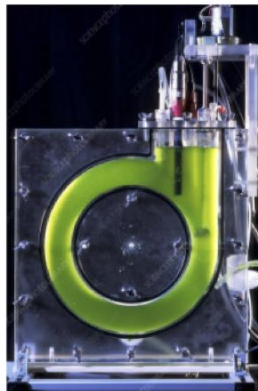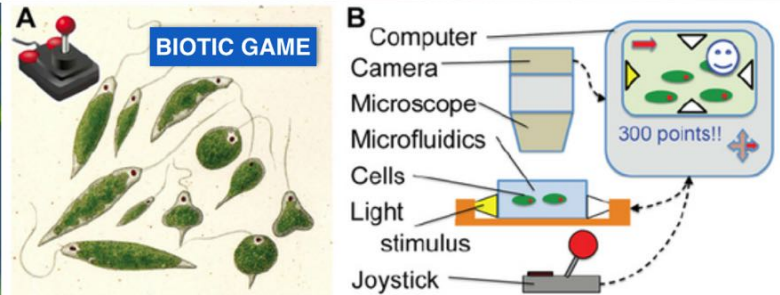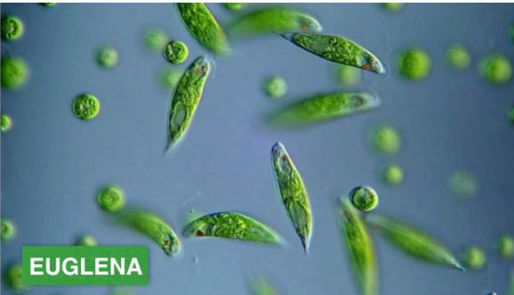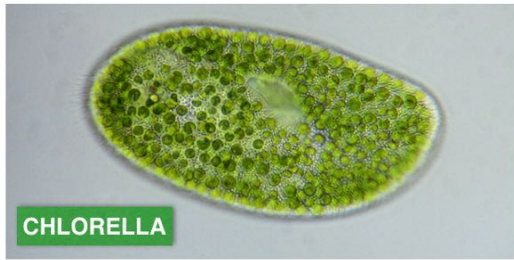TeZ - Bioreactor workshop [2022]

What is a bioreactor?

A bioreactor is a ==**container** which is **used to hold organisms**== for the purpose of harnessing their natural biochemical processes.
A simple and well known example of a bioreactor is a fermentation tank for beer, in which certain microorganisms are encouraged to thrive, causing the contents of the tank to ferment and creating a usable end product.
There are a number of types of bioreactors, and they are used for a variety of purposes, from processing solid waste to manufacturing pharmaceuticals.

Why a bioreactor?

CHLORELLA

SPIRULINA

EUGLENA

SUPERFOOD

BIOTIC GAME

A

B
Computer
Camera
Microscope
Microfluidics
Cells
Light
stimulus
Joystick

300 points!!

