Hamburger bacterial contamination study

2 treatments, randomly assigned to hamburger patties

 active: proposed new treatment to reduce bacterial growth

 control: no antibacterial

After 96 hours at 4C, measure bacterial load

 units are colony forming units (cfu) per gram of meat

 patty treatment cfu rank

 11 active 0.02 1.0

 2 active 0.03 2.0

 1 active 0.11 3.5

 9 active 0.11 3.5

 12 control 0.17 5.0

 3 active 0.18 6.0

 10 active 0.19 7.0

 7 control 0.22 8.0

 8 control 0.35 9.0

 5 control 0.53 10.0

 6 control 0.57 11.0

 4 control 2.50 12.0

Rank sum (of controls): 55



two-sided p-value = 0.0086 (exact = permutation test)

Normal approximation = 0.010