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### CASE STUDY No. 002

# Recombinant Protein Production in *E. coli*: From Shaker to Bioreactor

#### Researchers' affiliations

University of Brasília, Brasília, Brazil and University of São Paulo, São Paulo, Brazil. Study supervised by Professor Pérola de Oliveira Magalhães.

#### Equipment

- > New Brunswick Innova<sup>®</sup> 44 shaker
- > <u>BioFlo<sup>®</sup> bench scale bioreactor</u>

#### Challenge

The enzyme L-asparaginase (L-ASNase) is relevant in the biopharmaceutical field as well as the food industry. To be economically viable, production processes need to deliver high protein yields. The study aimed at defining a detailed process for the production of L-ASNase in *E. coli* BL 21 (DE3) in shake flasks and bioreactors.

#### Strategy

To develop a highly productive bioprocess, the medium composition, inducer concentration, induction time, and culture feeding were optimized. Process optimization started in shake flasks before the process was transferred to a bioreactor.

#### Results

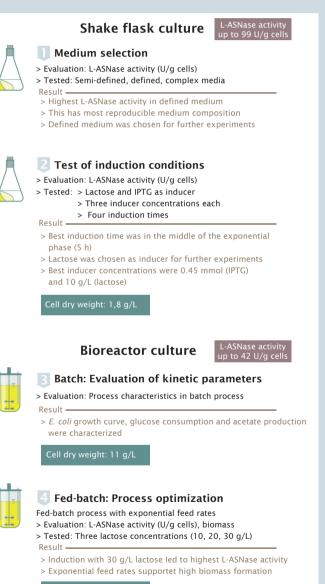
Process transfer from shake flask to bioreactor led to a 27fold increased cell concentration. The L-ASNase activity per gram cells in the bioreactor indicates, that induction can be optimized further.

#### Conclusion

The study showcases an experimental workflow for the optimization of protein production. Shake flasks wer useful for optimizing a range of process parameters. Bioreactors have enabled a significant increase in productivity.

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ll dry weight: 59 g/L

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**Barros et al.** Development of Processes for Recombinant L-Asparaginase II Production by *Escherichia coli* Bl21 (De3): From Shaker to Bioreactors. Pharmaceutics, 2020

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