DAFTAR PUSTAKA

Agustin, r. D. (2020). *Sistem monitoring suhu penyimpanan dan waktu fermentasi pada kematangan tape ubi jalar berbasis internet of things*. Https://sipora.polije.ac.id/id/eprint/101%0ahttps://sipora.polije.ac.id/101/4/e32170416_laporan lengkap.pdf

Al Khairi, M. H, (2021, April 22), *Mahir Elektro*, diakses pada 16 Juni 2023 dari https://www.mahirelektro.com/2020/10/perbedaan-antara-dht11-dan-dht22.html

Asnawi, m., sumarlan, s. H., & hermanto, m. B. (2013). Karakteristik tape ubi kayu (manihot utilissima) melalui proses pematangan dengan penggunaan pengontrol suhu. *J. Biopres komoditas tropis*, *1*(2), 56–66.

Berlian, z., aini, f., & ulandari, r. (2016). Uji kadar alkohol pada tapai ketan putih dan. *Jurnal biota*, *2*(1), 106–111.

Bintara, W. S (2023, Maret 2), *dianisa.com*, diakses pada 12 Juli 2023 dari https://dianisa.com/pengertian-android/

Burange, A. W., & Misalkar, H. D. (2015). Review of Internet of Things in Development of Smart Cities with Data Management & Privacy.

Chusna, F (2023, April 12), *Telecommunication*, diakses pada 21 Juli 2023 dari https://www.linknet.id/article/cloud-storage

Developer Android Studio (2023), *Developers Android Studio,* diakses pada 19 Juni 2023 dari https://developer.android.com/studio/intro?hl=id

Djunaidi, k., jatnika, h., ningrum, r. F., & kabidoyo, w. S. C. (2019). Alat pendeteksi dan monitoring kematangan tape. *Petir*, *12*(2), 222–230. Https://doi.org/10.33322/petir.v12i2.531

Erintafifah, (2021, Oktober 8), *KMtek,* diakses pada 13 Juli 2023 dari https://www.kmtech.id/post/mengenal-perangkat-lunak-arduino-ide

Iqbal, Muhammad (2022, Maret 11), *Telkom University*, diakses pada 14 Juli 2023 dari https://miqbal.staff.telkomuniversity.ac.id/mikrokontroler-esp32/

Islami, r. (2018). *Pembuatan ragi tape dan tape*. 56–63.

Juliarto, Rendi (2020, November 25), *Dicoding Intern*, diakses pada 22 Juli 2023 dari https://www.dicoding.com/blog/apa-itu-firebase-pengertian-jenis-jenis-dan-fungsi-kegunaannya/

Kanino, d. (2019). Pengaruh konsentrasi ragi pada pembuatan tape ketan (the effect of yeast concentration on making tape ketan. *Pengaruh konsentrasi ragi pada pembuatan tape ketan (the effect of yeast concentration on making tape ketan*, *2 no 1*, 64–71. Https://journal.unhas.ac.id/index.php/jppa/issue/view/700

Men, Badell (2016), *kapalomen*, diakses pada 12 Juli 2023 dari http://www.kapalomen.com/2016/11/android-komponen-aplikasi-android.html

N. Azizah, al-baarri, a. N., & mulyani, s. (2012). *Pengaruh lama fermentasi terhadap kadar alkohol , ph , dan produksi gas pada proses fermentasi bioetanol dari whey dengan substitusi kulit nanas*. *1*(2), 72–77.

Negara, m. K., wirawan, r., & qomariyah, n. (2020). Rancang bangun sistem monitoring gas alkohol pada fermentasi ketan berbasis sensor tgs 2620. *Orbita: jurnal kajian, inovasi dan aplikasi pendidikan fisika*, *6*(2), 235. Https://doi.org/10.31764/orbita.v6i2.3166

Oriza, (2022, Agustus 31), *Idmetafora*, diases pada 15 Juli 2023 dari https://idmetafora.com/news/read/701/Mengenal-Android-Studio-Pengertian-Manfaat-fitur-dan-Cara-Install.html

Prastyo, E. A, (2020), *Edukasi Elektronika*, diakses pada 17 Juni 2023 dari https://www.edukasielektronika.com/2020/10/mq-3-gas-sensor-alcohol-ethanol-smoke.html

Prastyo, E. A (2022, November 21), *Arduino Indonesia*, diakses pada 23 Juli 2023 dari https://www.arduinoindonesia.id/2022/11/pengertian-jenis-dan-cara-kerja-kabel-jumper-arduino.html

Prastyo, E. A (2022, Oktober 24), *Arduino Indonesia*, diakses pada 29 Juli 2023 dari https://www.arduinoindonesia.id/2022/10/pengertian-dan-prinsip-kerja-motor-servo.html

Sani, s. P., & dahlan, a. A. (2022). *Perancangan sistem untuk monitoring suhu dan kadar alkohol pada fermentasi tape ketan berbasis iot*. *11*(2), 46–51.

Simanjuntak, a. Y. M., & subagyo, r. (2019). Analisis hasil fermentasi pembuatan bioetanol dengan. *Sjme kinematika*, *4*(2), 79–90.

