Extraction and Lost Juice vs Tandem Length (Hugot)

Lost undiluted juice % fibre and extraction for the number of rollers (Hugot eqns 20.17–20.18), and the expected bagasse sucrose ratio of two tandem lengths (20.19).

Method: Hugot; Handbook of Cane Sugar Engineering; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Number of rollers in the tandem	15.000	
Sugar content of cane, percent	14.000	
Number of mills, tandem a	5.0000	
Number of mills, tandem b	7.0000	

Calculated results

Parameter	Value	Unit
Lost undiluted juice % fibre 500/N	33.333	%
Extraction 100 − 70/N (f ≈ 12.5 %)	95.333	%
Ratio of sucrose in bagasse, tandem a to b	1.1628	

Notes for this case

- Hugot stresses that these are trends from Java figures and the Nth-root rule has no experimental basis.

Formula and method

$$j = \frac{500}{N}\,\%, \quad e = 100 - \frac{70}{N}\,\%, \quad \frac{\sigma_a}{\sigma_b} = \frac{R^{1/N_a}}{R^{1/N_b}}$$

Variables

N	Number of rollers in the tandem	-
R	Sugar content of cane, percent	-
N_a	Number of mills, tandem a	-
N_b	Number of mills, tandem b	-
j	Lost undiluted juice % fibre 500/N	-
e	Extraction 100 − 70/N (f ≈ 12.5 %)	-
σ_a/σ_b	Ratio of sucrose in bagasse, tandem a to b	-

Method and standards

Hugot's empirical trends.

Assumptions and limits

- Average imbibition (λ ≈ 2) and β ≈ 0.6; the extraction rule is for fibre near 12.5 %. Fibre and imbibition are not inputs, so the results are trends for that basis only.
- In the Nth-root rule R is the sugar content as a percentage number (14, not 0.14), as Hugot writes it; the ratio depends on that scaling.

References

- Hugot
- Handbook of Cane Sugar Engineering
- 3rd ed. (Elsevier, 1986)
- ch. 20
- eqns 20.17–20.19 and Table 20.2
- pp. 322–323

Report details

Report reference	FCC-DQPA-88B0 (the same inputs always give the same reference)
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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/milling/mill-tandem-length-extraction

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.