## TeZ - Bioreactor workshop [2022]

https://git.desearch.cc/TeZ/BIOREACT

## What is a bioreactor?

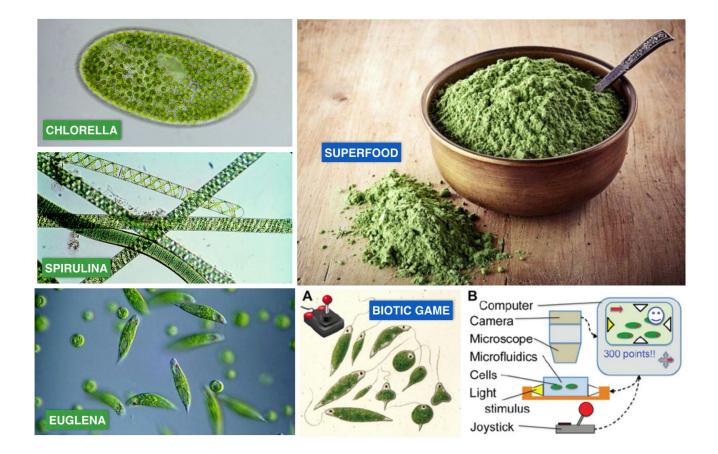
A bioreactor is a **container** which is **used to hold organisms** for the purpose of harnessing their natural biochemical processes.

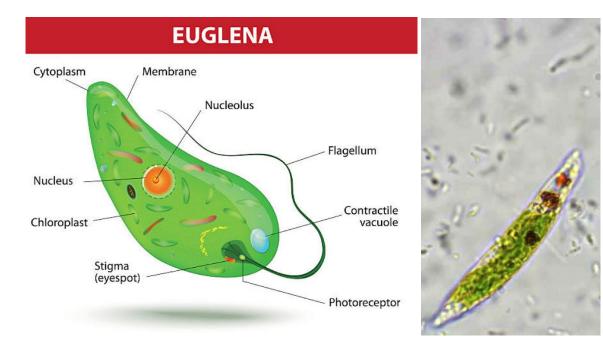
A simple and well known example of a bioreactor is a fermentation tank for beer, in which certain microorganisms are encouraged to thrive, causing the contents of the tank to ferment and creating a usable end product.

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?

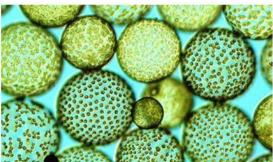






#### BIOFUEL

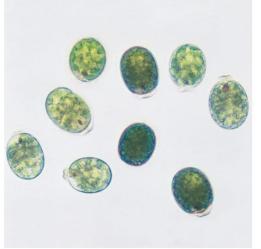
Some species of algae produce 50% or more lipids (oils) through a photosynthetic process. These oils can be extracted from large algae farms to produce biofuels like biodiesel, biogasoline, and biojetfuel, as well as plastics, adhesives, and cosmetics. They can even be used for products such as protein pills, pharmaceuticals, and feed for livestock. Algae-based biofuels are being considered as a substitute for fossil fuels.





