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LAMPIRAN A

```
#define pin_motor_2_a 4
#define pin_motor_2_b 5
#define pin_motor_3_a 6
#define pin_motor_3_b 7
#define pin_ultrasonic_1_trig 22
#define pin_ultrasonic_1_echo 23
#define pin_ultrasonic_2_trig 24
#define pin_ultrasonic_2_echo 25
#define pin_ultrasonic_3_trig 26
#define pin_ultrasonic_3_echo 27
#define pin_lamp_1 8
#define pin_lamp_2 9
#define pin_lamp_3 10
#define pin_dht_1 A0
#define pin_dht_2 A1
#define pin_dht_3 A2
#define TdsSensorPin A6
#define pin_fan_1 30
#define pin_fan_2 31
#define pin_fan_3 33
#define pin_pump 32
#define pin_buzzer 53
#include <Wire.h>
#include "TCA9548A.h"
TCA9548A I2CMux;
#include<LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2);
float bagi1, bagi2, bagi3;
// settingan
const int chamber1Height = 10;
const int chamber1Temp = 29;
const int chamber1Lux = 225;
const int chamber2Height = 10;
const int chamber2Temp = 29;
const int chamber2Lux = 330;
```

```
const int chamber3Height = 10;
const int chamber3Temp = 29;
const int chamber3Lux = 451;
float lastA1, lastA2, lastA3;
float lastT1, lastT2, lastT3;
// akhir settingan
int chamber1LuxPwm = 128;
int chamber2LuxPwm = 128;
int chamber3LuxPwm = 128;
void setup() {
  Serial.begin(9600);
  setupMotor();
  setupLamp();
  setupAmbient();
  setupTDS();
  setuprelay();
  setupBuzzer();
  buzzerBeep();
  I2CMux.openChannel(7);
  delay(1000);
  lcd.init();
  lcd.backlight();
  I2CMux.closeChannel(7);
  delay(100);
}
int lcdcase;
void loop() {
  pumpLoop();
  long lastPump = 0;
  bool pumpStatus = false;
  float tds = readTDS();
  delay(10);
  int us1 = ultrasonic1Get();
  delay(10);
  int us2 = ultrasonic2Get();
  delay(10);
  int us3 = ultrasonic3Get();
  delay(10);
  float t1 = dht1GetTemp();
```

```
delay(10);
float t2 = dht2GetTemp();
delay(10);
float t3 = dht3GetTemp();
if (t1 != 0)lastT1 = t1;
if (t2 != 0)lastT2 = t2;
if (t3 != 0)lastT3 = t3;
delay(10);
float a1 = ambient1Get();
delay(100);
float a2 = ambient2Get();
delay(100);
float a3 = ambient3Get();
delay(100);
if (a1 != 0)lastA1 = a1/2.6;
if (a2 != 0)lastA2 = a2/3.4;
if (a3 != 0)lastA3 = a3/4.6;
Serial.print("TDS = ");
Serial.print(tds);
Serial.print('\t');
//delay (3000);
Serial.print("U=");
Serial.print(us1);
Serial.print(" | ");
Serial.print(us2);
Serial.print(" | ");
Serial.print(us3);
Serial.print('\t');
//  delay (3000);
Serial.print("T");
Serial.print(lastT1);
Serial.print(" | ");
Serial.print(lastT2);
Serial.print(" | ");
Serial.print(lastT3);
Serial.print('\t');
//  delay (3000);
Serial.print("chy = ");
Serial.print(lastA1);
```

```
  Serial.print(" | ");
  Serial.print(lastA2);
  Serial.print(" | ");
  Serial.print(lastA3);
  Serial.print('\t');
  //  delay (3000);
  Serial.print("PWM = ");
  Serial.print(chamber1LuxPwm);
  Serial.print(" | ");
  Serial.print(chamber2LuxPwm);
  Serial.print(" | ");
  Serial.print(chamber3LuxPwm);
  Serial.print('\n');
 if (ultrasonic1Get() > chamber1Height) {
    Serial.println("motor 1 down");
  }
  while (ultrasonic1Get() > chamber1Height) {
    delay(100);
    pumpLoop();
    motor1Down();
  }
  if (ultrasonic1Get() < chamber1Height) {
    Serial.println("motor 1 Up");
  }
  while (ultrasonic1Get() < chamber1Height) {
    delay(100);
    pumpLoop();
    motor1Up();
  }
  motor1Stop();
  if (ultrasonic2Get() > chamber2Height) {
    Serial.println("motor 2 down");
  }
  while (ultrasonic2Get() > chamber2Height) {
    delay(100);
    pumpLoop();
    motor2Down();
  }
  if (ultrasonic2Get() < chamber2Height) {
```

```
  Serial.println("motor 2 Up");
}
while (ultrasonic2Get() < chamber2Height) {
  delay(100);
  pumpLoop();
  motor2Up();
}
motor2Stop();
if (ultrasonic3Get() > chamber3Height) {
  Serial.println("motor 3 down");
}
while (ultrasonic3Get() > chamber3Height) {
  delay(100);
  pumpLoop();
  motor3Down();
}
if (ultrasonic3Get() < chamber3Height) {
  Serial.println("motor 3 Up");
}
while (ultrasonic3Get() < chamber3Height) {
  delay(100);
  pumpLoop();
  motor3Up();
}
motor3Stop();
if (lastT1 > chamber1Temp) {
  relayFan1On();
} else {
  relayFan1Off();
}
if (lastT2 > chamber2Temp) {
  relayFan2On();
} else {
  relayFan2Off();
}
if (lastT3 > chamber3Temp) {
  relayFan3On();
} else {
  relayFan3Off();
```

```
}
if (lastA1 > chamber1Lux && chamber1LuxPwm > 0) {
  chamber1LuxPwm--;
}
if (lastA1 < chamber1Lux && chamber1LuxPwm < 255) {
  chamber1LuxPwm++;
}
if (lastA2 > chamber2Lux && chamber2LuxPwm > 0) {
  chamber2LuxPwm--;
}
if (lastA2 < chamber2Lux && chamber2LuxPwm < 255) {
  chamber2LuxPwm++;
}
if (lastA3 > chamber3Lux && chamber3LuxPwm > 0) {
  chamber3LuxPwm--;
}
if (lastA3 < chamber3Lux && chamber3LuxPwm < 255) {
  chamber3LuxPwm++;
}
analogWrite(pin_lamp_1, chamber1LuxPwm);
analogWrite(pin_lamp_2, chamber2LuxPwm);
analogWrite(pin_lamp_3, chamber3LuxPwm);
if (tds < 500) {
  buzzerBeep();
}
I2CMux.openChannel(7);
delay(500);
lcd.clear();
switch (lcdcase) {
  case 0:
    lcd.setCursor(0, 0);   //kolom dan baris
    lcd.print("Ultrasonik");
    lcd.setCursor(0, 1);
    lcd.print("|");
    lcd.print(us1);
    lcd.print("|");
    lcd.print(us2);
    lcd.print("|");
    lcd.print(us3);
```

```
  lcdcase++;
  break;
 case 1:
  lcd.setCursor(0, 0);   //kolom dan baris
  lcd.print("suhu");
  lcd.setCursor(0, 1);
  lcd.print(lastT1);
  lcd.print("|");
  lcd.print(lastT2);
  lcd.print("|");
  lcd.print(lastT3);
  lcdcase++;
  break;
 case 2:
  lcd.setCursor(0, 0);   //kolom dan baris
  lcd.print("cahaya");
  lcd.print("|");
  lcd.print(lastA1);
  lcd.print("|");
  lcd.setCursor(0, 1);
  lcd.print(lastA2);
  lcd.print("|");
  lcd.print(lastA3);
  lcdcase++;
  break;
 case 3:
  lcd.setCursor(0, 0);   //kolom dan baris
  lcd.print("PWM");
  lcd.setCursor(0, 1);
  lcd.print(chamber1LuxPwm);
  lcd.print("|");
  lcd.print(chamber2LuxPwm);
  lcd.print("|");
  lcd.print(chamber1LuxPwm);
  lcdcase++;
  break;
 case 4:
  lcd.setCursor(0, 0);   //kolom dan baris
  lcd.print("TDS = ");
```

