SSF Moisture Optimizer & Analysis Report

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Project: Agro-waste Bioprocess Optimization

Experimental Methodology

The software utilizes a dual-phase monitoring system to standardize Solid-State Fermentation (SSF):

1. **Moisture Normalization**: Adjusting sun-dried substrates (Yam/Cassava) to target moisture levels using the dry-basis equation. This ensures optimal water activity for enzyme secretion.

2. **Moisture Content Analysis (MCA)**

This module calculates the baseline hydration state of the raw agro-waste substrate. Accurate MCA is critical for downstream water activity adjustments.

The Formula:

MC (%) = [(Wet Weight - Dry Weight) / Wet Weight] x 100

Standard protocol: Substrates are typically dried at 105°C for 24 hours until constant weight is achieved.

3. **Performance Analysis**: We measure how much product we made and how fast we made it. This tells us if the experiment was efficient and worth the time.

Sample Experimental Log

Name	Category	Result A	Result B
Sample-001 (Yam)	Moisture (Yam)	900.00 ml Water	100.00 ml Inoculum
Sample-002 (Cass)	Performance	2.40 mg/g Yield	0.025 mg/g/h Speed

System Architecture & Development

This application was developed as a specialized tool for microbiology researchers to bridge the gap between raw lab data and standardized results.

The Development Stack

• Frontend: Built with **HTML5** and **CSS3** using a custom **'Emerald Dark'** theme optimized for

low-light laboratory environments.

• Logic Engine: Powered by **JavaScript (ES6)** to perform real-time stoichiometric calculations without requiring a server connection.

• Precision: Implements high-precision floating-point arithmetic to ensure inoculum ratios are accurate to four decimal places.

Methods for Researchers

1. Input: Users enter substrate mass and target percentages based on their specific microbe (e.g., Aspergillus niger).

2. Processing: The 'Optimizer' algorithm automatically subtracts the inoculum volume from the total required liquid to prevent over-saturation.

3. Persistence: Local session logging allows researchers to track multiple batches side-by-side for comparative analysis.

Note: This tool is designed for laboratory standardization and does not store sensitive experimental secrets online.

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