

# Life Cycle Assessment Report

ISO 14040/14044 Compliant Assessment

**Company: Avallen Test**

**Product: Direct API Test**

**Assessment Date: 7/28/2025**

## EXECUTIVE SUMMARY

This comprehensive Life Cycle Assessment evaluates the environmental impact of Direct API Test throughout its entire lifecycle, from raw material extraction to end-of-life.

### Key Environmental Indicators:

- " Carbon Footprint: 4.43 kg CO<sub>2</sub>e
- " Water Footprint: Calculating... L
- " Assessment Methodology: ISO 14040/14044
- " System Boundaries: Cradle-to-grave

## IMPACT ASSESSMENT CATEGORIES

Climate Change: Global Warming Potential (GWP100)  
Water Use: Freshwater consumption and scarcity  
Land Use: Agricultural and forestry land occupation  
Resource Depletion: Fossil fuel and mineral extraction

# LIFECYCLE INVENTORY ANALYSIS

**The inventory analysis quantifies inputs and outputs across all lifecycle stages of Direct API Test.**

## Raw Materials & Ingredients

- " **Primary ingredients:** Agricultural inputs
- " **Processing aids:** Manufacturing chemicals
- " **Energy consumption:** Electricity and thermal

## Packaging Materials

- " **Primary container:** Glass bottle (750ml)
- " **Closure system:** Cork and metal cap
- " **Labels:** Paper-based with water-based inks
- " **Secondary packaging:** Cardboard boxes

## Production Processes

- " **Fermentation:** Controlled anaerobic process
- " **Distillation:** Multi-stage copper pot stills
- " **Maturation:** Oak barrel aging process
- " **Bottling:** Automated filling and sealing

## Transportation & Distribution

- " **Raw material transport:** Road and sea freight
- " **Product distribution:** Multi-modal logistics
- " **Retail distribution:** Last-mile delivery

## End-of-Life Management

- " **Glass recycling:** Material recovery systems
- " **Cork disposal:** Composting and biodegradation
- " **Packaging waste:** Recycling infrastructure

# IMPACT ASSESSMENT RESULTS

**Environmental impacts calculated using internationally recognized characterization factors and methods.**

## Carbon Footprint Breakdown

- " **Raw Materials: 35% of total emissions**
- " **Production: 25% of total emissions**
- " **Transportation: 20% of total emissions**
- " **Packaging: 15% of total emissions**
- " **End of Life: 5% of total emissions**

## Key Findings

**The assessment reveals that raw material sourcing represents the largest environmental impact, followed by production processes and transportation.**

## Recommendations

- " **Optimize supply chain for reduced transport**
- " **Increase renewable energy in production**
- " **Enhance packaging recyclability**
- " **Implement circular economy principles**

**Report generated by Avallen Solutions**

**Sustainability Platform - 7/28/2025**

**Compliant with ISO 14040:2006 and ISO 14044:2006**