

Gene expression levels of *csy1* gene - lab report example

[Science](#), [Biology](#)



Gene Expression Levels of csy1 Gene

Lab Summary on Gene Expression Levels of csy1 Gene Introduction The science of measuring expression of a gene is a widely practiced technique in molecular biology. The technique is therefore when a snapshot is taken of the cell's physiology under certain particular conditions. It is a practical thing that organisms contain genes. The genes are actually the specific regions on the chromosome and give particular instructions on how to make products. Most of the time, this product is a protein. Hundreds and even thousands of genes are usually contained in a single chromosome. Therefore, for a diploid organism with two copies of each chromosome, there are also two copies of each gene. The two copies come as a result of one chromosome being inherited from the female parent, as the other chromosome is inherited from the male parent of the organism.

Genes are upregulated to respond to come signals. In this manner, the copy number of the gene stays constant as the DNA message is transcribed into a message that is functional as it takes the form of mRNA. This transcript of the mRNA takes place in the nucleus, but a modification on it, takes place, before the mRNA leaves for the cytoplasm. During this modification process of the mRNA, certain none-useful regions, called introns, of immature mRNA is removed to make it mature. The mature mRNA is then translated into a functional product the moment it takes its place in the cytoplasm. Just one gene is capable of turning into thousands of mRNA copies which undergo processes to become functional proteins. Practically speaking, this protein that results, is what is responsible for physiological response in an organism.

The main aim of the experiment that was carried out was to measure the

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gene expression of csy1 gene. This gene is responsible for the coding of capsaicin synthase enzyme. It is logical to expect higher amounts of capsaicin synthase from or higher levels of the expression of csy1 mRNA. This is because, the synthesis of capsaicin depends upon the capsaicin synthase enzyme. In this experiment, we hypothesize that the mass and the amount of csy1 have an inverse relationship. We therefore expect that, the smaller the pepper mass, the greater the pixel density in gel electrophoresis. The rationale here is that, the higher levels of capsaicin will result from increased enzyme activity which would be likely because of greater transcripts of csy1 mRNA.

Materials and Method

Gel electrophoresis was used to visualize the DNA after csy1 cDNA had been amplified using the PCR. Samples of DNA were inserted into lanes of a 1.2% agarose gel and an electric current was applied to the gel while it sits in a conductive buffer. This was done to conduct gel electrophoresis. After the electric current was removed, the samples of the DNA appeared as individual bands and could be visualized within the gel. The gel was analyzed to examine the DNA location within the gel. From this, we were able to know the size of the DNA, including the number of base pairs and the band intensity. All the DNA bands were made of the same size since the lab samples contained the same DNA sequence. cDNA band intensity was then used as a measure of the amount of csy1 mRNA that was present at the extraction time, in the cells.

Three peppers of different masses were taken. Using the E. Z. N. A RUN isolation kit, the RUN was extracted from the pepper. The qScript cDNA

super mix kit was then used to conduct reverse transcriptase-PCR on the RNA. The process also isolated the mature RNA and converted them into cDNA. The Got Taq polymerase and Master Mix Kit was used to amplify the cDNA sequence containing the cys1 gene. The pixel density for each pepper's cys1 gene was then measured through the gel electrophoresis, using GeneTools. This gave us the data to compare mass to pixel density of each pepper.

Results

The results from the electrophoresis showed that the pepper with a mass of 700000 had a pixel density of 108154. 4. The pepper with a mass of 600000 had a pixel density of 696032. 9 and the pepper with a mass of 100000, had a pixel density of 797873. 1.

Pepper

Mass

Pixel Density (no units)

1

700000

108154. 4

2

600000

696032. 9

3

100000

797873. 1

Variable 1

Variable 2

Mean

534020. 1

0

Variance

138614065942. 81

0

Observations

3

3

Hypothesized mean difference

0

df

3

t Stat

84. 78367898

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