### Euglena gracilis, Living

Item #: 152800 ★★★★★ 5.0 (3) Description Specifications Reviews Q&A

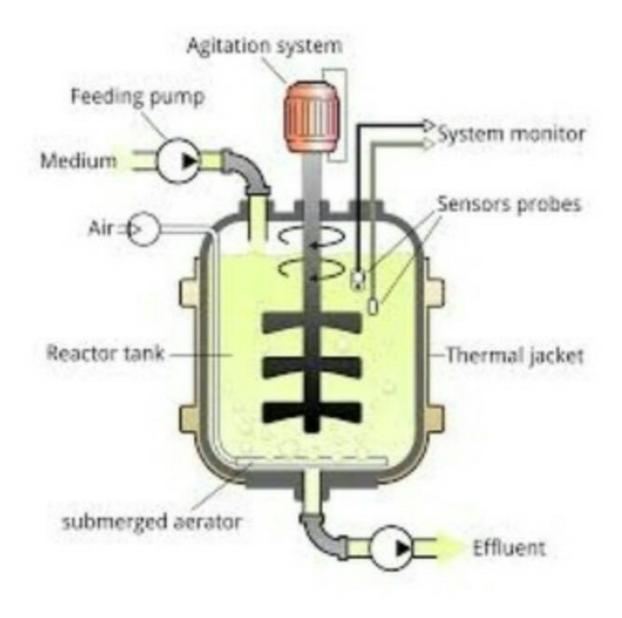


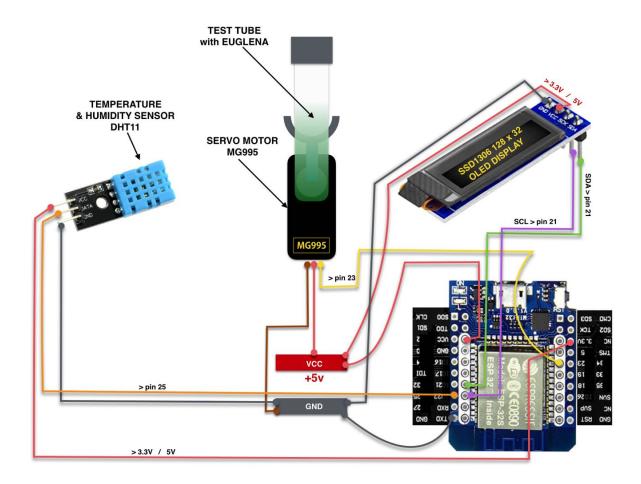
0	<u>This p</u>	roduct co	ontains shipping or purchase i	estrictions. Read
Proc	luct: (	(in stock)		
Qua	ntity	-		