Surya merta, i. G., widagda, i. G. A., & alit paramarta, i. B. (2017). Perancangan

alat ukur kadar alkohol menggunakan sensor mq-3 berbasis mikrokontroler atmega16. *Buletin fisika*, *18*(2), 74. Https://doi.org/10.24843/bf.2017.v18.i02.p06

Virgin, j. (2015). *Kadar etanol dalam tape sebagai hasil fermentasi beras ketan (oryza sativa glutinosa) dengan saccaromyces cerevisiae*. 16–1

LAMPIRAN

Lampiran *Source Code* Arduino IDE

```
#include <ESP32Servo.h>
#include <WiFi.h>
#include <FirebaseESP32.h>
#include <NTPClient.h>
#include <WiFiUdp.h>
#include "DHT.h"


#define DHTPIN 26     // what digital pin we're connected to
#define DHTTYPE DHT22   // DHT 22  (AM2302), AM2321
#define servoPin 18
#define mq3Pin 33

Servo myservo;  // create servo object to control a servo
// 16 servo objects can be created on the ESP32

int pos = 0;

WiFiUDP ntpUDP;
NTPClient timeClient(ntpUDP, "pool.ntp.org");

//Week Days
String weekDays[7] = { "Minggu", "Senin", "Selasa", "Rabu", "Kamis",
"Jumat", "Sabtu" };

//Month names
String months[12] = { "Januari", "Februari", "Maret", "April",
"Mei", "Juni", "Juli", "Agustus", "September", "Oktober",
"November", "Desember" };

#define FIREBASE_HOST "fenta-app-2023-default-rtdb.asia-
southeast1.firebasedatabase.app" //menghubungkan nodemcu ke firebase
#define FIREBASE_AUTH "iuwZMvm5ibgTuNuQwEI7CQ1g3MRc0ZkFx1ioMuJV"
//menghubungkan nodemcu ke firebase
#define WIFI_SSID "NEKO" //Menghubungkan internet ke nodemcu ESP32
#define WIFI_PASSWORD "nekoeiko" //Menghubungkan internet ke nodemcu
ESP32

#define GMT_OFFSET 8

FirebaseData firebaseData;
int currentYear = 0;
```

```
time_t epochTime;
String weekDay, formattedTime, currentDate, waktu;

DHT dht(DHTPIN, DHTTYPE);

int adcAlkohol = 0;

String kondisi = "-";

long startingTime = 120000;
long batasHari = 3;
long batasWaktu = batasHari * 86400 * 1000;

float batasSuhuAtas = 40.0;
float batasSuhuBawah = 35.0;

void setup() {
  Serial.begin(115200);
  konekWifi();
  setWaktu();
  Firebase.begin(FIREBASE_HOST, FIREBASE_AUTH);
  dht.begin();

  ESP32PWM::allocateTimer(0);
  ESP32PWM::allocateTimer(1);
  ESP32PWM::allocateTimer(2);
  ESP32PWM::allocateTimer(3);
  myservo.setPeriodHertz(50);    // standard 50 hz servo
  myservo.attach(servoPin, 1000, 2000);
     myservo.write(120);
      delay(1000);
      myservo.write(0);
}
void loop() {
  long sekarang = millis();
  getWaktu();
  float t = dht.readTemperature();
   if (isnan(t)) {
    Serial.println(F("Failed to read from DHT sensor!"));
    return;
  }
  adcAlkohol  = analogRead(mq3Pin);
  float persenAlkohol = map(adcAlkohol, 0, 4095, 0, 100);
  Serial.print("MQ : ");
  Serial.println(adcAlkohol);
  delay(1000);
  if(kondisi == "-"){
```

```
    kondisi = "STARTING";
    addHistori(0, 0.0, kondisi);
  }
  if(sekarang > startingTime){
    if(sekarang <= batasWaktu){

     if(t > batasSuhuAtas){
      kondisi = "Wadah Terbuka";
      myservo.write(120);
    }else if(t <= batasSuhuAtas && t >= batasSuhuBawah){
      kondisi = "Suhu Optimal";
      myservo.write(0);
    }else{
      kondisi = "Fermentasi Berlangsung";
      myservo.write(0);
     }
    }else{
      if(t > batasSuhuAtas){
         myservo.write(120);
      }else{
         myservo.write(0);
      }
      if(t > batasSuhuBawah){
        kondisi = "Fermentasi Berhasil";
      }else{
        kondisi  = "Fermentasi Gagal";
      }
    }
  }else{
    return;
  }
  addHistori(persenAlkohol, t, kondisi);  //memasukkan data alkohol
ke history
  delay(15000);
}

void konekWifi() {
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
  Serial.print("Connecting WiFi");
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println();
  Serial.print("WiFi Connected to : ");
  Serial.println(WIFI_SSID);
  Serial.print("IP Address : ");
```

```
  Serial.println(WiFi.localIP());
  delay(1000);
}
  //  Serial.println("Sukses terkoneksi wifi!");
  //  Serial.println("IP Address:"); //alamat ip lokal
  //  Serial.println(WiFi.localIP());

//Kode untuk menambahkan data sensor ke history
void addHistori(float alkohol, float suhu, String kondisi) {
  FirebaseJson json;

  json.set("alkohol", alkohol);
  json.set("suhu", suhu);
  json.set("status", kondisi);
  json.set("waktu", waktu);

  if (Firebase.updateNode(firebaseData, "/current", json)) {
    Serial.println(firebaseData.dataPath());
    Serial.println(firebaseData.pushName());
    Serial.println(firebaseData.dataPath() + "/" +
firebaseData.pushName());
  } else {
    Serial.println(firebaseData.errorReason());
  }
  if (Firebase.pushJSON(firebaseData, "/histori", json)) {
    Serial.println(firebaseData.dataPath());
    Serial.println(firebaseData.pushName());
    Serial.println(firebaseData.dataPath() + "/" +
firebaseData.pushName());
  } else {
    Serial.println(firebaseData.errorReason());
  }
}
//END kode penambahan data ke history

//Kode mendapatkan data waktu
void getWaktu() {
  timeClient.update();
  epochTime = timeClient.getEpochTime();
  String tStamp = String(epochTime);
  formattedTime = timeClient.getFormattedTime();
  int currentHour = timeClient.getHours();
  int currentMinute = timeClient.getMinutes();
  int currentSecond = timeClient.getSeconds();
  weekDay = weekDays[timeClient.getDay()];
  struct tm *ptm = gmtime((time_t *)&epochTime);
  int monthDay = ptm->tm_mday;
```

```
  int currentMonth = ptm->tm_mon + 1;
  String currentMonthName = months[currentMonth - 1];

  currentYear = ptm->tm_year + 1900;

  //Print complete date:
  currentDate = String(monthDay) + "-" + String(currentMonth) + "-"
+ String(currentYear);

  waktu = weekDay + ", " + currentDate + " " + formattedTime + "
WITA";

  Serial.print("->GetWaktu: ");
  Serial.println(waktu);
}
//END kode utk mendapatkan data waktu

void setWaktu() {

  // Initialize a NTPClient to get time
  timeClient.begin();
  // Set offset time in seconds to adjust for your timezone, for
example:
  // GMT +1 = 3600
  // GMT +8 = 28800
  // GMT -1 = -3600
  // GMT 0 = 0

  timeClient.setTimeOffset(GMT_OFFSET * 3600);
}
```

