

Ferma

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<https://duckie-romeo-uncommitting.ngrok-free.dev/>

Ferma

Summary

Predicted Final Product

7.17

Actual Final Product

7.04

Risk Score (0-100)

0.0

Harvest Time (h)

1.53

Harvest timestamp: 2025-01-01 01:35:00

This estimates when
production slows down, and
harvesting won't lose yield.

Model Performance

MAE

0.1621

R²

0.9894

0.9894 (~1)= extremely strong model fit

Predict values from the
Random Forest
regression model that
learn the data and predict
trends: if the process
continues normally, the
batch will finish around
7.17 units of product.”

Actual Final Product: 7.17 predicted vs
7.04 actual (close indicate our model
predict correct)

Mean Absolute Error: Average
difference between model
predictions and real product
values. Lower is better.

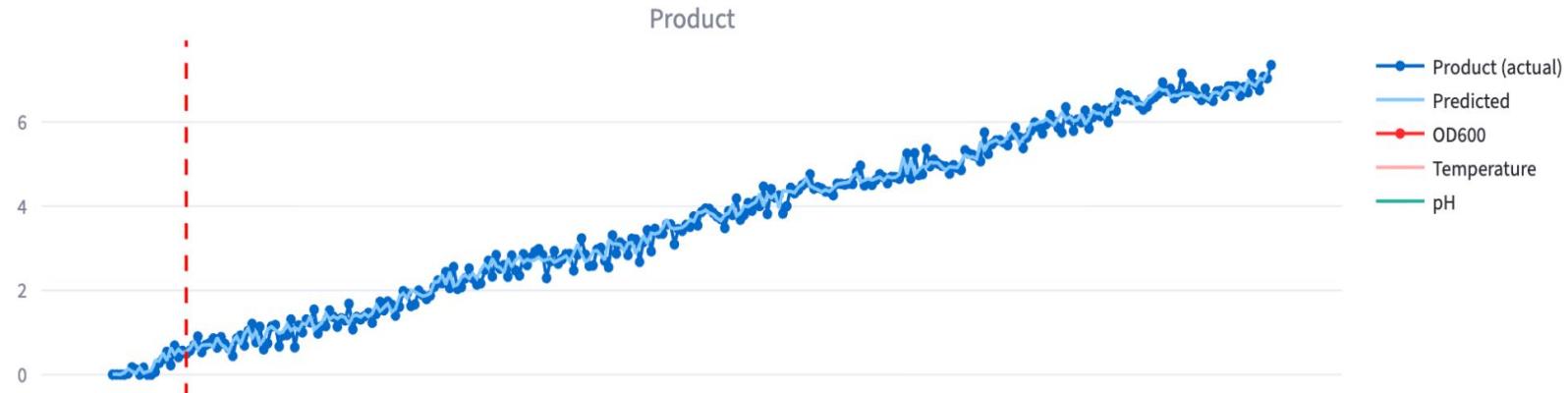
Evaluate Graphs

Blue curve (Product actual): shows how the product concentration (e.g., grams per liter) increases over time during fermentation.

