

Unwrapping the wonders of chocolate: from candy to functional food

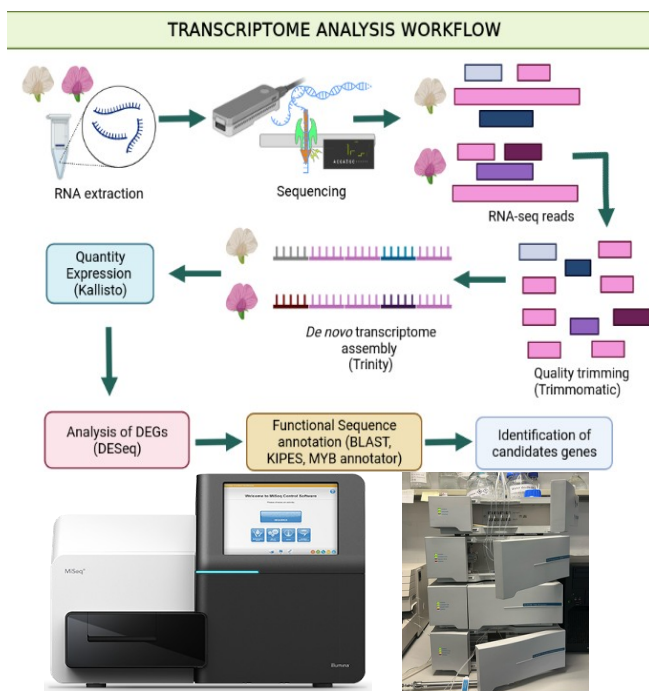
Background

Chocolate is processed through several steps of drying and fermentation of cocoa beans that are harvested from tropical *Theobroma cacao* trees. *T. cacao* is endemic to Central and South America. Known as the "fruit of the gods" with a notable historical importance in the area of Mesoamerica in pre-Columbian times, cocoa beans were used as the first monetary mechanism in the region. Today, as global chocolate consumption continues to grow, the demand for high quality cocoa beans is also increasing, especially for chocolatiers in Europe looking to add high quality but also fair-traded and sustainable chocolate to their production. This is particularly beneficial to Central American farmers, whose cocoa trees produce much higher quality beans than those in other parts of the world and their trees are known to produce fine aroma cocoa beans.

Despite all this, cocoa bean production in Central American countries such as El Salvador is today almost non-existent due to a limited access to genetic material and lack of knowledge about the polyphenolic content in the ancestral "Criollo" variety known to produce the highest quality beans.



Source: Vianney Castañeda, 2021



Source: www.illumina.com

Scientific aim

With the availability of the sequenced cacao genome (Argout et al., 2011) and improved genetic and transcriptomic technologies your work will consist in determining the polyphenol content specifically of flavonoids in different salvadoran cacao genotypes with the use of HPLC analysis. In addition, in order to identify the candidate genes associated with the flavonoid biosynthesis, DNA and RNA extraction will be necessary to obtain RNA-seq data that will be used for gene expression analysis.

Determine which cocoa genotypes have higher values of polyphenols and specifically functional flavonols; this in order to ultimately develop a functional chocolate bar formulation.

Methods

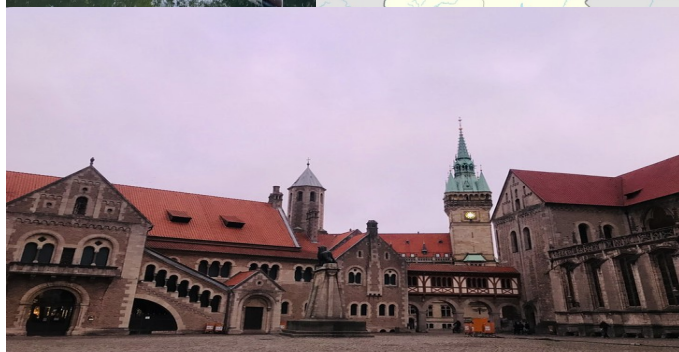
- RNA-seq analysis
- DNA/RNA extraction
- Sequencing by Synthesis (MiSeq)
- High Performance Liquid Chromatography (HPLC)
- Cloning
- Plant transformation
- qPCR

Our lab group (Plant Biotechnology and Bioinformatics)

Our group is led by Prof. Dr. Boas Pucker and consists of biologists, biotechnologists and bioinformaticians (<https://www.tu-braunschweig.de/en/ifp/pbb>). We are a dynamic and inclusive group of motivated young researchers. Our research focuses on specialized plant metabolites by integrating genomics and transcriptomics along with the application of different bioinformatics tools. This gives us good possibilities to work at the intersection between these disciplines. We do weekly lab meetings with a journal club which helps us to share new ideas and clarify concepts in a friendly work environment. Additionally, in summer days, when we are not working on our projects we also like to do barbecues and spend time together in our institute's garden.



Instagram/twitter : @PuckerLab



Source: www.braunschweig.de

About Brunswick (Braunschweig)

Brunswick is located in north central Germany. It is the second largest city in the state of Lower Saxony after Hanover. Its strategic geographical position provides a good and fast connection to the most important cities in Germany such as Berlin, Hamburg, Frankfurt, Cologne and Hannover.

Brunswick is known as the city of lions and is characterized by its historic buildings dating back to medieval times, its shops and its dynamic cultural and arts scene. The several research institutes located in the area make Brunswick an important city of research and scientific development in Europe.

The TU Braunschweig is the oldest technical university in Germany, being founded in 1745 as the Collegium Carolinum and is a member of the TU9, a society that includes the most renowned technical institutes in Germany.



Come join us!