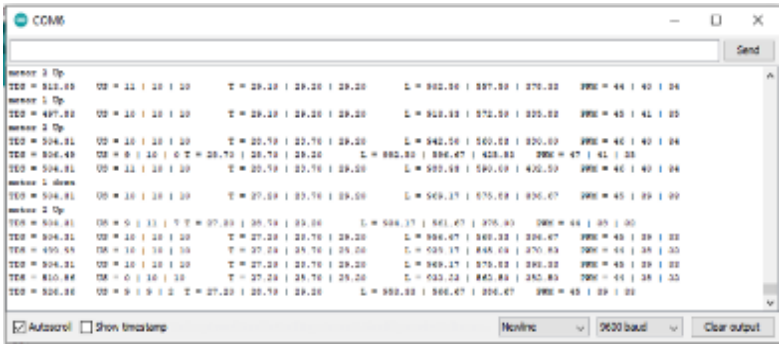
```
      lcd.print(tds);
      lcdcase = 0;
      break;
  }
  delay(100);
  I2CMux.closeChannel(7);
}
long lastPump = 0;
bool pumpStatus = false;
void pumpLoop() {
  delay(10);
  if (millis() > lastPump + 100 && !pumpStatus) {
    relayPumpOff();
    lastPump = millis();
    pumpStatus = !pumpStatus;
  }
  if (millis() > lastPump + 10000 && pumpStatus) {
    relayPumpOn();
    lastPump = millis();
    pumpStatus = !pumpStatus;
  }
}
void serialEvent() {
  String data = Serial.readStringUntil('\n');
  Serial.println(data);
  if (data.indexOf("s") != -1) {
    motor1Stop();
    motor2Stop();
    motor3Stop();
    lamp1Set(0);
    lamp2Set(0);
    lamp3Set(0);
  } else if (data.indexOf("m1u") != -1) {
    motor1Up();
  } else if (data.indexOf("m1d") != -1) {
    motor1Down();
  } else if (data.indexOf("m2u") != -1) {
    motor2Up();
  } else if (data.indexOf("m2d") != -1) {
```

```
  motor2Down();
} else if (data.indexOf("m3u") != -1) {
  motor3Up();
} else if (data.indexOf("m3d") != -1) {
  motor3Down();
} else {
  int value = data.toInt();
  lamp1Set(value);
  lamp2Set(value);
  lamp3Set(value);
}
```