# **EUGLENA MEDIUM RECIPE**



#### DIAGRAM OF STIRRED TANK BIOREACTOR





SSD1306 O	LED DISPLAY
power:	3.3V-5V

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

				chipPU		RST/EN						TXD	GPIO1	emacRXD2	UOTXD	CLKout3	BROCR	AM Port	
	adcPA	RTCI00	adc1_0	SENSvp	GP1036	SVP						RXD	GPIO3		UORXD	CLKout2	PROGRA	AIVI POR	
	DAC_2	RTCI07	adc2_9	emacRXD1	GP1026	1026						1022	GP1022	emacTXD1	uORTS	vspiWP	Wire SCL		
	spi_SCK	HSI_data7	VSPLCLK		GPIO18	1018						1021	GP1021	emacTXEN		vspiHD	Wire SDA		
	spi_MISC	VSPIQ	uOCTS	emacTXD0	GP1019	1019	-				-	1017	GPI017	emacC0180	u2TXD	HS1data5			
	spi_MOS	HSI_strobe	VSPI_ID		GP1023	1023	<				/	1016	GP1016	emacCLKOUT	u2RXD	HS1data4			
	spi_SS	HSI_data6	VSPI_CSO	emacRXCLK	GPIO5	105						GND							
						3V3						VCC							
S2data3 SDdata3 hsplID MTC	CK Touch4	RTCIO14	adc2_4	emacRXER	GPIO13	тск						TDO	GPIO15	emacRXD3	adc2_3	RTCIO13	Touch3	MTDO	hspiCS0 SDcmd HS2ci
FLASH	H D3 SDdata3	HS1data3	u1TXD	spiWP	GP1010	SD3						SD0	GP107	SPIQ	u2RTS	HS1data0	SDdata0	FLASH DO	
							CHD	OFT	6	TO	CND								
	adcPA	RTCIO3 RTCIO5	adc1_3 adc1_7	SENSvn VDET2		GND NC SVN IO35	GND NC SVN 1035	1018	ESP WROOM 02	RXD (1 1022 (1 1021 (1	GND 1027 1025 1032	GND 1027 1025 1032	GP1025 GP1032	emacRXD0	adc2_8 adc1_4	RTC106 RTC109	Touch7 DAC_1 Touch9	XTAL32	
XTAL	adcPA	RTCIO5 RTCIO8	adc1_7 adc1_5	VDET2	GP1035 GP1033	NC SVN IO35 IO33	NC SVN 1035 (033	SVP 1026 1018 1019	ESP WROOM 32	RXD (1 1022 (1 1021 (1 1017 (1)	1027 1025 1032 TDI ->	IO27 IO25 IO32 TDI	GP1025 GP1032 GP1012	emacRXD0 emacTXD3	adc2_8 adc1_4 adc2_5	RTC106 RTC109 RTC1015	DAC_1 Touch9 Touch5		hspiiQ SDdata2 HS2da
XTAL	adcPA	RTCIO5 RTCIO8 RTCIO4	adc1_7 adc1_5 adc1_6	VDET2 VDET1	GPIO35 GPIO33 GPIO34	NC SVN IO35 IO33 IO34	NC SVN 1035 1033 1034	SVP 1026 1018 1019 1023		RXD (1 1022 (1 1021 (1 1017 (1 1016 (1)	1027 1025 1032 ТDI —> 104	IO27 IO25 IO32 TDI IO4	GPIO25 GPIO32 GPIO12 GPIO4	emacRXD0 emacTXD3 emacTXDR	adc2_8 adc1_4 adc2_5 adc2_0	RTCIO6 RTCIO9 RTCIO15 RTCIO10	DAC_1 Touch9 Touch5 Touch0	MTDI	hspilQ SDdata2 HS2da
XTAL	adcPA	RTCIO5 RTCIO8	adc1_7 adc1_5 adc1_6	VDET2	GPIO35 GPIO33 GPIO34	NC SVN IO35 IO33 IO34 TMS	NC SVN 1035 1033 1034 TMS	SVP 1026 1018 1019 1023 105		RXD (1022) (1017) (1016) (1016) (1017) (1016) (1016) (1017) (1016	1027 1025 1032 TDI -> 104 100	IO27 IO25 IO32 TDI IO4 IO0	GPI025 GPI032 GPI012 GPI04 GPI00	emacRXD0 emacTXD3 emacTXDR emacTXCLK	adc2_8 adc1_4 adc2_5 adc2_0 adc2_1	RTCIO9 RTCIO15 RTCIO10 RTCIO10 RTCIO11	DAC_1 Touch9 Touch5 Touch0 Touch1		hspilQ SDdata2 HS2da
XTAL Zelk SDelk hupiCLK MTh	adcPA 32 Touch8 MS Touch6	RTCIO5 RTCIO8 RTCIO4 RTCIO16	adc1_7 adc1_5 adc1_6 adc2_6	VDET2 VDET1	GPI035 GPI033 GPI034 GPI014	NC SVN IO35 IO33 IO34	NC SVN 1035 1033 1034	SVP 1026 1018 1019 1023 105		RXD (1022) (1017) (1016) (1016) (1017) (1016) (1016) (1017) (1016	1027 1025 1032 ТDI —> 104	IO27 IO25 IO32 TDI IO4	GP1025 GP1032 GP1012 GP104 GP100 GP102	emacRXD0 emacTXD3 emacTXDR emacTXCLK	adc2_8 adc1_4 adc2_5 adc2_0 adc2_1	RTCIO6 RTCIO9 RTCIO15 RTCIO10	DAC_1 Touch9 Touch5 Touch0	MTDI	hspilQ SDdata2 HS2da
XTAL Zelk SDelk hupiCLK MTh	adcPA	RTCIO5 RTCIO8 RTCIO4 RTCIO16	adc1_7 adc1_5 adc1_6 adc2_6	VDET2 VDET1	GPIO35 GPIO33 GPIO34	NC SVN IO35 IO33 IO34 TMS	NC SVN 1035 1033 1034 TMS NC	SVP 1026 1018 1019 1023 105		RXD (1022) (1021	1027 1025 1032 TDI -> 104 100	IO27 IO25 IO32 TDI IO4 IO0	GPI025 GPI032 GPI012 GPI04 GPI00	emacRXD0 emacTXD3 emacTXDR emacTXCLK	adc2_8 adc1_4 adc2_5 adc2_0 adc2_1 adc2_1	RTCIO6 RTCIO9 RTCIO15 RTCIO10 RTCIO11 RTCIO12	DAC_1 Touch9 Touch5 Touch0 Touch1	MTDI CLKout1	hspilQ SDdata2 HS2da

#### ARDUINO CODE FOR ESP32

```
_____
```

// 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);
}
```

\_\_\_\_\_