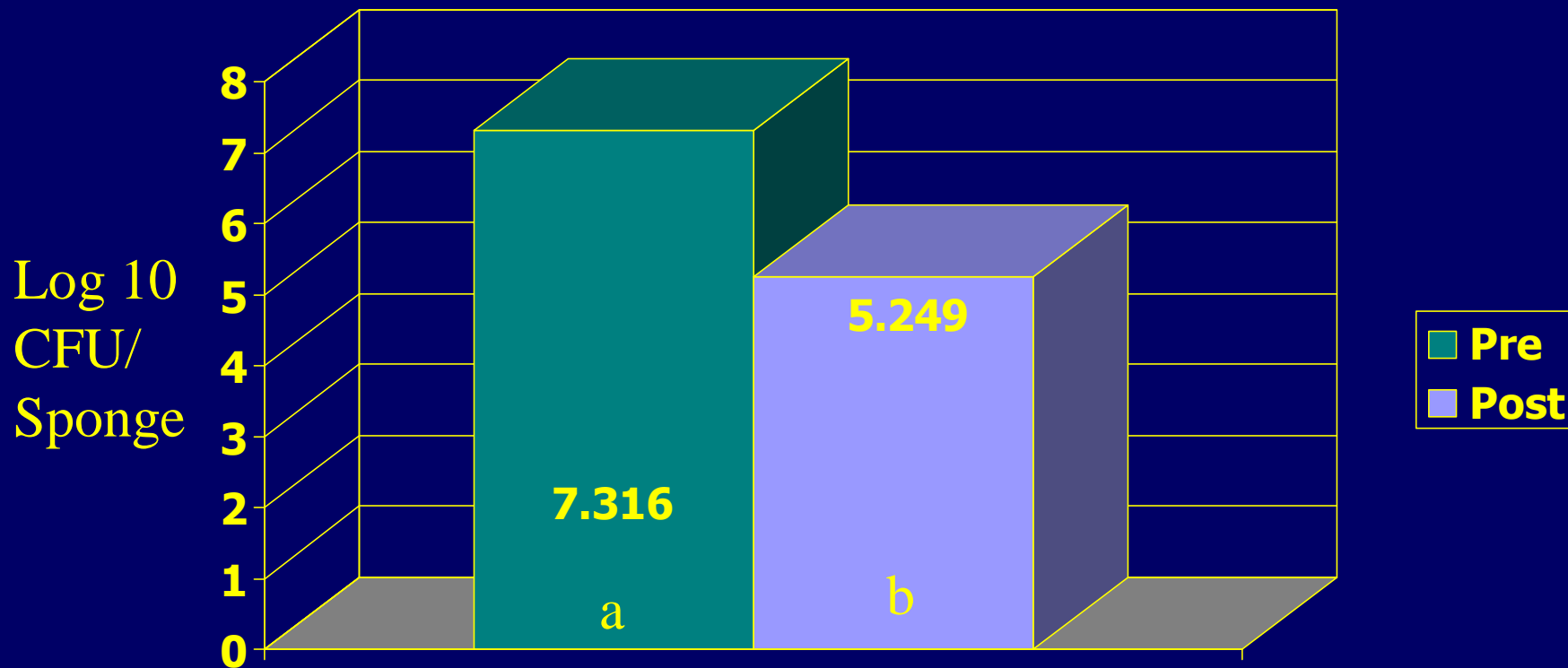


Total Yeast and Mold in Litter Surface



Flame Engineering Turkey Farm Trial

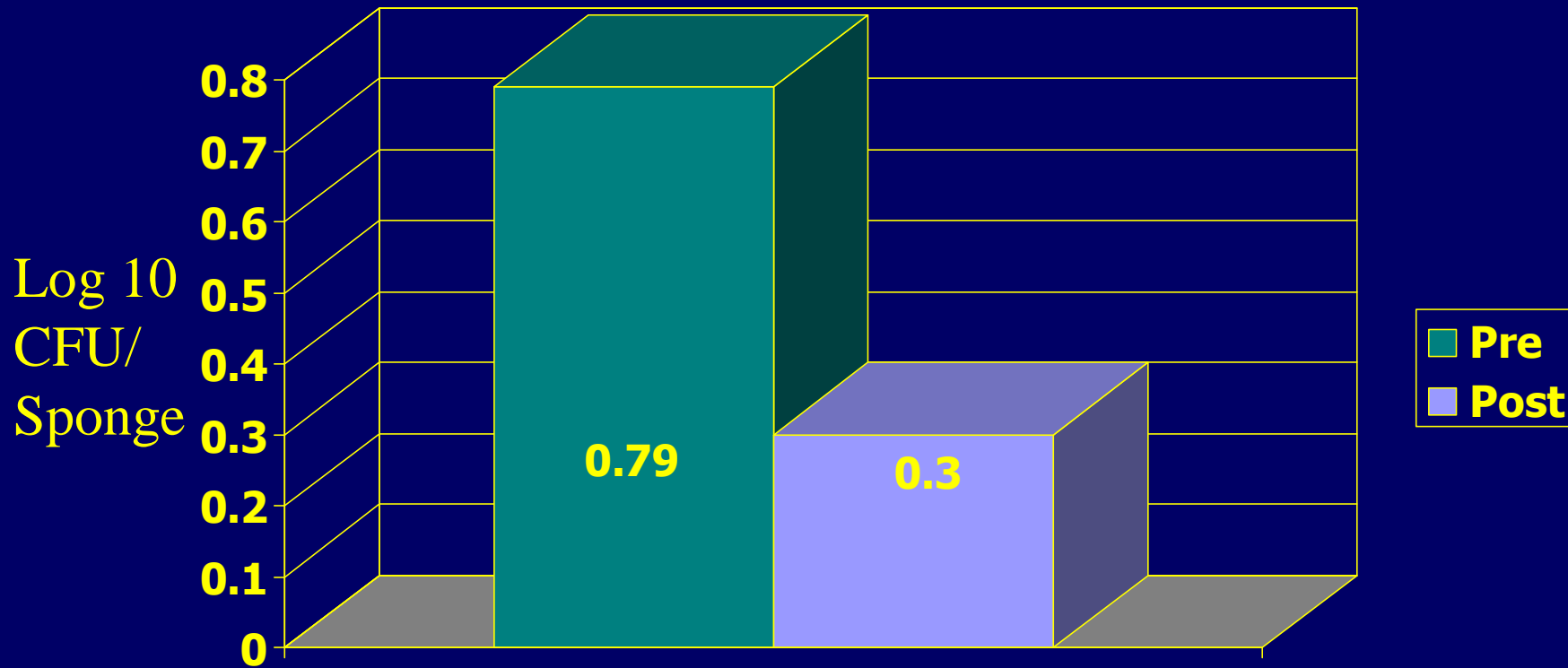
Impact on Aerobic Bacteria



$Pr > F = .0547$

Flame Engineering Turkey Farm Trial

