Information about the SISE-Analyser

1 August 2025. Modifications of the SISE-Analyser were made to enable the calculation of ion fluxes with two different methods, which was saved as SISE-Analyser110. The first method was already available in version *100 and is based on the chemical potential of the ion of interest. This procedure was developed by Newman and published in Plant Cell and Environment, 2001, volume 24, pages 1-14. The second method used Fick's law to calculate ion fluxes based on ion concentrations, as explained by Smith et al. in Methods in Cell Biology, 1994, volume 40, pages 115-134. A further explanation of these methods is submitted to a scientific journal and hopefully will be published soon.

Note that a modification of the data array that stores all analysis results was required for this change in the program. The program now stores the fitted voltage values for both the SISE1 and SISE2 channels at positions 0 and 1, instead of just the differential voltage between both positions (dV). This allows the calculation of ion concentrations at both positions and the ion flux based on Fick's law. If the chemical potential is used, dV is first calculated for both voltage values.

In addition to modifications in the "Calibration" module, also changes in the "Buffer correction" module were made. The buffer correction remained unchanged for the "Chemical potential" approach, but in case that the "Diffusion gradient" was used, the flux of conjugated buffer is also calculated with Fick's law.

25 April 2025.

The version SISE-Analyser100 was uploaded to GitHub as Windows executable (.exe) and LabView (.vi) files. The Windows executable files need support of the LabView Runtime engine (version 2025Q1) that can be downloaded from the NI -Website (https://www.ni.com/). The virtual instrument (*.vi) files only can be opened with NI-LabView, such as the community edition, which is free for non-commercial use. In addition, the virtual instrument applications make use of SubVI's, which are provided in the SISE-Submodules-(Vis) folder.

A precise description of the programs is uploaded to BioRxiv's (https://www.biorxiv.org/) and will be submitted to a scientific Journal.