3 METHODOLOGY

3.1 Research Tool

This research was carried out using Aspen Plus simulator and Microsoft Office Excel 2007 for process flow sheeting to provide data analysis.

3.1.1 Aspen Plus

Aspen plus was utilized in this study of Forward osmosis desalination process. Aspen plus was chosen because it is easy to manipulate the process variables and unit operation technology, as well as fully customizes simulation by using customization and extensibility capabilities. Aspen plus has unique features that propagate information both forward and reverse directions, performing back calculation in non-sequential manner. The bi-directionality often makes iterative calculation unnecessary and faster solution.

3.1.2 Microsoft Office Excel 2007

The most widely used spreadsheet tools that analyze, share and manage information more effectively. This software gives the freedom to import, organize, and explore massive data sets quickly and easily, and the advanced analyzes tools help make them right decisions for any situations. It keeps things simple and straight forward. It features calculation, graphing tools, pivot tables and a macro programming language called VBA (Visual Basic for Application).
3.2 Research Activities

3.2.1 Data Collection

A general understanding of the processes must be clear at this particular stage. The key to operate Aspen Plus simulator must be well-known prior to data collection from a selected reviewed journal and previous work to be applied in the simulation.

3.2.2 Validation

For validation of simulation process, the result from journal of Forward osmosis was compared with the simulation result.

3.2.3 Optimization

Optimization was made after the validation process. There are two input variables were identified to be optimized which are flux and concentration. The data obtained was used for further optimization.
3.3 Summary

The research is carried out using Aspen Plus simulator. This simulator was recognized as the research tool because of its unique feature and fast solution. As part of the research methodology, data collection from various reviewed journal was applied to the base case simulation after the overall process was obtained. Then, the validation of Forward Osmosis desalination process was done to distinguish the calculated and simulated results. Lastly, optimization was done by higher flux with the best selectivity. The summary of methodology is shown in Figure 3.1.