Steve Smith Lab # 2

Honors Biology Mr. Collea

**Title**: Does Chewing Gum Affect its Mass.

**Abstract**

The purpose of this investigation is to determine if the mass of gum changes as it is chewed. The procedure includes chewing a single piece of gum for 1 minute at a rate of 1 chew/second. The results indicate the mass of the gum decreased as it was chewed.

**Introduction**

The purpose of this investigation is to determine if the mass of gum changes as it is chewed. Gum chewing take place in the oral cavity (mouth) through the mechanical action of the teeth and tongue and the chemical action of saliva which contains water, mucus and the digestive enzyme salivary amylase. Salivary amylase is an enzyme that digests sugars. Water is a polar molecule which means it has an unequal charge distribution that makes it an excellent solvent for dissolving certain things. The mucus in the saliva acts as a lubricant that aids in the swallowing process. In light of this, it is hypothesized that if the mass of gum is related to chewing, then the longer the gum is chewed the greater the mass will become. This is due to the fact that the water and mucus in the saliva will add more mass to the gum than the digestive enzyme salivary amylase will remove. The dependent variable in this investigation is the mass of gum and the independent variable is the length of time it is chewed. Some of the controlled variables in this investigation include the method and rate of chewing along with the drying and massing techniques used.

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**Methods**

The materials used in this investigation are pieces of gum, a digital balance and a paper towel. The procedure includes chewing a single piece of gum for 1 minute at a rate of 1 chew/second. After each 60 second interval, the gum is removed from the mouth and dried by rolling around on a paper towel for 5 seconds to remove any moisture from its surface and massed using a digital scale. This procedure is repeated 5 times giving a total chewing time of 5 minutes.

**OR**

**Materials**: piece of gum, digital scale, paper towel

**Procedure**:

1. Mass a new piece of gum and record the data in Table 1.

2. Place a single piece gum in mouth and chew for 60 seconds at a rate of 1 chew/second.

3. Remove gum and pat dry for 5 seconds on a paper towel.

4. Mass gum and record the data in Table 1.

5. Repeat 4 times.

**Results**

The results indicate the mass of the gum decreased as it was chewed. The greatest change in mass was recorded after the first minute of chewing and the amount of change decreased as time went on. Results of this investigation are located in Table 1 and Graph 1 below.

**Table 1.**

|  |  |
| --- | --- |
| **Time (minutes)** | **Mass (grams)** |
| 0 | 6.2 |
| 1 | 5.2 |
| 2 | 4.6 |
| 3 | 4.2 |
| 4 | 4.0 |
| 5 | 3.9 |

**Graph 1.**

**Discussion**

As previously stated, the results indicate the mass of the gum decreased as it was chewed with the greatest change in mass recorded after the first minute and the amount of change decreased as time went on. The overall decrease in mass was 2.3 grams. This result disproves my hypothesis that the mass of gum would increase the longer it was chewed. Obviously the enzymatic and dissolving nature of the saliva had a greater impact on the chewed gum than did the additional mass due to the saliva. These results are similar when compared to other groups in the class.

Problems encountered during this investigation include: **(1)** the manner in which the gum was chewed. Although the rate of chewing was specified to one chew/second, the manner, force and side of the gum in which the gum was chewed was not specified and should be in any future investigations. **(2)** the pat drying method of drying the gum posed a problem as the gum would sometimes stick to the paper towel. Future investigations should account for this and utilize a different method of drying such as a desiccator or an oven set to a very low temperature.

**Conclusion**

During this lab I learned that the mass of the gum decreased as it was chewed and the enzymatic and dissolving nature of the saliva had a greater impact on the chewed gum than did the additional mass due to the saliva. I also learned the importance of controlling variables and how a well written procedure attempts to eliminate the effects any other variables may have on the reliability and validity of experiment. Most importantly, this lab taught me how to write a lab report and the necessary elements required for each section of a well written lab report.

**Results**

The results indicate the mass of the gum decreased as it was chewed. The greatest change in mass was recorded after the first trial and the amount of change decreased as the trials increased. Results of this investigation are located in Table 1 and Graph 1 below.

**Table 1.**

|  |  |
| --- | --- |
| **Trial** | **Mass (grams)** |
| 0 | 3.5 |
| 1 | 4.5 |
| 2 | 5.3 |
| 3 | 5.9 |
| 4 | 6.1 |
| 5 | 6.2 |

**Graph 1.**