LAMPIRAN B

Pengujian sensor bh 1750 dan snsor DHT 22

Hari 1

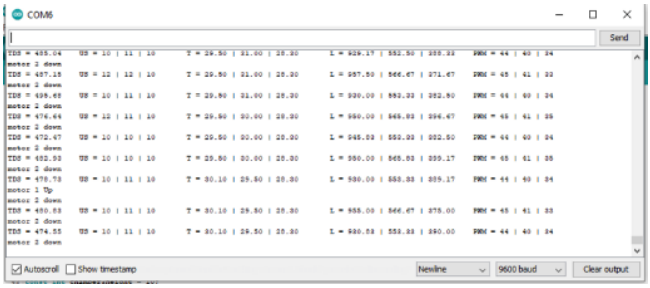


Chamber 1

Chamber 2

Chamber 3

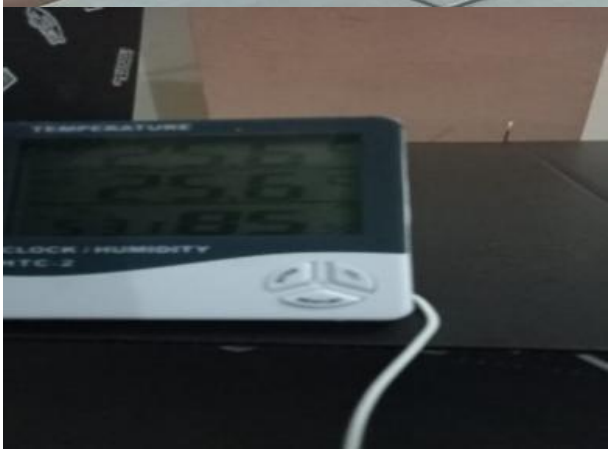
Hari 2



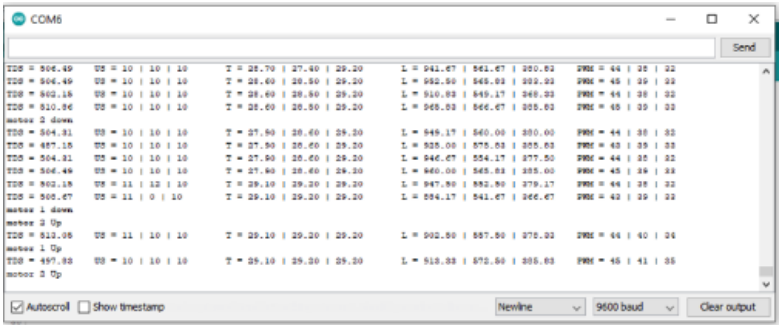
Chamber 1

Chamber 2

Chamber 3



Hari 3



Chamber 1

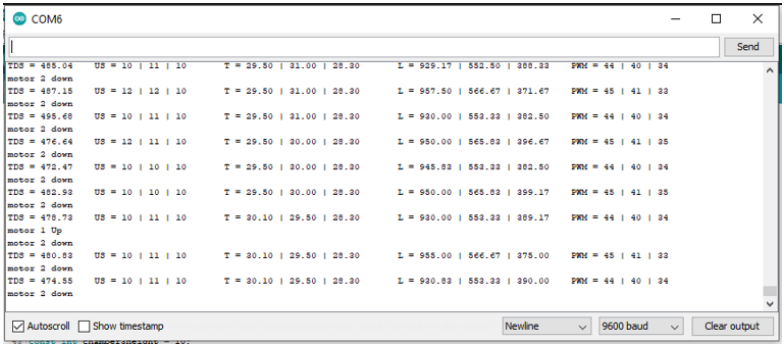
Chamber 2

SANFIX LX-1010BS
DIGITAL LUX METER
54

TEMPERATURE
21.9
26.8
77
CLOCK HUMIDITY

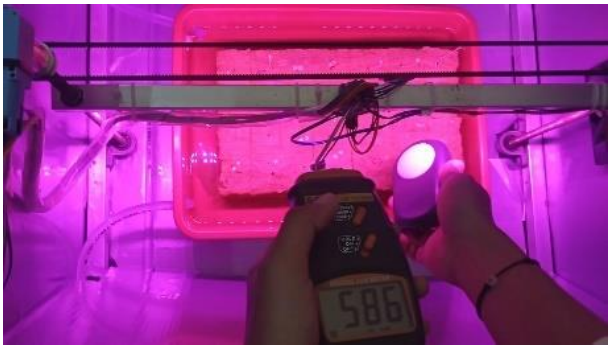
Chamber 3

Hari 4:

