Design and Fabrication of Pilot-scale Dye Extraction Machine for Value Addition and Technology Transfer

- Natural Dye Extraction, Value Addition, and Pilot-Scale Machine Fabrication for Technology Transfer

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- Duration: 18 months

Problem Statement

- - Synthetic dyes dominate industries (textiles, food, cosmetics)
- - Cause 17–20% of global industrial water pollution
- - Health risks linked to toxicity
- - Natural dyes are eco-friendly but face: low yield, poor reproducibility, lack of scalable methods

Our Solution

- - Optimized dye extraction protocols
- - Pilot-scale machine fabrication
- - Value addition: improved formulations, colour fastness
- - Technology transfer to SMEs and industries

Innovation

- From bench to pilot scale: yield improves 5–30% → 25–60%
- Optimized extraction methods: aqueous, solvent, Soxhlet
- Spectral performance database (absorption spectra, colour fastness, reproducibility)
- - Eco-friendly, modular, scalable machine design and fabrication

Market Opportunity

- - Global natural dye market > $5 billion (CAGR >10%)
- - Driven by eco-conscious consumers & sustainable brands
- - SMEs, textile, food, cosmetics, crafts industries as key adopters

Project Goals & Outputs

- Goals: Scale-up extraction, add value, enable tech transfer

- Outputs:
- - Validated extraction protocols
- - Functional pilot machine (30–40 kg/day)
- - Spectral performance database
- - Techno-economic & environmental assessment
- - Dissemination workshops/manuals

Impact

- Environmental: Reduced synthetic dye pollution
- Economic: SME opportunities, import substitution
- Social: Jobs, farmer livelihoods, preserve indigenous knowledge
- Supports SDGs 9, 12, 13

Timeline (18 Months)

- Months 1–2: Literature & preparation
- Months 3–5: Design & modeling
- Months 6–8: Procurement & planning
- Months 9–12: Fabrication & assembly
- Months 13–15: Testing & optimization
- Months 16–17: Validation & evaluation
- Month 18: Reporting & tech transfer

Budget Overview (₦60,000,000)

- Design, Fabrication & Materials 58.33%
- Testing, Validation & Quality Assurance 8.33%
- Dissemination & Technology Transfer 16.66%
- Logistics and personnel 16.66%

Call to Action

- Join us in transforming eco-friendly dye production through innovation, value addition, and technology transfer.

- Partnerships: funding agencies, SMEs, textile industries, sustainability champions

- Contact us