

Abstract

Diabetes is a dangerous disease with high potential to be a killer. In 2030, it is predicted that there will be a significant increase in the number of diabetics compared to 2010. As the number of diabetics increases, the demand for insulin will also increase. Thus, it is predicted that there will be a rapid increase in demand for insulin and the need to find new, more efficient and more affordable ways of producing insulin.

The limited amount of production, coupled with high consumer demand, will certainly increase the market price of insulin. Also, the WHO stated that the prevalence of diabetes in middle to lower-income countries is relatively higher than in high-income countries. This of course will limit and reduce insulin access for those who need it.

Therefore, we developed a new, more efficient and cost-effective insulin production technique, using transgenic *Aloe vera* as an insulin production plant. By using this technique, the human preproinsulin genome will be inserted into the *Aloe vera* chloroplast using the particle bombardment technique, which is expected to produce significant results in transgenic *Aloe vera*. The presence of insulin in *Aloe vera* will be checked using ELISA techniques, western blot, and others.

However, due to time constraints and pandemics, this study will only focus on *in silico* simulations, in the form of computation, processing and data analysis, as well as *in vivo* experimental designs which are expected to be used as considerations before and after comparisons of *in vivo* experiments.

Keyword: *In silico*, computing, diabetes, insulin, *Aloe vera*, chloroplast, *particle bombardment*.