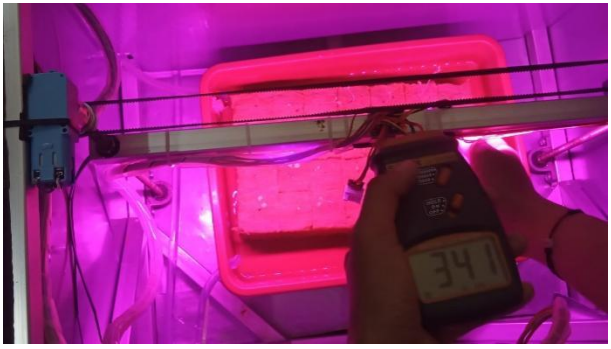


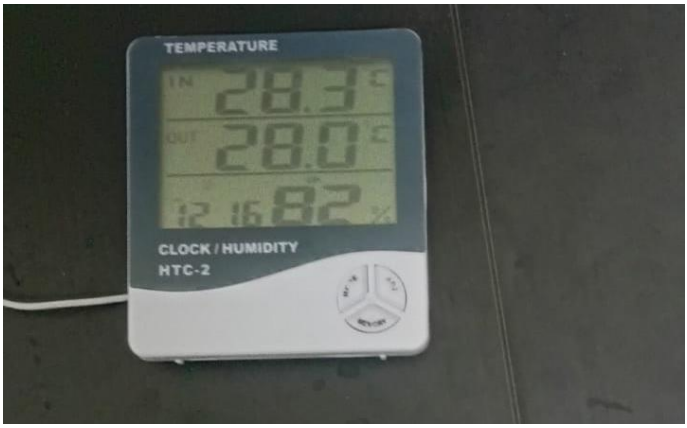
Chamber 1

Chamber 2

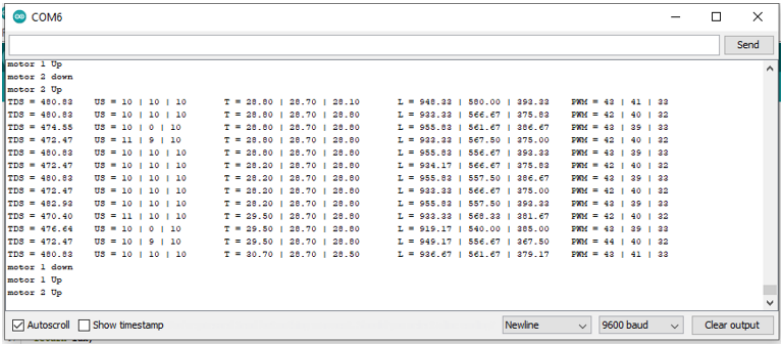


Chamber 3





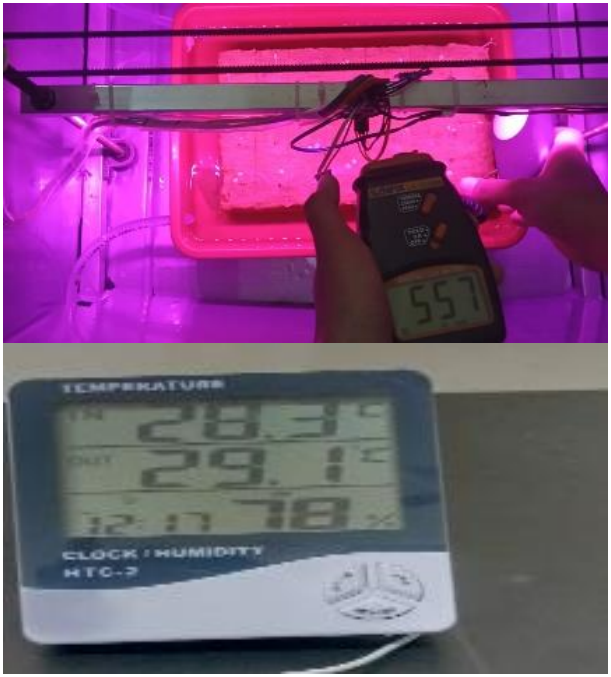
Hari 5



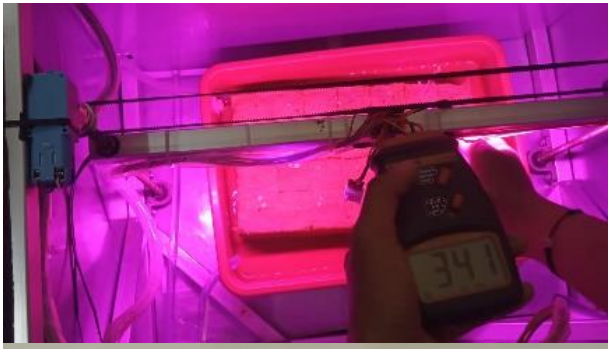
Chamber 1

TEMPERATURE
IN
28.3
OUT
29.3
12 16 79
CLOCK / HUMIDITY
HTC-2

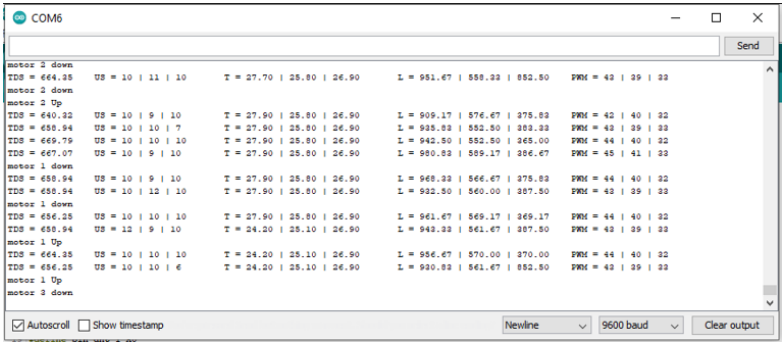
Chamber 2


557