-> healthy fermentation: slope **steady upward increase**

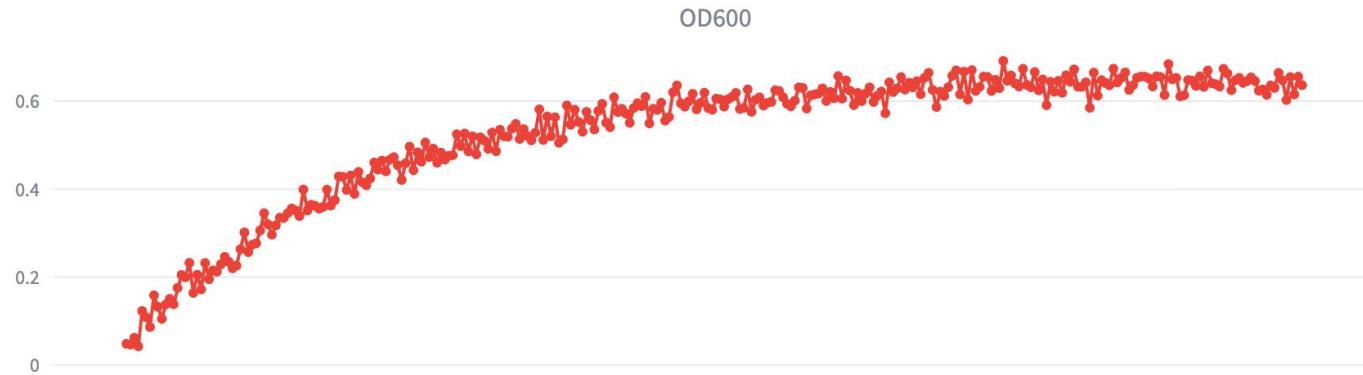


Fermentation Dashboard

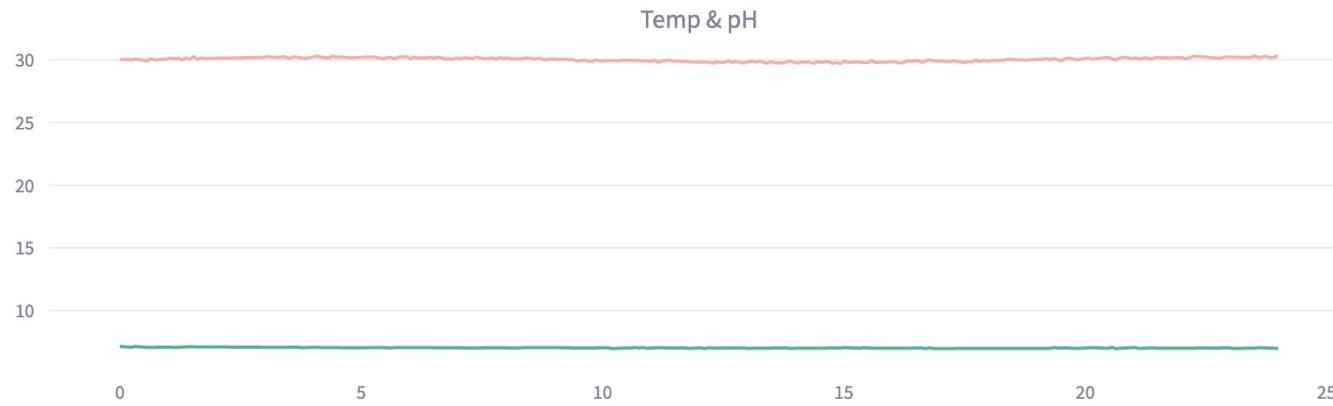


This graph shows how much product the fermentation produces over time. The model predicts the expected production. The red dashed line marks the ideal time to harvest—when producing more becomes inefficient.”

OD600 Curve (OD600 represents **cell biomass** (how much the culture has grown))



We see a strong growth profile—rapid increase followed by leveling off.
OD600 producing biomass efficiently and behaved normally.



Stable Temp:Good control

Stable PH:steady cell growth

These lines show that temperature and pH stayed nearly constant throughout fermentation

Growth Phase Distribution

```
▼ {  
    "Lag" : 145  
    "Decline" : 134  
    "Exponential" : 15  
    "Stationary" : 5  
    "Unknown" : 1  
}
```

The culture spent most of its time in the **lag phase**, had only a short **exponential phase**, and entered a long **decline phase**, indicating weak overall growth.

Temperature control was excellent (very small deviation), meaning heating/cooling systems performed well.

pH drifted by ~0.53 units, enough to stress cells and reduce metabolic efficiency.

There were **12 OD600 drop events**, suggesting mixing issues, contamination risk, or sudden environmental stress.

Risk Diagnostics

```
▼ {  
    "temp_dev" : 0.029082238651390924  
    "ph_dev" : 0.5319923158174271  
    "od_drop_events" : 12  
    "o2_slope" : 3.041244926959068  
}
```

Oxygen consumption rate (O₂ slope) was high, indicating the culture demanded oxygen quickly early on and may have become oxygen-limited later.

Overall, the batch shows **stable temperature but stressed biomass**, with signs of **pH imbalance, oxygen limitation, and insufficient growth**, explaining the short productive phase.