

## Digestion in the Stomach

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Digestion begins in the mouth. When you chew your food it is mixed with saliva, which not only supplies moisture but also the carbohydrate-digesting enzyme, amylase. When you eat raw food, its enzymes work with the salivary amylase to begin digestion.

Swallowing prevents food from remaining in the mouth long enough for any significant amount of digestion to occur. However, the food and salivary enzymes continue the digestion process until the secretion of stomach acid causes the pH to drop below 3.0, which is the activity range of plant enzymes. Before food arrives, the stomach normally has a pH between 5.0 and 6.0. In young and healthy adults it takes about 45 minutes before enough acid is generated to drop the pH to 3.0. This is because stomach acid is secreted into the stomach in response to the expansion of the stomach wall. During this time a considerable amount of digestive work can be accomplished if plant enzymes, either indigenous to the raw food ingested or from a supplemental source, are present. Unfortunately, the amount of time necessary to make stomach acid increases with age. Studies have proven that older adults often suffer from inadequate stomach acid levels.

There is a common misconception that enzymes are destroyed by stomach acid. Nothing could be further from the truth. Stomach acid does not digest protein. Rather, it activates an enzyme called pepsinogen which then becomes pepsin that is secreted by the stomach wall. This enzyme is only active within the pH range of 3.0 to 5.0 and requires the acid to maintain that pH. Pepsin is very specific in its action and is simply incapable of digesting food enzymes, which are very large molecules and are more than just protein. More than seventy years ago, Olaf Bergeim conducted a series of experiments on salivary digestion at the Laboratory of Physiological Chemistry in the University of Illinois, College of Medicine in Chicago. He found that an average of 59-76% of ingested carbohydrates is digested within 15-30 minutes after a meal. He concluded that a very considerable degree of starch digestion may be brought about by saliva if food is chewed properly. The pH within the stomach rarely, if ever, drops below 3.0. Pure stomach acid has a pH of 1.8 when it first enters the stomach, but is quickly diluted in the presence of food. Regardless, plant enzymes are not destroyed by the highly acidic environment of the stomach. They simply become dormant until reaching the higher pH levels in the small intestine, where they again become active and continue the digestive process. Once their digestive function in the gastrointestinal tract is completed, a large number of enzymes are absorbed through the gut wall into the bloodstream. A lot of research remains to be done to determine the exact fate of these enzymes after they pass through the gut wall into blood. However, it is known that plant enzymes will pass from the body into the urine after they have completely lost their usefulness.

Dr. Howell was particularly impressed by the way the ingestion of raw food slowed the progress of chronic degenerative diseases and spent his professional life postulating and then validating his theories.