TEMPERATURE
IN
28.3
OUT
29.1
12 17 78
CLOCK / HUMIDITY
HTC-2

Chamber 3



Hari 6



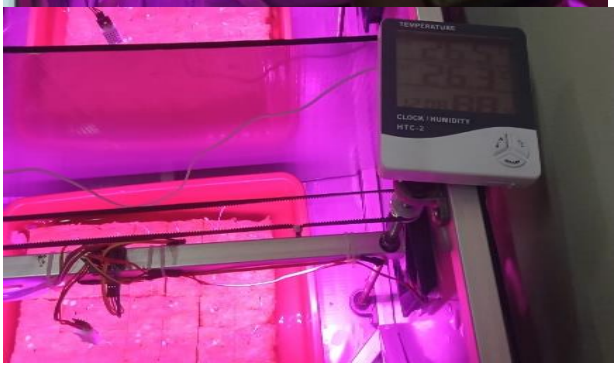
Chamber 1

Chamber 2

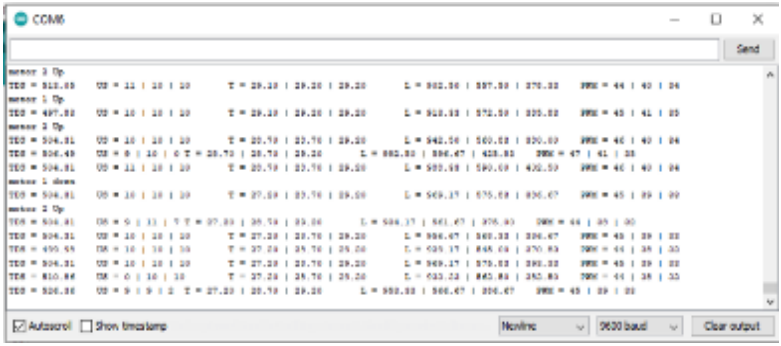
TEMPERATURE
CLOCK HUMIDITY

Chamber 3

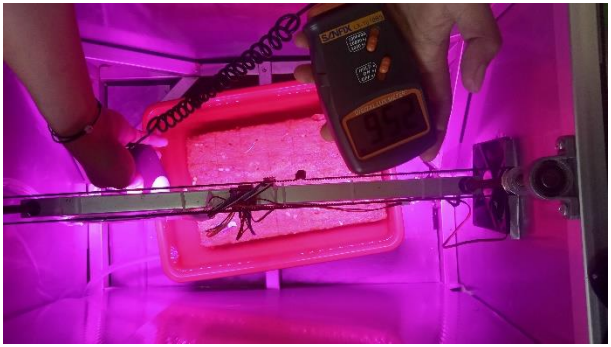
320


TEMPERATURE
CLOCK HUMIDITY
HTC-2

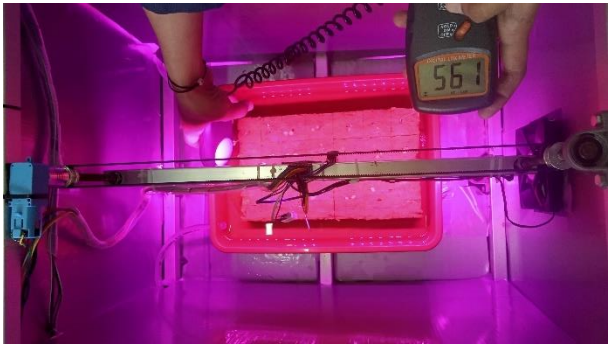
Hari 7



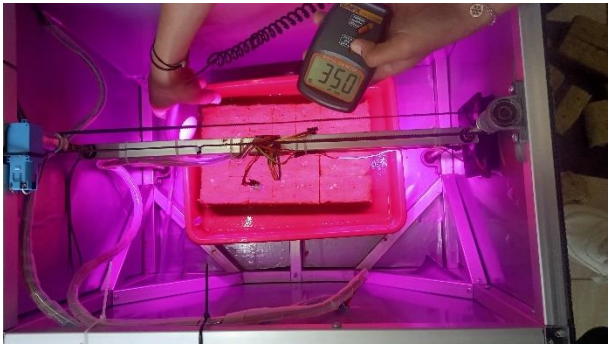