EUGLENA

Cytoplasm
Membrane
Nucleolus
Flagellum
Nucleus
Contractile vacuole
Chloroplast
Stigma (eyespot)
Photoreceptor
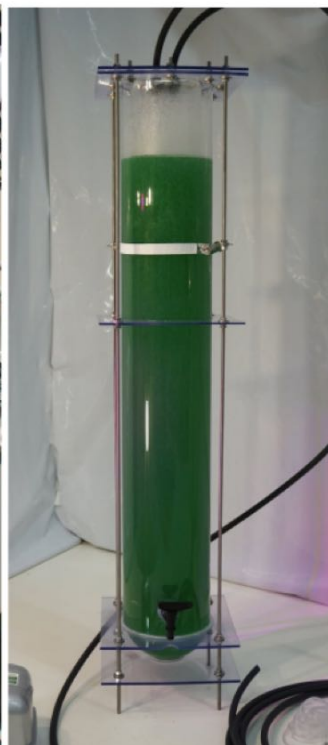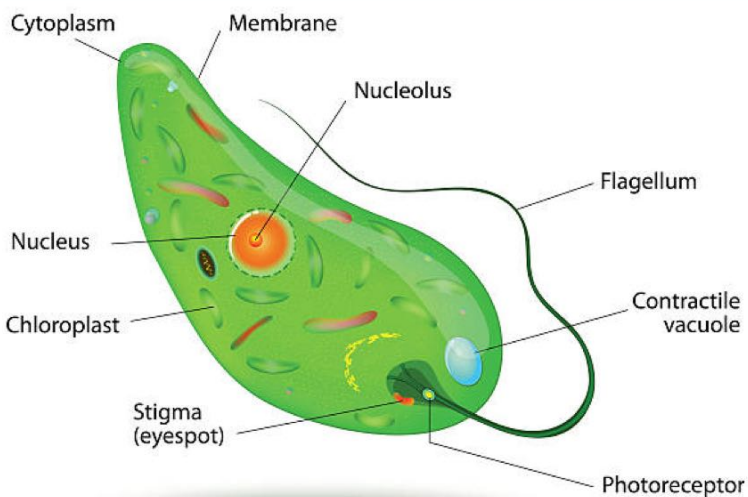
Some species of algae produce 50% or more lipids (oils) through a photosynthetic process. These oils can be extracted from large algae farms to produce biofuels like biodiesel, biogasoline, and biojetfuel, as well as plastics, adhesives, and cosmetics. They can even be used for products such as protein pills, pharmaceuticals, and feed for livestock. Algae-based biofuels are being considered as a substitute for fossil fuels.
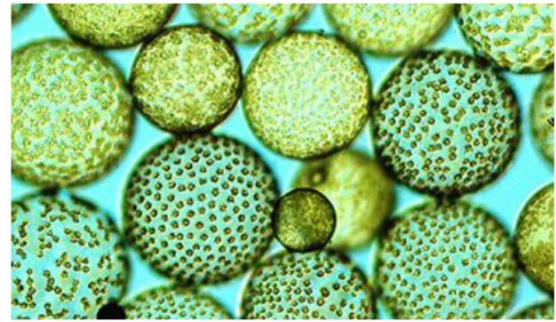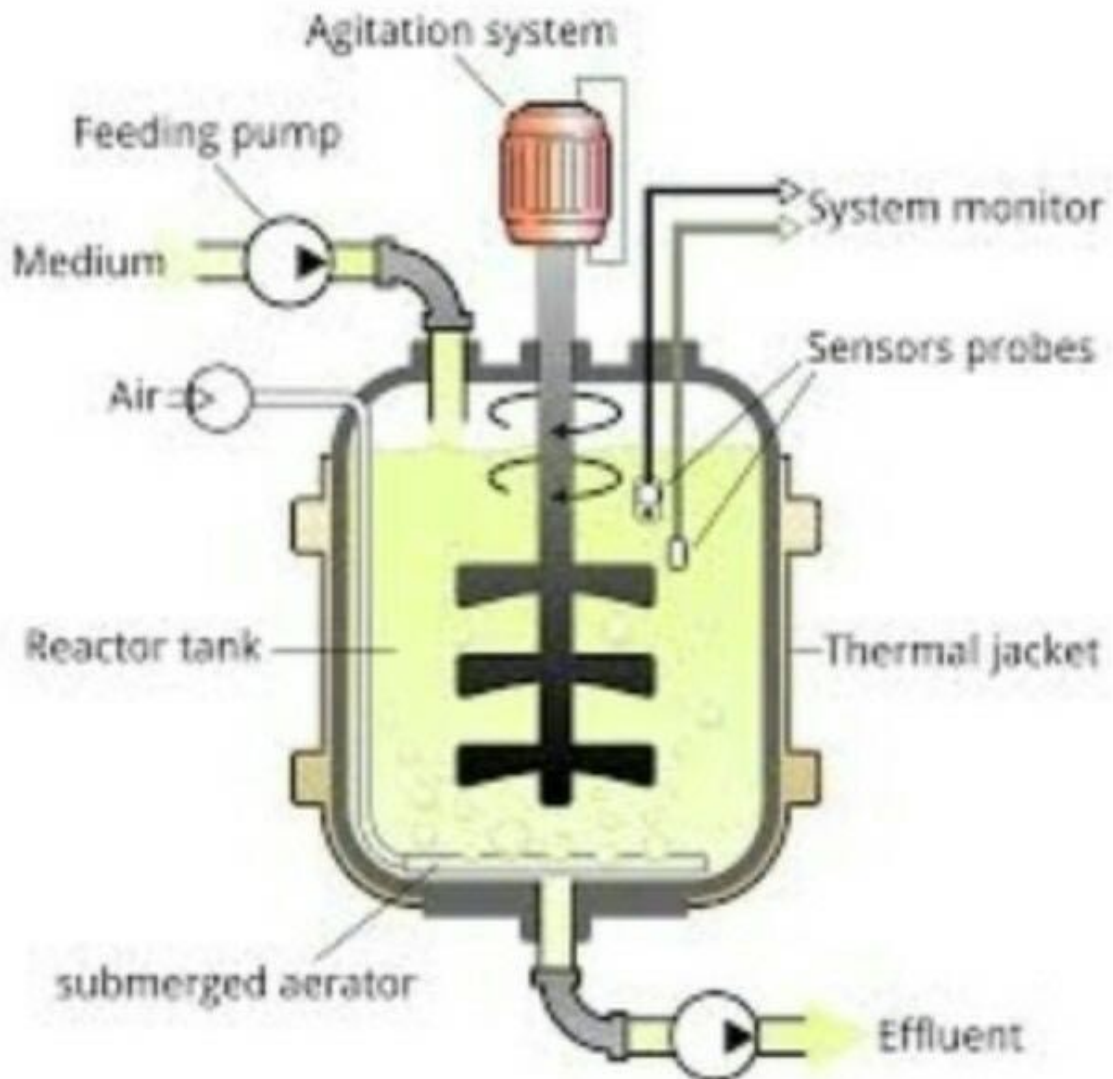
DIAGRAM OF STIRRED TANK BIOREACTOR

TEST TUBE
with EUGLENA

TEMPERATURE
& HUMIDITY SENSOR
DHT11

SERVO MOTOR
MG995

MG995

SSD1306 128 x 32
OLED DISPLAY

> 3.3V / 5V

SDA > pin 21

SCL > pin 21

> pin 23

VCC
+5v

> pin 25

GND

> 3.3V / 5V

DHT11 Ratings		
Parameters	**Value**	**Units**
Supply voltage	3 to 5.5	V
Supply current	0.5 to 2.5	mA
Sampling interval	1	sec

SSD1306 OLED DISPLAY
power: 3.3V-5V

ARDUINO CODE FOR ESP32

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```cpp
// SIMPLE SERVO TEST

#include <ESP32Servo.h>

Servo myservo;  // create servo object to control a servo

// Recommended PWM GPIO pins on the ESP32 include 2,4,12-19,21-23,25-27,32-33
int servoPin = 23;

void setup() {
  myservo.setPeriodHertz(50);
  myservo.attach(servoPin);
}

void loop() {
  myservo.write(0);
  delay(2000);
  myservo.write(180);
  delay(2000);
}
```

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