Lampiran *Source Code Android Studio*

activity_main. merupakan *sorce code* untuk desain tampilan utama.

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    tools:context=".MainActivity">


    <androidx.cardview.widget.CardView
        android:layout_width="match_parent"
        android:layout_height="110dp"
        android:backgroundTint="#2B2B2B">

        <ImageButton
            android:id="@+id/btn_menu"
            android:layout_marginTop="8dp"
            android:layout_marginStart="8dp"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:background="@drawable/ic_menu"
            android:onClick="showPopup" />

        <TextView
            android:id="@+id/textView4"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_gravity="center"
            android:fontFamily="sans-serif-condensed"
            android:text="FENTA"
            android:textColor="@color/white"
            android:textSize="30sp" />
    </androidx.cardview.widget.CardView>

    <androidx.cardview.widget.CardView
        android:id="@+id/mid"
        android:layout_marginTop="85dp"
        android:layout_marginStart="35dp"
        android:layout_marginEnd="35dp"
        android:layout_marginBottom="50dp"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        app:cardCornerRadius="30dp"
        app:cardElevation="50dp">

        <ScrollView
            android:layout_width="match_parent"
            android:layout_height="match_parent">

            <LinearLayout
                android:layout_width="match_parent"
                android:layout_height="match_parent"
                android:layout_margin="10dp"
```

```
                android:orientation="vertical">

                <TextView
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:layout_marginTop="20dp"
                    android:layout_marginBottom="8dp"
                    android:fontFamily="sans-serif-condensed"
                    android:gravity="center"
                    android:text="SUHU UDARA"
                    android:textColor="@color/black"
                    android:textSize="20sp"/>

                <androidx.cardview.widget.CardView
                    android:layout_width="match_parent"
                    android:layout_height="60dp"
                    android:layout_marginLeft="8dp"
                    android:layout_marginRight="8dp"
                    android:layout_marginBottom="8dp"
                    android:backgroundTint="#2b2b2b"
                    app:cardCornerRadius="15dp"
                    app:cardElevation="10dp">

                    <TextView
                        android:id="@+id/suhu_text_view"
                        android:layout_width="match_parent"
                        android:layout_height="match_parent"
                        android:fontFamily="sans-serif-condensed"
                        android:gravity="center"
                        android:textColor="@color/white"
                        android:textSize="24sp" />

                </androidx.cardview.widget.CardView>

                <TextView
                    android:layout_width="match_parent"
                    android:layout_height="wrap_content"
                    android:layout_marginTop="20dp"
                    android:layout_marginBottom="8dp"
                    android:fontFamily="sans-serif-condensed"
                    android:gravity="center"
                    android:text="KADAR ALKOHOL"
                    android:textColor="@color/black"
                    android:textSize="20sp"/>

                <androidx.cardview.widget.CardView
                    android:layout_width="match_parent"
                    android:layout_height="60dp"
                    android:layout_marginLeft="8dp"
                    android:layout_marginRight="8dp"
                    android:layout_marginBottom="8dp"
                    android:backgroundTint="#2b2b2b"
                    app:cardCornerRadius="15dp"
                    app:cardElevation="10dp">

                    <TextView
                        android:id="@+id/kadar_alkohol_text_view"
                        android:layout_width="match_parent"
                        android:layout_height="match_parent"
```