Chamber 1



Chamber 2

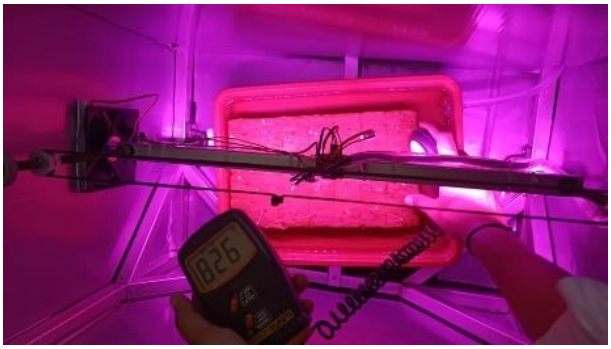


Chamber 3

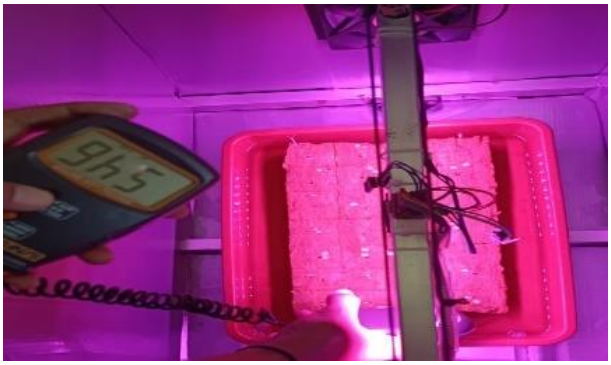


Hari 8

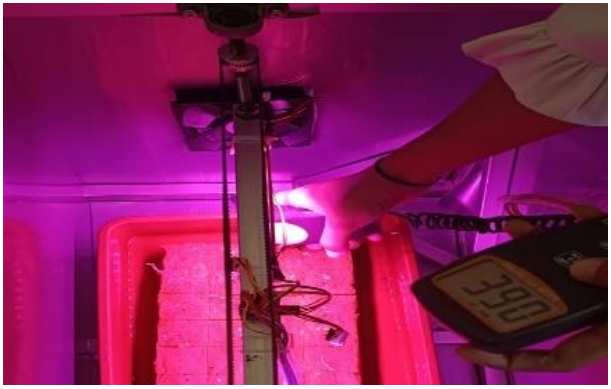
Chamber 1



Chamber 2

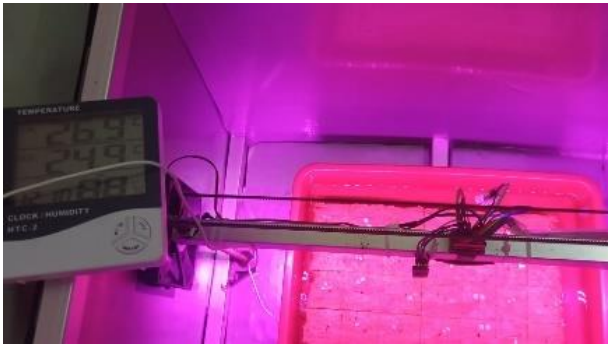


Chamber 3

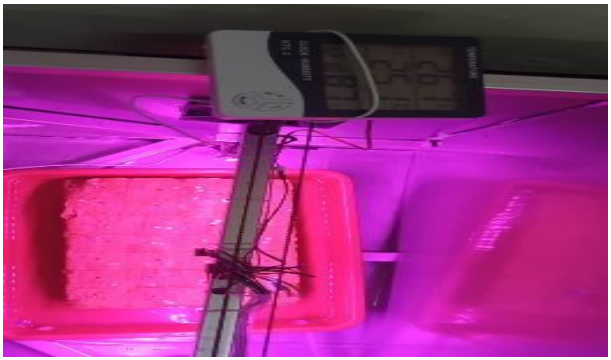


Chamber 1

Chamber 2



Chamber 3

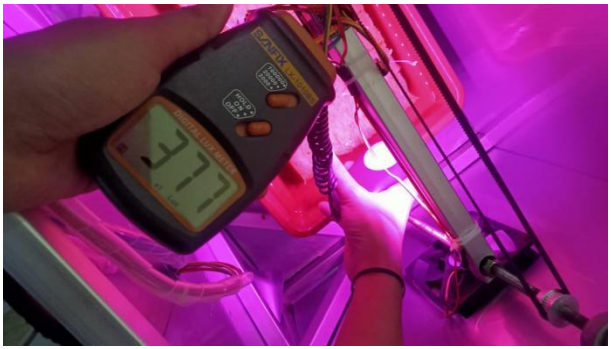


Hari 9

Chamber 1

