Report on Logistic Growth curve

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Abstract

Introduction

Methods

A subset of microbial growth data was selected based on "the highest number of data points". The candidate dataset was the replicate 1 from Zwietering *et al.*(1994)[1] *Lactobaciulus plantarum* on MRS substrate under 10 degrees Celsius. The data was containing 151 records on population cell count (N).

The data was recorded in "population change" (response variable) against "time of experiment (hr)" (explanatory variable). The response variable was neither normally-distributed nor log-normal (Shapiro Test p-value: 0 ; Min 0.16 , 1st Q 3.24 , 2nd Q 6.55 , 3rd Q 7.47 , Max 8.86 , all corrected to 2 d.p.). Time (in hr) was also recorded not in a normal-distributed not log-normal way (Shapiro Test p-value: 0 ; Min 1.49 , 1st Q 57.07 , 2nd Q 123.3 , 3rd Q 195.36 , Max 345.07 , all corrected to 2 d.p.).

modified Gompertz model[1]

Buchanan model[2]

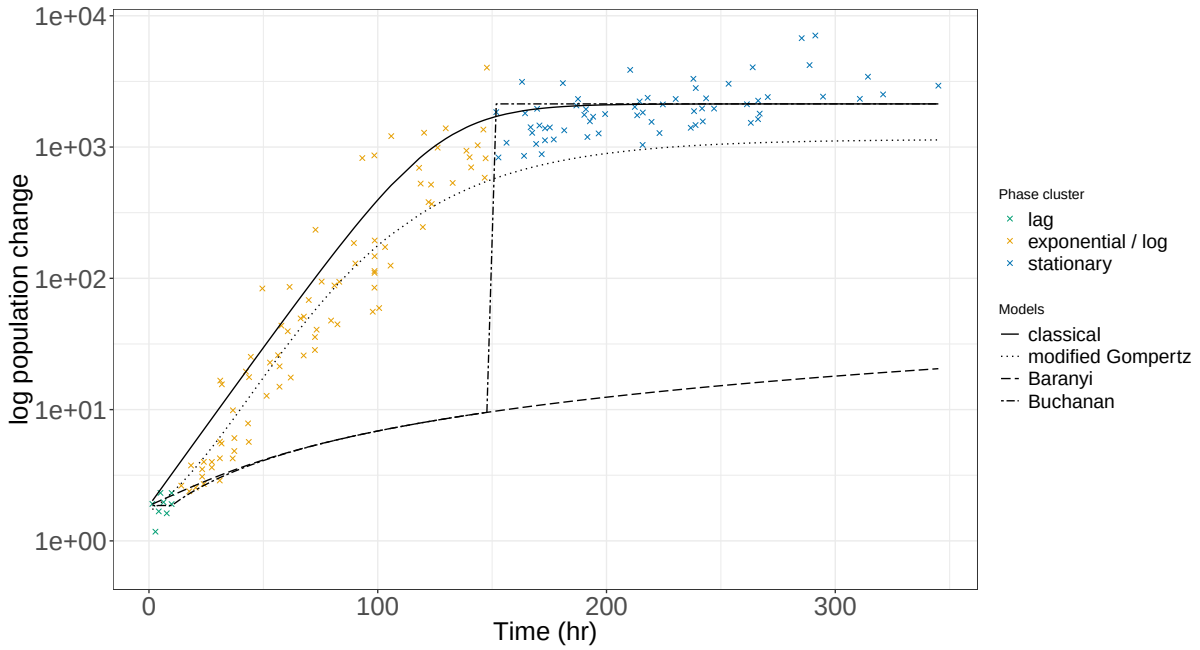

Figure 1: Semi-log graph showing four different models fitting on data of "Population Change" against "Experiment time" with points clustered into three main phases of sigmoid growth curve.

Computing tools

Results

Discussion

Conclusion

Code and Data Availability

All scripts and data used for this report were publicity available at GitHub.

References

1. Zwietering, M., De Wit, J., Cuppers, H. & Van't Riet, K. Modeling of bacterial growth with shifts in temperature. *Appl. Environ. Microbiol.* **60,** 204–213 (1994).

2. Buchanan, R., Golden, M. & Whiting, R. Differentiation of the effects of pH and lactic or acetic acid concentration on the kinetics of Listeria monocytogenes inactivation. *Journal of Food Protection* **56,** 474–478 (1993).