```
                android:fontFamily="sans-serif-condensed"
                android:gravity="center"
                android:textColor="@color/white"
                android:textSize="24sp" />

        </androidx.cardview.widget.CardView>

        <TextView
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="20dp"
            android:layout_marginBottom="8dp"
            android:fontFamily="sans-serif-condensed"
            android:gravity="center"
            android:text="REAL TIME CONDITION"
            android:textColor="@color/black"
            android:textSize="20sp" />

        <androidx.cardview.widget.CardView
            android:layout_width="match_parent"
            android:layout_height="60dp"
            android:layout_marginLeft="8dp"
            android:layout_marginRight="8dp"
            android:layout_marginBottom="8dp"
            android:backgroundTint="#2b2b2b"
            app:cardCornerRadius="15dp"
            app:cardElevation="10dp">

            <TextView
        android:id="@+id/realtime_condition_text_view"
                android:layout_width="match_parent"
                android:layout_height="match_parent"
                android:fontFamily="sans-serif-condensed"
                android:gravity="center"
                android:textColor="@color/white"
                android:textSize="24sp" />

        </androidx.cardview.widget.CardView>

        <TextView
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginTop="20dp"
            android:layout_marginBottom="8dp"
            android:fontFamily="sans-serif-condensed"
            android:gravity="center"
            android:text="LAST UPDATE"
            android:textColor="@color/black"
            android:textSize="20sp" />

        <androidx.cardview.widget.CardView
            android:layout_width="match_parent"
            android:layout_height="60dp"
            android:layout_marginLeft="8dp"
            android:layout_marginRight="8dp"
            android:layout_marginBottom="16dp"
            android:backgroundTint="#2b2b2b"
            app:cardCornerRadius="15dp"
            app:cardElevation="10dp">
```

```
                    <TextView
                        android:id="@+id/last_update_text_view"
                        android:layout_width="match_parent"
                        android:layout_height="match_parent"
                        android:fontFamily="sans-serif-condensed"
                        android:gravity="center"
                        android:textColor="@color/white"
                        android:textSize="24sp" />

                </androidx.cardview.widget.CardView>
            </LinearLayout>
        </ScrollView>
    </androidx.cardview.widget.CardView>

    <Button
        android:id="@+id/dData"
        android:layout_width="300dp"
        android:layout_height="60dp"
        android:layout_alignParentBottom="true"
        android:layout_centerInParent="true"
        android:layout_marginTop="60dp"
        android:layout_marginBottom="60dp"
        android:backgroundTint="#2b2b2b"
        android:fontFamily="sans-serif-condensed"
        android:text="Download Data"
        android:textSize="24sp" />

</RelativeLayout>
```

activity_list.xml merupakan *sorce code* untuk desain histori

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".ListActivity">

    <androidx.cardview.widget.CardView
        android:layout_width="match_parent"
        android:layout_height="110dp"
        android:backgroundTint="#2B2B2B">

        <ImageButton
            android:id="@+id/btn_menu"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginStart="8dp"
            android:layout_marginTop="8dp"
            android:background="@drawable/ic_menu"
            android:onClick="showPopup" />

        <TextView
            android:id="@+id/textView4"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_gravity="center"
            android:fontFamily="sans-serif-condensed"
            android:text="FENTA"
            android:textColor="@color/white"
            android:textSize="30sp" />
    </androidx.cardview.widget.CardView>

    <androidx.cardview.widget.CardView
        android:id="@+id/mid"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginStart="35dp"
        android:layout_marginTop="85dp"
        android:layout_marginEnd="35dp"
        android:layout_marginBottom="50dp"
        app:cardCornerRadius="30dp"
        app:cardElevation="50dp">

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:layout_margin="10dp"
            android:orientation="vertical">

            <androidx.recyclerview.widget.RecyclerView
                android:id="@+id/rv_data"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_marginTop="4dp"
                android:layout_marginBottom="10dp"
```

```
                tools:listitem="@layout/item_card" />


        </LinearLayout>
    </androidx.cardview.widget.CardView>
```

item_card.xml merupakan *sorce code* untuk desain item pada histori

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.cardview.widget.CardView
xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:backgroundTint="#2b2b2b"
    android:layout_margin="8dp"
    app:cardCornerRadius="15dp"
    app:cardElevation="10dp">

    <RelativeLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent">

        <TextView
            android:id="@+id/tv_tanggal"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_marginStart="8dp"
            android:layout_marginTop="8dp"
            android:fontFamily="sans-serif-condensed"
            android:gravity="start"
            android:textColor="@color/white"
            android:text="Tanggal" />

        <TextView
            android:id="@+id/tv_jam"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_marginStart="8dp"
            android:layout_marginTop="8dp"
            android:layout_marginEnd="8dp"
            android:layout_toEndOf="@id/tv_tanggal"
            android:fontFamily="sans-serif-condensed"
            android:gravity="end"
            android:textColor="@color/white"
            android:text="Jam" />

        <TextView
            android:id="@+id/tv_alkohol"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_below="@id/tv_tanggal"
            android:layout_marginStart="8dp"
            android:textColor="@color/white"
            android:layout_marginTop="8dp"
            android:fontFamily="sans-serif-condensed"
            android:gravity="start"
            android:text="Kadar Alkohol" />