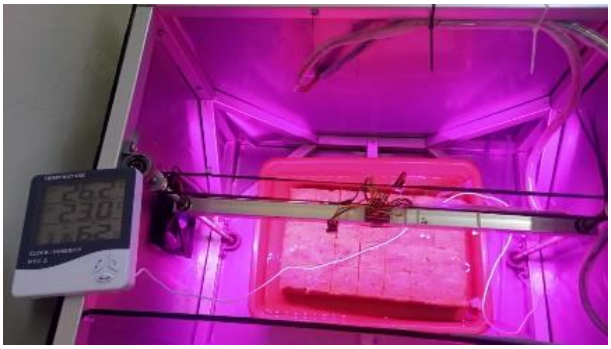
Chamber 2

Chamber 3



Chamber 1

Chamber 2



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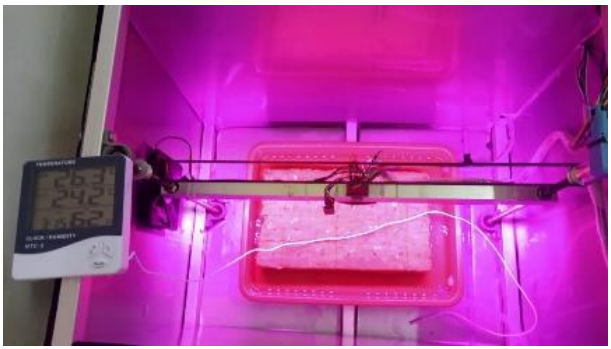
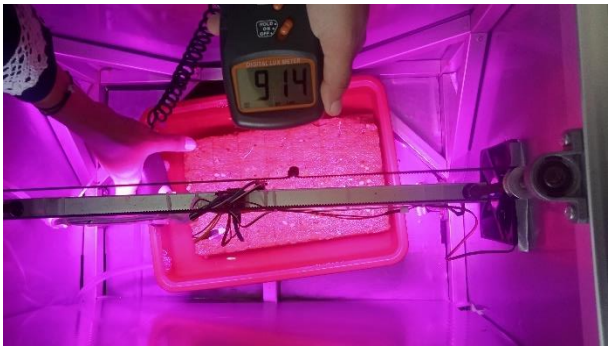


Hari 10

Chamber 1



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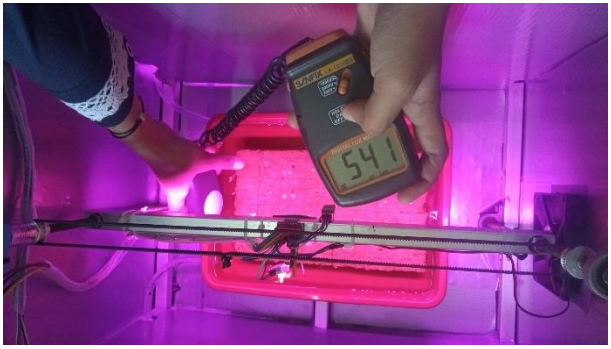
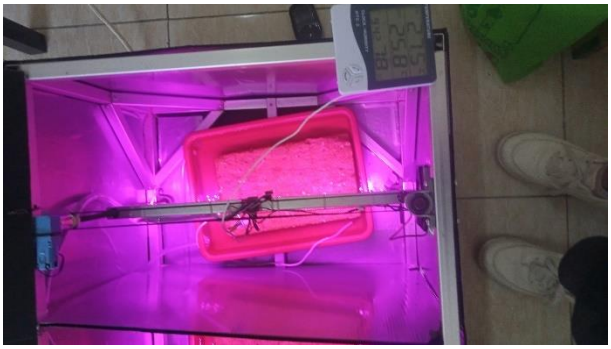