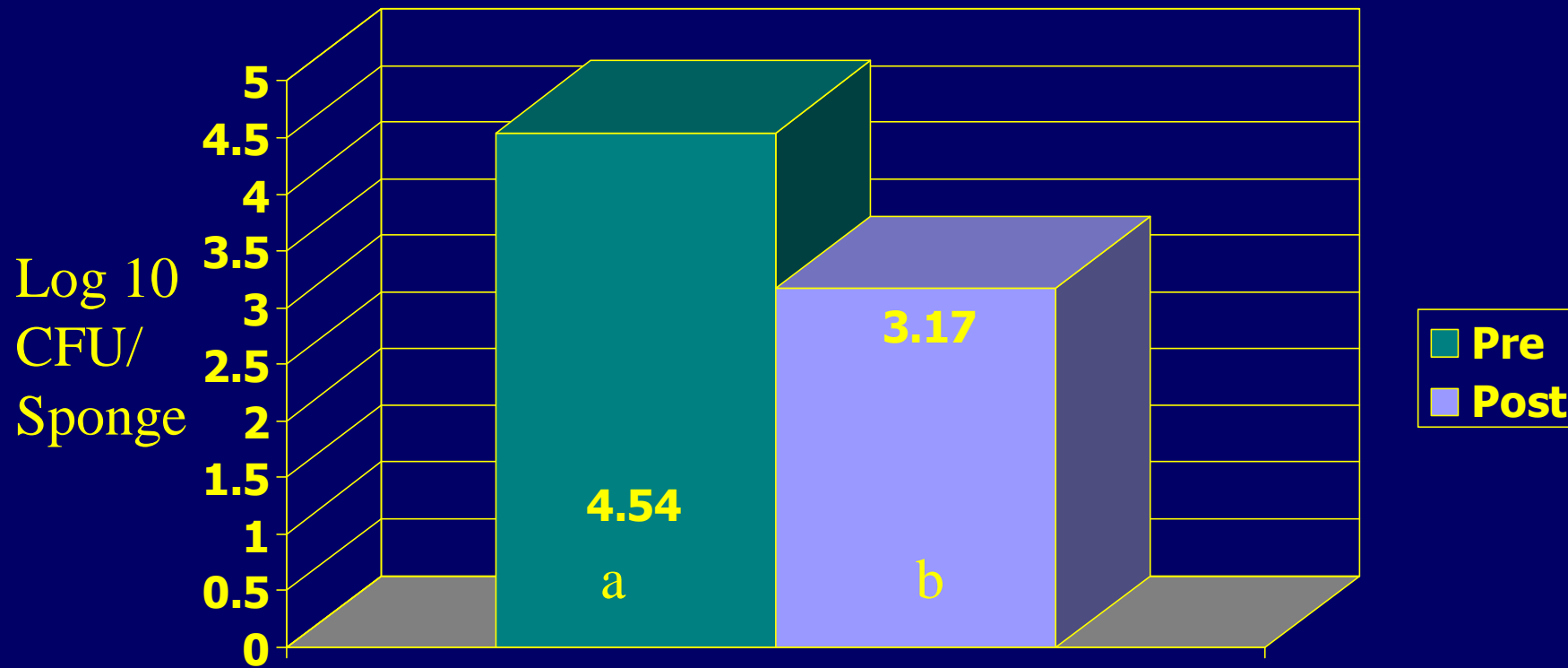
Impact on Total Coliforms



$Pr > F=.0750$

Flame Engineering Turkey Farm Trial

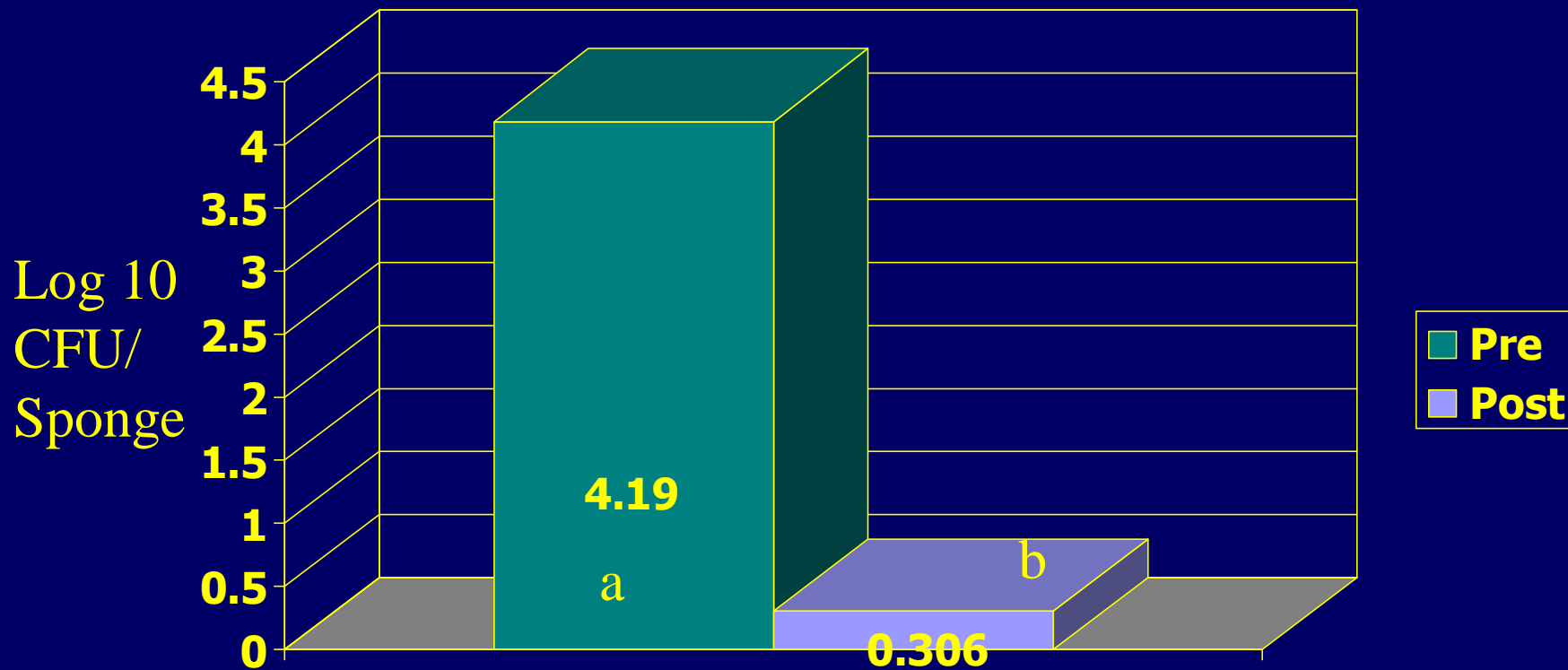
Impact on Mold



$Pr > F=.0012$

Flame Engineering Turkey Farm Trial

Impact on Yeast



$Pr > F = .0056$

Conclusion

- Flame Sanitizer can be an effective tool in a sanitation program
- Provides options to reduce pathogen load in production facilities
- Will not replace good sanitation and management
- Challenge is to promote Flame Sanitizer as safe alternative to chemical treatments