

Reducing Acrylamide in Soluble Coffee Using a Novel Amidase – Acrylerase®.



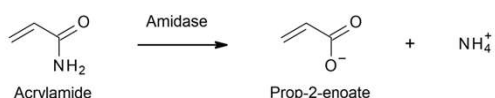
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Rationale

- **Acrylamide** is a heat-induced contaminant in coffee. As a potential human carcinogen and genotoxic, the EU sets a benchmark level in instant coffee at **850 ppb**.¹
- **Wild-type amidases** can break down acrylamide into non-toxic products but show limited activity at low pH and >50 °C², typical in coffee extracts.



- Aim: Evaluate **acrylamide reduction in coffee extracts** using a **food-grade engineered amidase** from *Pseudonocardia thermophila* under varied conditions with focus on its industrial use.

Results

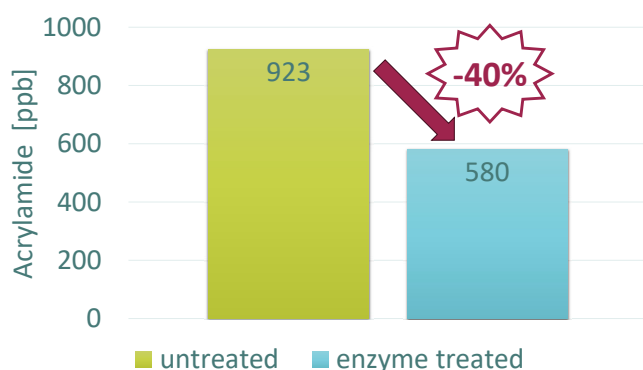


Figure 1: Industrial scale performance of Acrylerase®

- Up to **70% reduction** of acrylamide at lab scale and **40% reduction** at industrial trials without major process changes.
- Higher **enzyme dosage & temperature** → faster, greater reduction.
- **pH effect**: pH 5,1 ≈ **2× reduction** vs pH 4,8.

Conclusion / Perspectives

- **Acrylerase®** demonstrated **reliable acrylamide mitigation** in coffee extracts from lab to factory.
- **Industrially scalable and integrable** with minimal process adaptations.
- **Optimization** is possible via **dosage, temperature and time** tuning.

Materials & Methods

Acrylerase® (Amidase)	Lab scale variables	Industrial trial
	▪ Dosage (kilounits/kg dry matter³). ▪ pH. ▪ Temperature. ▪ Time.	15 m³ stirred tank ▪ 5 kU/kg d.m. ▪ pH 5,3 ▪ 55°C ▪ 4 hours.
Fresh coffee concentrate 50% dry mater	Acrylamide quantification LC-MS/MS (DIN EN ISO 18862:201-12)	

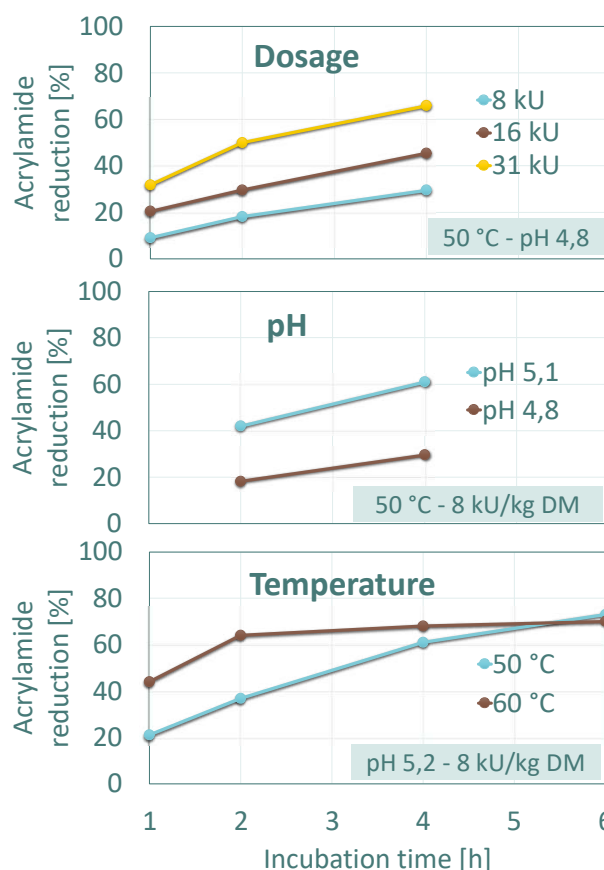


Figure 2: Optimization parameters influencing acrylamide reduction in coffee extracts using Acrylerase®

References:

1. EU Commission Regulation 2017/2158
2. R. Singh et al. (2025). Microbial amidases: Characterization, advances and biotechnological applications. *Biotechnology Notes*, 6, 44-58.
3. EP4093865A1 Patent – Enzyme for decomposing acrylamide