AER© Bioreactor Designs

I. The f_i AER Bioreactor:

a. Two 1-W LED (one red , one blue) illuminating
b. A 10 gallon tank with lid-portal, reflective lid, reflective base and walls
c. 0.40 sq in fresh spinach leaf on elevated wire mesh
d. 0.15 mole CO_2 released from 9" OD collection sac (30% CO_2 in the 10 gal tank)
e. Average temperature of 25° C (78° F)
f. Iodine to stain glucose in spinach cells
g. Compound light microscope with image retention device

Hypothesis: The AER Bioreactor will demonstrate synthesis and retention of excess glucose in spinach cells exposed to a high CO_2 concentration

Method:

1. Divide fresh spinach leaf into control and CO_2 -exposed samples
2. Collect CO_2 (sterno emission) into a 9" OD sac
3. Place demonstration samples on elevated wire mesh in the 10 gal tank
4. Place CO_2 sac in tank. Withdraw sac through

lid-port and close port: tank's ~ 30% CO_2 [(1)].

6. *Illuminate reflective chamber with red & blue LED for _____ minutes*
7. *Iodine-stain control and exposed samples*
8. *Retain 40X, 100X images of control and exposed samples*
9. *Compare stained-cell counts of control / exposed samples (χ^2)*

(1) Nishimura & Asakawa, Plant Physiol. 1978.

II. The f_{ii} AER Bioreactor:

This reactor design is for extraction of excess glucose from high CO_2-exposed spinach cells.

The design's a modification of standard sugar beet glucose-extraction procedure:

Method:

1. *Crush and float CO_2-exposed leaf in water.*
2. *Filter and compost leaf debris*
3. *Process / concentrate sucrose solute*

Philip Nolan
waupacacpr@gmail.com

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