        <TextView
            android:id="@+id/tv_suhu"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_below="@id/tv_jam"
            android:layout_marginStart="8dp"
```

```
            android:textColor="@color/white"
            android:layout_marginTop="8dp"
            android:layout_marginEnd="8dp"
            android:layout_toEndOf="@id/tv_alkohol"
            android:fontFamily="sans-serif-condensed"
            android:gravity="end"
            android:text="Suhu" />

        <TextView
            android:id="@+id/tv_kondisi"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:layout_below="@id/tv_alkohol"
            android:layout_marginStart="8dp"
            android:layout_marginTop="8dp"
            android:layout_marginEnd="8dp"
            android:layout_marginBottom="8dp"
            android:fontFamily="sans-serif-condensed"
            android:gravity="center"
            android:text="Kondisi"
            android:textColor="@color/white"
            android:textSize="12sp"
            android:textStyle="bold" />
    </RelativeLayout>
</androidx.cardview.widget.CardView>
```

menu_main.xlm merupakan *sorce code* untuk dsain tampilan menu

```
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android">
    <item
        android:id="@+id/menu_home"
        android:title="Home" />
    <item
        android:id="@+id/menu_list"
        android:title="List Item" />
    <item
        android:id="@+id/menu_keluar"
        android:title="Keluar" />
</menu>
```

Data.java merupakan *sorce code* data realtime dari *firebase* yang akan ditampilkan

```
package ta.skripsi;

public class Data {
    private double suhu;
    private double alkohol;
    private String status;
    private String waktu;

    public Data() {
        // kosong, diperlukan untuk Firebase Realtime Database
    }

    public Data(double suhu, double alkohol, String status, String
waktu) {
        this.suhu = suhu;
        this.alkohol = alkohol;
        this.status = status;
        this.waktu = waktu;
    }
    public double getSuhu() {
        return suhu;
    }

    public void setSuhu(double suhu) {
        this.suhu = suhu;
    }

    public double getAlkohol() {
        return alkohol;
    }

    public void setAlkohol(double alkohol) {
        this.alkohol = alkohol;
    }

    public String getStatus() {
        return status;
    }

    public void setStatus(String status) {
        this.status = status;
    }

    public String getWaktu() {
        return waktu;
    }

    public void setWaktu(String waktu) {
        this.waktu = waktu;
    }

}
```

DataAdaper.java merupakan *sorce code* yang mengatur format data

```
package ta.skripsi;


import android.text.Spannable;
import android.text.SpannableString;
import android.text.style.RelativeSizeSpan;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.TextView;

import androidx.annotation.NonNull;
import androidx.recyclerview.widget.RecyclerView;

import java.util.List;

public class DataAdapter extends
RecyclerView.Adapter<DataAdapter.ViewHolder> {
    private List<Data> dataList;

    public DataAdapter(List<Data> dataList) {
        this.dataList = dataList;
    }

    @NonNull
    @Override
    public ViewHolder onCreateViewHolder(@NonNull ViewGroup
parent, int viewType) {
        View view =
LayoutInflater.from(parent.getContext()).inflate(R.layout.item_car
d, parent, false);
        return new ViewHolder(view);
    }

    @Override
    public void onBindViewHolder(@NonNull ViewHolder holder, int
position) {

        Data data = dataList.get(position);
        // Format suhu dengan satu desimal dan satuan °C
        String suhuText = String.format("Suhu: %.1f °C",
data.getSuhu());

        // Membuat objek SpannableString untuk tampilan suhu
        SpannableString spannableSuhuString = new
SpannableString(suhuText);

        // Mengatur ukuran font untuk teks "Suhu:"
        spannableSuhuString.setSpan(new RelativeSizeSpan(1.0f), 0,
5, Spannable.SPAN_EXCLUSIVE_EXCLUSIVE);

        // Mengatur ukuran font untuk nilai suhu
        spannableSuhuString.setSpan(new RelativeSizeSpan(1.5f), 6,
suhuText.length(), Spannable.SPAN_EXCLUSIVE_EXCLUSIVE);

        // Mengaplikasikan SpannableString ke TextView
        holder.tvSuhu.setText(spannableSuhuString);
```

```
        String alkoholText = String.format("Alkohol: %.1f %%",
data.getAlkohol());
        SpannableString spannableAlkoholString = new
SpannableString(alkoholText);

        // Setting a larger font size for "Alkohol:"
        spannableAlkoholString.setSpan(new RelativeSizeSpan(1.0f),
0, 8, Spannable.SPAN_EXCLUSIVE_EXCLUSIVE);

        // Setting a smaller font size for the alcohol value
        spannableAlkoholString.setSpan(new RelativeSizeSpan(1.5f),
9, alkoholText.length(), Spannable.SPAN_EXCLUSIVE_EXCLUSIVE);

        // Applying the SpannableString to the TextView
        holder.tvKadarAlkohol.setText(spannableAlkoholString);
        holder.tvKondisi.setText(data.getStatus());
        String waktu = data.getWaktu();
        String[] waktuSplit = waktu.split(" ");
        String tanggal = waktuSplit[1];
        String jam = waktuSplit[2];
        holder.tvTanggal.setText(tanggal);
        holder.tvJam.setText(jam);
    }


