

Tenets for Successful Integrated Research (sample issues)

- Analyze common/identical samples
- Samples must be reproducible
- Initial samples must be obtained from homogeneous culture
- Chemostat cultures meet operating criteria



Why Use Chemostats

Batch

•Advantages

- Easy
- Inexpensive
- Traditional

•Disadvantages

- Uncontrolled
- Growth rate (μ_{max})
- Poor mass transfer
 - O₂, CO₂, H₂, CH₄...
 - Anoxic at low culture densities

Chemostats

•Advantages

- Control
 - Growth rate (= dilution rate)
 - pH, O₂, CO₂
 - Culture density
- Reproducible

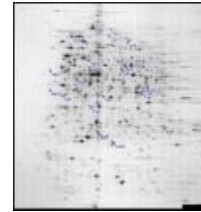
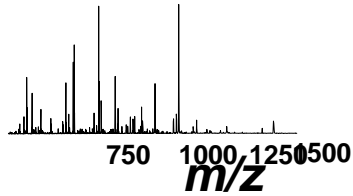
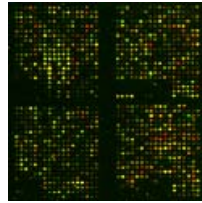
•Disadvantages

- Expensive?
 - Capital equipment
 - Labor
- Non-traditional (learning curve)

Federation Sample Table

Sample	Electron acceptor	DOT (% of air saturation)	Calcium	Flocs	Growth rate (same as dilution rate)
CR16.1	O ₂	20	+	+	0.225 h ⁻¹
CR16.2	fumarate	0	+	-	0.225 h ⁻¹
CR16.3	O ₂	20	+	+	0.225 h ⁻¹
CR17.1	O ₂	20	+	+	0.225 h ⁻¹
CR17.2	fumarate		+	-	0.225 h ⁻¹
CR17.3	O ₂	20	+	+	0.225 h ⁻¹
CR19.1	O ₂	50	-	-	0.12 h ⁻¹
CR19.2	O ₂	Trace	-	-	0.12 h ⁻¹
CR20.1	O ₂	20	+	+	0.225 h ⁻¹
CR20.2	O ₂	Trace	+	-	0.225 h ⁻¹
CR21.1	O ₂	20	+	+	0.225 h ⁻¹
CR21.2	fumarate	0	+	-	0.225 h ⁻¹

Overview of Experiment CR19



DO₂, %

