Determining at What Stage Bananas (Musa acuminata) and Pineapples (Ananas comosus) Contain the Highest Amylolytic and Proteolytic Activity

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Amylase and protease are digestive enzymes, or molecules, that speed up chemical reactions. Without enzymes, reactions essential to life would take years to occur. This project's objective is to determine whether ripe, unripe, or overripe bananas and pineapples contain more enzyme activity. Eating fruits when they contain the optimum enzyme activity could be beneficial to enzyme deficient individuals. Amylase activity was detected by adding Lugol's iodine to rice water, turning it dark blue. A banana solution was then added to the rice water and iodine. The color of the liquid five minutes after adding the banana solution indicated the amylase activity. Lighter colors signified higher amylolytic activity as more amylase was present to hydrolyze the starch responsible for the dark blue color. Proteolytic activity was detected by creating holes in nutrient plates and adding a drop of pineapple solution into each hole. The diameter of the hole was subtracted from the diameter of the clear zone around it after twenty-four hours. Larger clear zones signified higher proteolytic activity as more protease was present to hydrolyze the casein responsible for the milk’s white color. The liquid was cloudy during the banana's unripe stage, becoming more transparent as the banana entered its ripe stage and darkening as it became overripe. The clear zone of the holes containing the unripe pineapple solution were the widest (average of 4.34mm), shrinking as the pineapple became overripe (average of 1.03mm). This study showed that ripe bananas and unripe pineapples contain the highest amylase and protease activity.

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