Ethanol from Cassava Roots or Chips

Ethanol per tonne of cassava from starch content, hydrolysis gain and overall efficiency, compared with the Alcohol Textbook's 70–110 L/t of roots.

Method: Jacques; Lyons and Kelsall (eds.); ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Cassava (roots or chips)	10.000	t/h
Starch content Fresh roots are mostly water; dried chips contain about 65–70 % starch (Alcohol Textbook ch. 6).	25.000	%
Overall efficiency (conversion, fermentation, distillation)	85.000	%
Ethanol density at 20 °C	789.24	kg/m³

Calculated results

Parameter	Value	Unit
Glucose from the starch per tonne	277.78	kg/t
Theoretical ethanol per tonne	180.00	L/t
Ethanol per tonne	153.00	L/t
Ethanol	1,530.0	L/h

Notes for this case

- This gives 153 L/t, above the 70–110 L of absolute alcohol per tonne of fresh roots the Alcohol Textbook reports: the starch content or the efficiency is high for fresh roots.

Formula and method

$$m_G = x_S \frac{M_G}{M_G - M_W}, \quad Y_t = \frac{m_G \, 2M_E/M_G}{\rho_e}, \quad Y = \eta Y_t$$

Variables

$\dot{m}$	Cassava (roots or chips)	kg/s
x_S	Starch content	-
η	Overall efficiency (conversion, fermentation, distillation)	-
ρ_e	Ethanol density at 20 °C	kg/m³
m_G	Glucose from the starch per tonne	kg/kg
Y_t	Theoretical ethanol per tonne	m³/kg
Y	Ethanol per tonne	m³/kg
$\dot{V}_E$	Ethanol	m³/s

Method and standards

Hydrolysis and fermentation stoichiometry.

Assumptions and limits

- Starch fully hydrolysed to glucose. A note appears when a fresh-root case (starch below 40 %) gives more than the 70–110 L/t the Alcohol Textbook reports.

References

- Jacques
- Lyons and Kelsall (eds.)
- The Alcohol Textbook

- 4th ed. (Nottingham University Press, 2003)
- ch. 6 (Vinh)
- ethanol production from cassava
- Stoichiometry: $(C_6H_{10}O_5)$□ + n H_2O → n $C_6H_{12}O_6$ → 2n C_2H_5OH + 2n CO_2

Report details

Report reference	FCC-6FRH-ZGCJ (the same inputs always give the same reference)
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Calculator	Ethanol from Cassava Roots or Chips
Method last reviewed	13 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/sugar-ethanol/ethanol/cassava-ethanol-yield

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.