Chamber 3

Chamber 1



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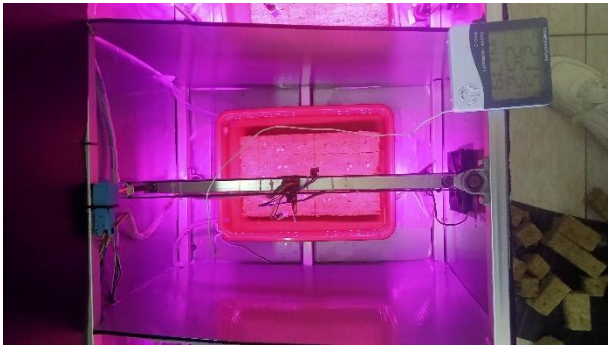
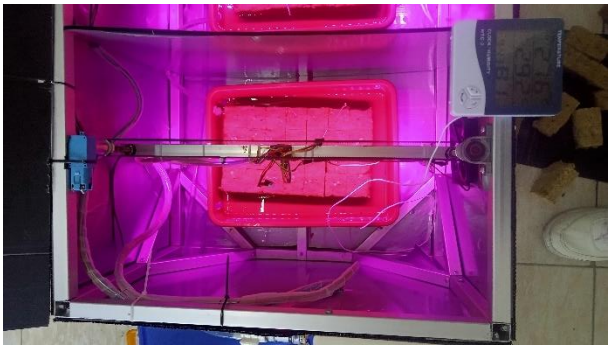
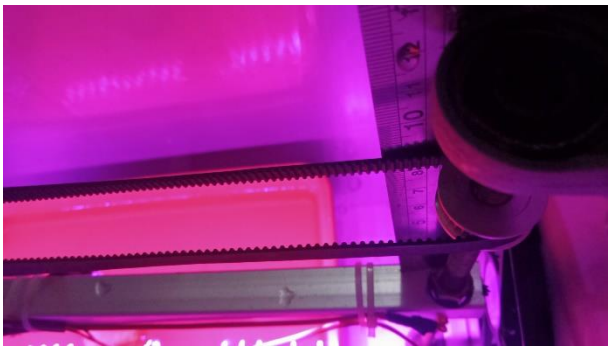
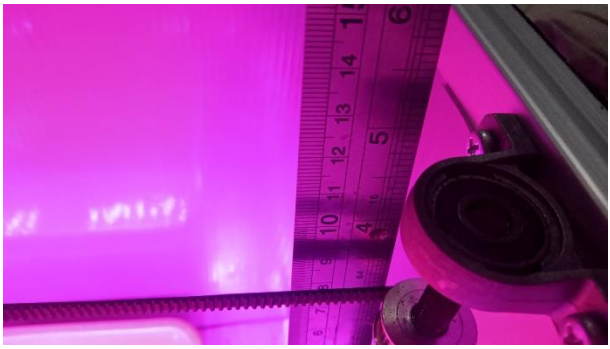


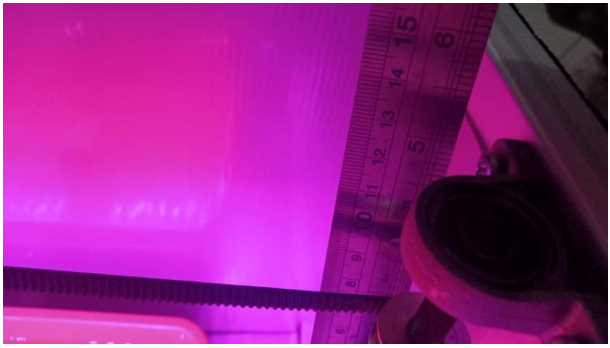
Chamber 3



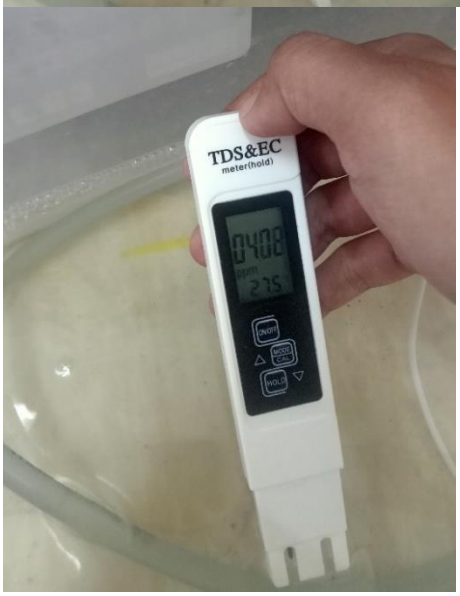
Pengujian sensor ultrasonik







Pengujian sensor TDS



0646

0642

TDS&EC
meter(hold)
ON/OFF
MODE
CAL
HOLD

BIODATA PENULIS

Nama	:	Ratih Anisah Fatin
Tempat/tanggal Lahir	:	Cilacap,23 Desember 2002
Alamat	:	Jl. Beringin GG. Garuda No.682 RT 04/RW 03 Desa Mernek, Kecamatan Maos Kabupaten Cilacap, Jawa Tengah 53272
Telepon/Hp	:	08886924247
Hobi	:	Membaca webtoon
Motto	:	Jadikan hari kemarin sebagai pembelajaran, dan jadikan hari esok sebagai harapan.

Riwayat pendidikan

- SD Negeri Mernek 03 Tahun 2008-2014
- SMP Negeri 2 Maos Tahun 2014-2017
- SMA Negeri 1 Maos Tahun 2017-2020
- Politeknik Negeri Cilacap Tahun 2020-2023

Penulis telah mengikuti sidang Tugas Akhir pada tanggal 16 Agustus 2023 sebagai salah satu persyaratan untuk gelar Ahli Madya (A.Md).