    @Override
    public int getItemCount() {
        return dataList.size();
    }

    public class ViewHolder extends RecyclerView.ViewHolder {
        private TextView tvSuhu, tvKadarAlkohol, tvKondisi, tvJam,
tvTanggal;

        public ViewHolder(@NonNull View itemView) {
            super(itemView);
            tvSuhu = itemView.findViewById(R.id.tv_suhu);
            tvKadarAlkohol =
itemView.findViewById(R.id.tv_alkohol);
            tvKondisi = itemView.findViewById(R.id.tv_kondisi);
            tvTanggal = itemView.findViewById(R.id.tv_tanggal);
            tvJam = itemView.findViewById(R.id.tv_jam);
        }
    }
}
```

ListActivity.java merupakan *sorce code* yang menghubungkan data ke tampilan histori aplikasi dalam bentuk list

```
package ta.skripsi;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.recyclerview.widget.LinearLayoutManager;
import androidx.recyclerview.widget.RecyclerView;

import android.content.Intent;
import android.os.Bundle;
import android.view.MenuItem;
import android.view.View;
import android.widget.PopupMenu;
import android.widget.Toast;

import com.google.firebase.database.DataSnapshot;
import com.google.firebase.database.DatabaseError;
import com.google.firebase.database.DatabaseReference;
import com.google.firebase.database.FirebaseDatabase;
import com.google.firebase.database.Query;
import com.google.firebase.database.ValueEventListener;

import java.util.ArrayList;
import java.util.Collections;
import java.util.List;

public class ListActivity  extends AppCompatActivity {
    private RecyclerView recyclerView;
    private List<Data> dataList;
    private DatabaseReference databaseReference;
    private DataAdapter adapter;

    public ListActivity() {
    }

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_list);
        recyclerView = findViewById(R.id.rv_data);
        recyclerView.setLayoutManager(new
LinearLayoutManager(this));
        dataList = new ArrayList<>();
        adapter = new DataAdapter(dataList);
        recyclerView.setAdapter(adapter);

        databaseReference =
FirebaseDatabase.getInstance().getReference("histori");
        databaseReference.addValueEventListener(new
ValueEventListener() {
            @Override
            public void onDataChange(@NonNull DataSnapshot
snapshot) {
                dataList.clear();
                for (DataSnapshot dataSnapshot :
snapshot.getChildren()) {
```

```
                    Data data = dataSnapshot.getValue(Data.class);
                    dataList.add(data);
                }
                Collections.reverse(dataList);
                adapter.notifyDataSetChanged();
            }

            @Override
            public void onCancelled(@NonNull DatabaseError error)
{
                Toast.makeText(ListActivity.this,
error.getMessage(), Toast.LENGTH_SHORT).show();
            }
        });
    }
    public void showPopup(View v) {
        PopupMenu popup = new PopupMenu(this, v);
        popup.setOnMenuItemClickListener(new
PopupMenu.OnMenuItemClickListener() {
            @Override
            public boolean onMenuItemClick(MenuItem item) {
                int id = item.getItemId();
                if (id == R.id.menu_home) {
                    Intent intent = new Intent(ListActivity.this,
MainActivity.class);
                    startActivity(intent);
                    return true;
                } else
                if (id == R.id.menu_list) {
                    Intent intent = new Intent(ListActivity.this,
ListActivity.class);
                    startActivity(intent);
                    return true;
                } else if (id == R.id.menu_keluar) {
                    finish();
                    return true;
                }
                return false;
            }
        });
        popup.inflate(R.menu.menu_main);
        popup.show();
    }
}
```

MainActivity.java merupakan *sorce code* yang menghubungkan data ke tampilan utama aplikasi

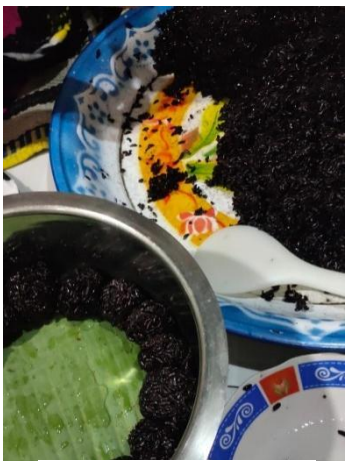
```
package ta.skripsi;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.net.Uri;
import android.os.Bundle;
import android.util.Log;
import android.view.MenuItem;
import android.view.View;
import android.widget.Button;
import android.widget.PopupMenu;
import android.widget.TextView;

import com.google.firebase.database.DataSnapshot;
import com.google.firebase.database.DatabaseError;
import com.google.firebase.database.DatabaseReference;
import com.google.firebase.database.FirebaseDatabase;
import com.google.firebase.database.Query;
import com.google.firebase.database.ValueEventListener;

public class MainActivity  extends AppCompatActivity {

    private TextView mSuhuTextView, mKadarAlkoholTextView,
mRealtimeConditionTextView, mLastUpdateTextView;
    Button downData;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        mSuhuTextView = findViewById(R.id.suhu_text_view);
        mKadarAlkoholTextView =
findViewById(R.id.kadar_alkohol_text_view);
        mRealtimeConditionTextView =
findViewById(R.id.realtime_condition_text_view);
        mLastUpdateTextView =
findViewById(R.id.last_update_text_view);
        downData = findViewById(R.id.dData);
        DatabaseReference databaseReference =
FirebaseDatabase.getInstance().getReference().child("current");
        databaseReference.addValueEventListener(new
ValueEventListener() {
            @Override
            public void onDataChange(@NonNull DataSnapshot
dataSnapshot) {
                String waktu =
dataSnapshot.child("waktu").getValue(String.class);
                String[] waktuSplit = waktu.split(" ");
                String tanggalJam = waktuSplit[1] + " / " +
waktuSplit[2];
                double suhu =
dataSnapshot.child("suhu").getValue(Double.class);
                double alkohol =
```

