

DOES HYPERBARIC OXYGEN ACT AS A NATURAL ANTIBIOTIC? SEMI- QUANTITATIVE ANALYSIS OF THE EFFECT OF DIFFERENT OXYGEN TENSIONS ON SELECTED BACTERIA.

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Introduction/Background: The aim of this experiment was to investigate the hyperbaric oxygen capability to act as a natural antibiotic, testing cidal and cytostatic effects on some selected ATCC (American-Type-Culture-Collection) bacteria.

Materials and Methods: We prepared a 2ml tryptose broth suspension of S Aureus (STAU)/ATCC-29213, E Coli (ESCO)/ATCC-25922, P Aeruginosa (PSAE)/ATCC-27853, E Faecalis (ENFA)/ATCC-29212, and we kept these preparations @37 ° C for 24H.

From these suspensions we prepared four sets (12 BD-FalconTubes each; Group A₁,A₂, B, and C) of a 3step 1:100 serial dilution for any ATCC-group to be tested in our Experimental Hyperbaric Chamber(4950µl of 0.45%NaCl and 5µl of bacterial suspension). Group A₁ has been exposed to 100%O₂@2.8ATAx75minutes, Group A₂ to 100%O₂@2.5ATAx75minutes, Group B to 21%O₂ @2.8ATAx 75minutes and Group C to 21%O₂ @1.0ATAx75minutes. Refrigeration was applied during the 10 minutes' journey from the Laboratory to the Test Chamber and back. A total of 48 ChocolateAgar plates of manually streaked bacteria were then incubated, at the end of the test, @37 ° Cx24H.

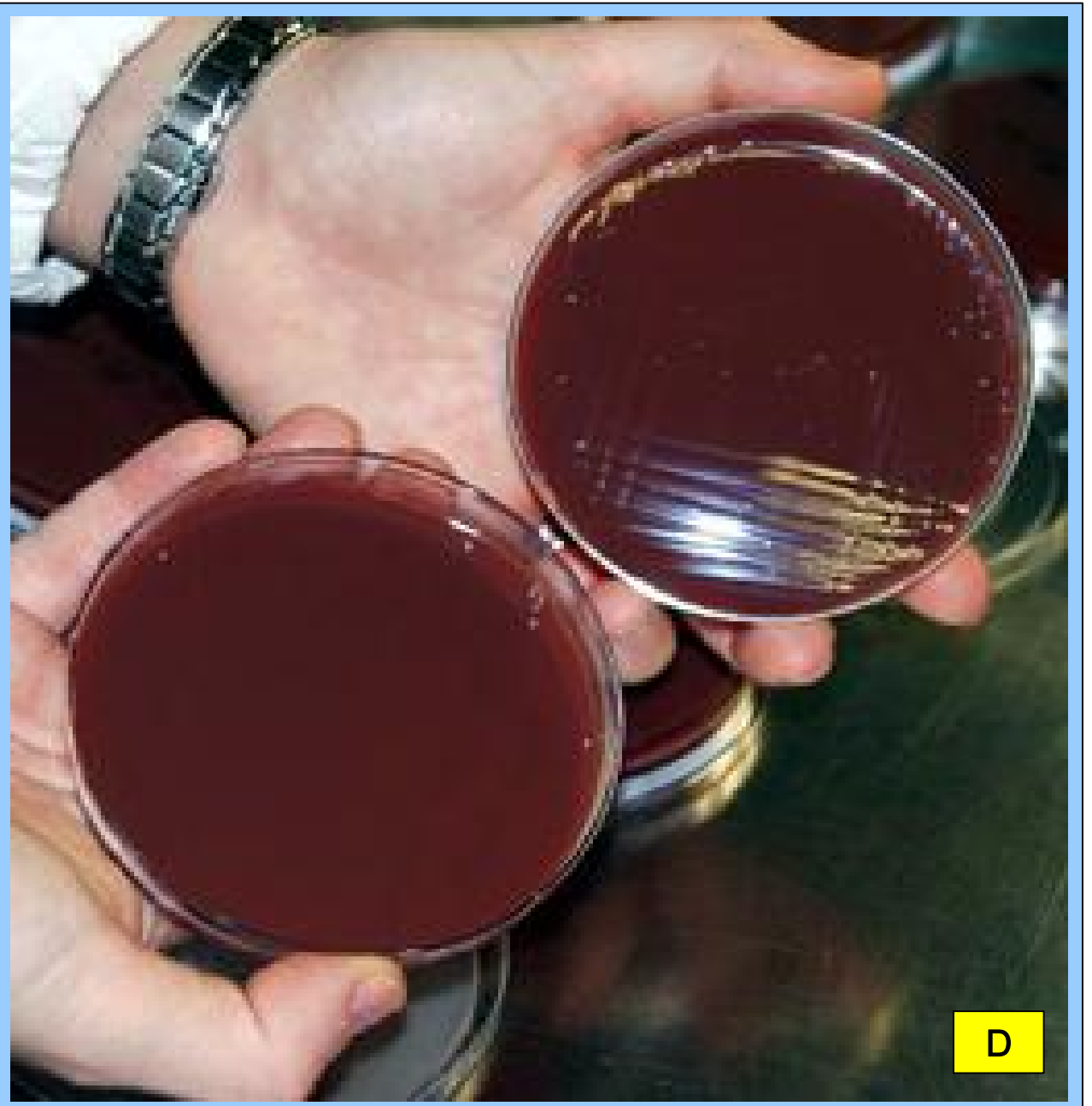
Results:

- [STAU,ESCO,PSAE,ENFA]: No difference between A₁ and B group.
 - 1st diluition (at the highest content in bacteria):
 - [STAU,PSAE,ENFA]: no difference between the 4 groups (A₁,A₂,B,C), [10⁶cfu/ml],
 - [ESCO]: no difference between the four groups (A₁,A₂,B,C), [10⁵cfu/ml].
 - 2nd diluition:
 - [PSAE,ENFA]: no difference between the four groups (A₁,A₂,B,C), [10⁵cfu/ml]
 - [STAU,ESCO]: A₁,A₂,B groups showed 10³cfu/ml, C group 10⁴cfu/ml.

.... Results:

3rd diluition:

- - [ESCO]: no difference between the four groups (A₁,A₂,B,C), [10³cfu/ml]
- [PSAE]: A₁,B groups showed 10³cfu/ml, A₂ group 10⁴ cfu/ml, C group 10⁵cfu/ml
- [STAU,ENFA]: no growth in A₁,B groups, while A₂ and C group 10³cfu/ml.



A: Experiment Chamber
B: Tubes before compression
C: Pressure test
D: Plate comparison

Summary/Conclusions: Apart specific differences owing to the characteristics of each bacteria group, the cidal and cytostatic effects are more evident as the pressure increases, and are not depending on the O₂ tension applied.



44th UHMS Annual Scientific Meeting
June 15-18, 2011 – Fort Worth, TX (USA)

Abstract # F-130