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A&P 2312 Lab Report

Title: **Assessing Protein Digestion by Trypsin**

**Abstract**

Trypsin, an enzyme produced by the pancreas, hydrolyzes proteins to small fragments (peptones and peptides). Also, enzymes in the human digestive tract converts proteins into short chains of amino acids. Trypsin a pancreatic enzyme breaks protein down into short chain peptides. In the small intestine, trypsin breaks down proteins, continuing the process of digestion that begins in the stomach. Trypsin is given to those who lack of enzymes that needed for digestion. It is also sometimes given for treatment of osteoarthritis. Some people apply trypsin directly to wounds and ulcers and removes dead tissues and improve healing. In the duodenum, trypsin catalyzes the hydrolysis of peptide bonds breaking down proteins into smaller peptides. The peptides products are then hydrolyzed into amin acids through other proteases that is available for absorption into the blood stream. BAPNA is a synthetic substrate with a dye bound to an amino acid. Trypsin cleaves the dye molecule from the amino acid where the solution changes from colorless to bright yellow. The yellow color is an evidence that trypsin hydrolyzes the peptide bonds in proteins to produce short chain peptides. Trypsin a proteinase enzyme that acts mainly on the interior bonds of proteins. The enzyme called trypsin present in pancreatic juice, is essential for protein digestion. Disorders of trypsin production can damage the pancreas.

**HYPOTHESIS**

The enzyme Trypsin will cleave the dye molecule bounded to the amino acid. And also, to find out if there will be a change in color from clear to yellow. If in the experiment a positive trypsin assays the solution turns yellow clear, it indicates a positive hydrolysis test.

**MATERIALS NEEDED**

1. 5 Test tube (1T -2T CONTROLS) (3T – 5T EXPERIMENTAL)

2. wax pencil

3. water bath set at 37C

4. Trypsin

5. BAPNA

6. Ice in a beaker

7. Water

**EXPERIMENTAL METHOD**

1. Two students should prepare the controls (tubes **1T** and **2T**) **1T** should be filled with 3 gtts(drops) of water and 3 gtts (drops) of trypsin whiles **2T** should be filled with 3 gtts (drops)of water and BAPNA
2. Two other students should prepare the experimental samples (tubes **3T** to **5T**). Add 3 gtts (drops) of trypsin to tube **5T** and place in ice before adding BAPNA. Add 3 gtts (drops) of trypsin in tube **3T** and place in water bath set at 37C and let it sit for 4 minutes. Now add 3 gtts (drops) of trypsin and 3 drops of BAPNA into tube **4T**.
3. Take tube **3T** out of the hot bath water and add 3 gtts (drops) of BAPNA
4. Now get tube **5T** out of the beaker with the ice and add 3 gtts (drops) of BAPNA.
5. Put all tubes in the water valve to incubate at **37C** except **5T** which was placed in the beaker with ice.

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| TUBE NO | 1T | 2T | 3T | 4T | 5T |
| **Additives**  **3 gtt each** | Trypsin  Water | BAPNA  WATER | Trypsin (BOIL TRYPSIN FOR 4 MINUTES THEN ADD BAPNA) | Trypsin  BAPNA | Trypsin  BAPNA |
| **Incubation**  **condition** | **37C** | **37C** | **37C** | **37C** | **0C** |
| **Color change** | **Clear (no)** | **Clear(no)** | **Clear (no)** | **Yellow** | Partial Yellow |
| **Result (+) (-)** | Negative (-) | Negative (-) | Negative (-) | Positive (+) | Positive (+) |

**DISCUSSION:**

Tube **1T** was a control containing trypsin only. So, it makes sense that it chose no color change. Since a color change will come from the digestion of BAPNA. Tube **2T** which contains BAPNA. So, in the absence of an enzyme it could not release the yellow in the digestion. **3T** where we initially boiled the trypsin, this denatured the enzyme so after adding BAPNA it wasn’t able to digest. So, the solution remains colorless. **4T** a very strong positive test for the digestion of BAPNA by trypsin. This makes perfect sense since we incubated these two by **37**C which makes perfect sense as the temperature for trypsin to ac on proteins. **5T** becomes fairly yellow, mildly positive. Which tells that trypsin is not as effective on a temperature of **0C** than it was on **37C**

**CONCLUSION:**

Upon the results it came to an understanding that the enzyme trypsin was able to cleave the dye molecule from the amino acid changing the color to yellow. This was a positive test and it makes sense that since we incubated these two together by 37C.Trypsin is effective on a temperature of 37C.

**Work cited:**

**Crampton, Linda. “The Pancreas: Trypsin, Protein Digestion, and Pancreatitis.” Owlcation, 1 Apr. 2020, owlcation.com/stem/Digestive-Enzymes-from-the-Pancreas-Uses-and-Interesting-Facts.**