```
dataSnapshot.child("alkohol").getValue(Double.class);
                String status =
dataSnapshot.child("status").getValue(String.class);

                mSuhuTextView.setText(String.format("%.1f °C",
suhu));

mKadarAlkoholTextView.setText(String.format("%.1f %%", alkohol));
                mRealtimeConditionTextView.setText(status);
                mLastUpdateTextView.setText(tanggalJam);
            }
            @Override
            public void onCancelled(@NonNull DatabaseError
databaseError) {
                Log.w("TAG", "Failed to read value.",
databaseError.toException());
            }
        });
        downData.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                gotoUrl("https://fenta-app-2023-default-rtdb.asia-
southeast1.firebasedatabase.app/histori");
            }
        });
    }
    private void gotoUrl(String s){
        Uri uri = Uri.parse(s);
        startActivity(new Intent(Intent.ACTION_VIEW,uri));
    }
    public void showPopup(View v) {
        PopupMenu popup = new PopupMenu(this, v);
        popup.setOnMenuItemClickListener(new
PopupMenu.OnMenuItemClickListener() {
            @Override
            public boolean onMenuItemClick(MenuItem item) {
                int id = item.getItemId();
                if (id == R.id.menu_home) {
                    Intent intent = new Intent(MainActivity.this,
MainActivity.class);
                    startActivity(intent);
                    return true;
                } else
                if (id == R.id.menu_list) {
                    Intent intent = new Intent(MainActivity.this,
ListActivity.class);
