**Centroid of the bacterial growth curves: A metric to assess phage efficiency**

Nava Hosseini1,2, \*, Mahdi Chehreghani3,, Sylvain Moineau1,2,4,5, and Steve J. Charette1,2,6, \*

1. Institut de Biologie Intégrative et des Systèmes (IBIS), Pavillon Charles-Eugène-Marchand, Université Laval, Quebec City, QC, G1V 0A6, Canada.
2. Département de biochimie, de microbiologie et de bio-informatique, Faculté des sciences et de génie, Université Laval, Quebec City, QC, G1V 0A6, Canada.
3. Department of Mechanical Engineering, McGill University, Montreal, QC, H3A 0C3, Canada.
4. Groupe de Recherche en Écologie Buccale (GREB), Faculté de médecine dentaire, Université Laval, Quebec City, QC, G1V 0A6, Canada.
5. Félix d’Hérelle Reference Center for Bacterial Viruses, Université Laval, Quebec City, QC, G1V 0A6, Canada.
6. Centre de Recherche de l’Institut Universitaire de Cardiologie et de Pneumologie de Québec (IUCPQ), Quebec City, QC, G1V 4G5, Canada.

\*Correspondance: Institut de Biologie Intégrative et des Systèmes (IBIS), Pavillon Charles-Eugène-Marchand, Université Laval, Quebec City, QC, G1V 0A6, Canada [nava.hosseini.1@ulaval.ca](mailto:nava.hosseini.1@ulaval.ca), [steve.charette@bcm.ulaval.ca](mailto:steve.charette@bcm.ulaval.ca).

**Please download the Installer from** [**https://github.com/navahs/Centroid-Index-Calculator.git**](https://github.com/navahs/Centroid-Index-Calculator.git)

**Currently, the Centroid\_Index\_Calculator is available for the Windows and MacOS.**

**1. Installation instructions for MacOS**

After downloading Centroid\_Index\_Calculator\_Installer, during the installation, one may see this error message:

“Centroid\_Index\_Calculator\_Installer” cannot be open because the developer cannot be verified”.

It might be necessary to refer to MacOS setting to make changes to allow the app to be installed, as follows:

Security & privacy>General>App store & identified developer>Open anyway.

Then, the installer will pop up on the screen.

The installation steps include:

DESTINATION>MATLAB RUNTIME>CONFIRMATION

This way, the “MATLAB Runtime” will be automatically downloaded on the system.

To open the software, please refer to:

Applications>Centroid\_Index\_Calculator folder>Application>Centroid\_Index\_Calculator

After some time, the “MATLAB app” will appear on the screen.

The installation of the software is more straightforward for Windows. The same “warning” notification might appear during the software installation due to security and privacy which is easily solvable.

**Notes:**

1. This software is developed to process an Excel file data, in which the data are (by default) spaced by “tab”. Therefore, the only step for the user is to copy/paste data from Excel file to the appropriate boxes in the software.

2. If one chose to enter the data manually, regardless of whether the data points are separated by “comma” or “tabs”, it is necessary to be consistent for all data. For example, the software will not be able to analyze the data and calculate the CI if the data for “time” are separated by “comma” and data for OD are separated by “tab”.

3. The software does not work for data with decimal points represented as “comma” instead of “period”. For example, the data must be 0.2 and not 0,2. This problem might appear if the Excel file is in a language other than English.

4. Once the calculations are done for a series of data, it is possible to delete the calculated value of CI in the associated box and then enter a new data set.