                    startActivity(intent);
                    return true;
                } else if (id == R.id.menu_keluar) {
                    finish();
                    return true;
                }
                return false;
            }
        });
        popup.inflate(R.menu.menu_main);
        popup.show();
    }
}
```

Lampiran Dokumentasi

Proses pemasakan dan pencampuran ragi dengan ketan

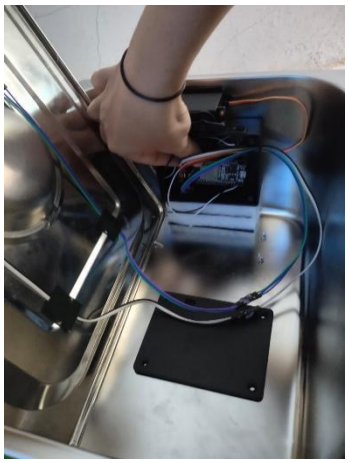
Beras dimasak



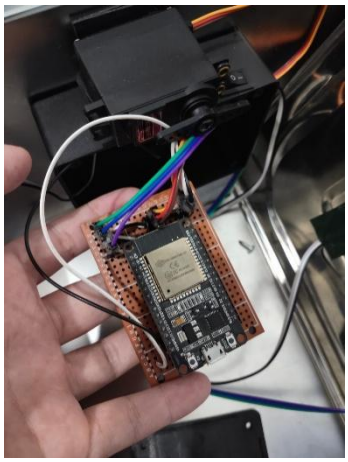
Pencampuran ragi dan ketan

Tampak tape sebelum fermentasi

Proses perakitan alat



Tampak dalam wadah



Pemasangan ESP32 di papan PCB

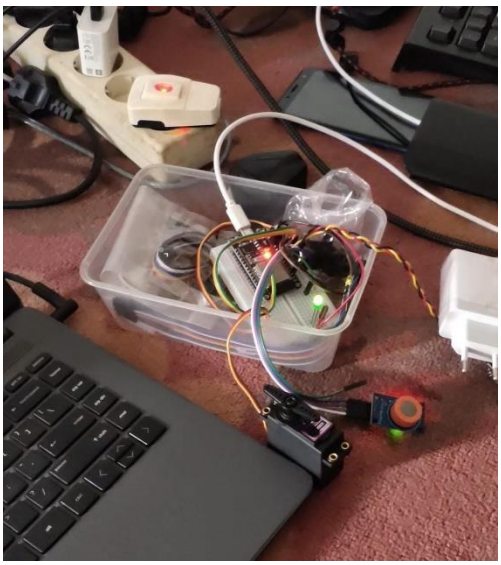
Pemasangan sensor MQ3 dan DHT22 pada tutup wadah

Pemasangan switch on off

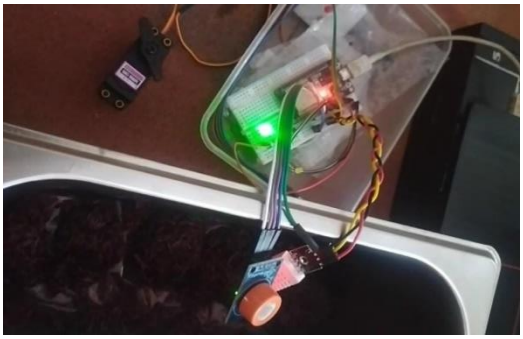
Pemasangan power suplay

Proses uji coba alat

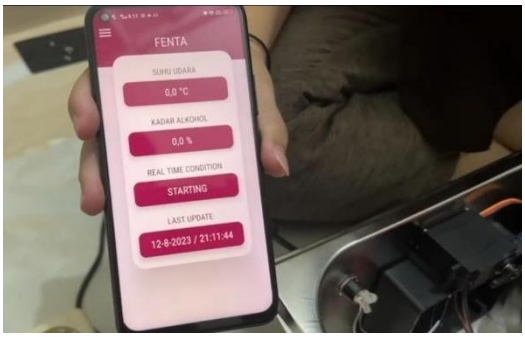
Tampilan sebelum masuk tahap fermentasi



Proses tes sambungan sensor

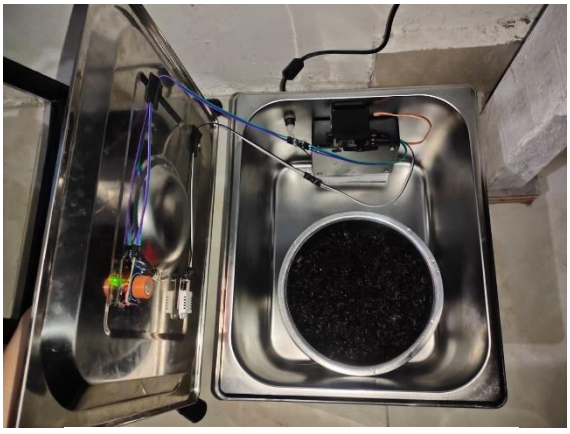


Proses uji coba sensor sebelum di tempel pada tutup wadah



Tampilan aplikasi fenta pada saat proses uji coba

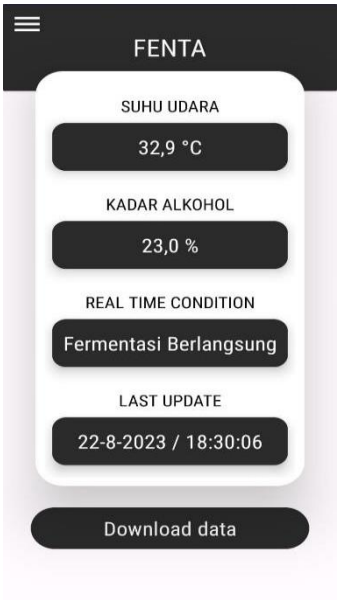
Tampilan wadah terbuka pada saat proses uji coba



Tampilan awal sebelum fermentasi

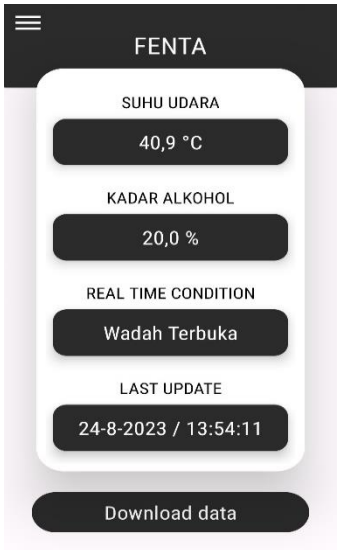
Tampilan aplikasi

Tampilan starting

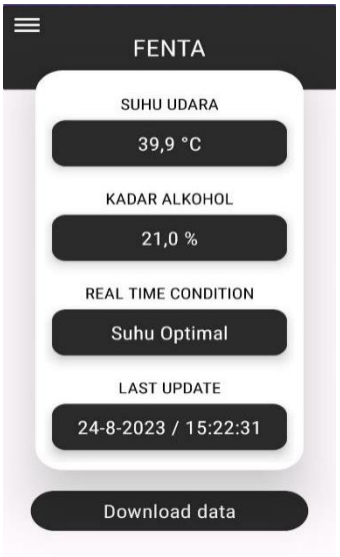


Tampilan fermentasi berlangsung

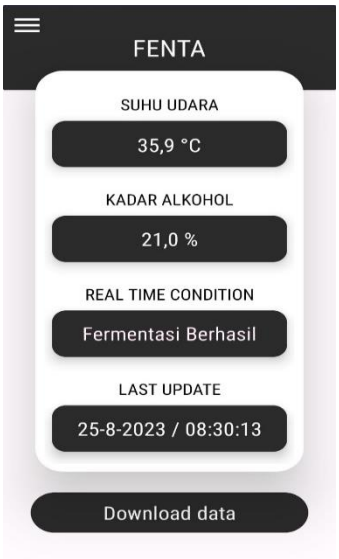
Tampilan histori



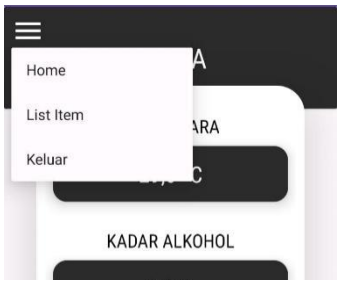
Tampilan wadah terbuka



Tampilan suhu optimal



Tampilan fermentasi berhasil



Tampilan menu