

# Digestive Enzymes: The facts you need to know

## Introduction

You might not have heard of digestive enzymes, but your body sure has. Without them your body wouldn't be able to benefit from all of the nutrients inside your food. The question that you might be asking is why you should be taking extra digestive enzymes as a supplement if your body already provides them. This is an area naturally full of confusion and misinformation, but thankfully we'll cover this in detail in the following book. Follow poor advice and rather than improving your health, you'll be damaging it.

The following piece will provide you with all the information that you need about protein enzymes. You'll learn what they are and why you need them, where they come from and how they benefit your body.

## What are digestive enzymes and why do I need them?

Every day we eat our daily food but the body doesn't, in fact, need *food*. It needs the nutrients within it. This food has to be processed by our digestive system from its natural form, such as a chicken breast or spinach, into its base nutritional elements.

Different food groups contain more or less of these different constituent parts: simple sugars derived from carbohydrates, fatty acids from fats, amino acids broken down from proteins. Furthermore, your body will absorb smaller amounts of important vitamins and minerals. This complicated process of breaking down foods is all thanks to your digestive enzymes. Their role is to facilitate the breaking down and absorption of nutrients so your body can continue to function healthily.

Without the enzymes, we absorb no nutrients, and without these healthy additions we won't last long, even if we're eating the best diet.

## How do digestive enzymes work?

Enzymes are required to breakdown specific elements of your food, namely carbohydrates, fats and proteins. Different enzymes are required for different food groups. The majority of these enzymes are created in the pancreas. This vital organ is responsible for the creation of Amylases (to break down complex carbohydrates), Lipases (to break down fats) and Proteases/Peptidases (to break down proteins).

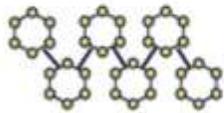
In the process of digestion, the Amylases break down complex carbohydrate molecules (which could comprise of a huge variety of glucose molecules) into their singular glucose parts. The full amino acid protein molecule is broken down into single amino acids. Finally, fats are broken down into their smaller glycerol and fatty acid parts. Once broken down the body can absorb them as essential nutrients.

**(Note for Justin – This could be represented as flow chart similar to the following image?)**

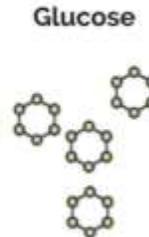
# HOW DO ENZYMES WORK?

Enzymes are required to break down the carbs, protein and fats we eat into molecules our body can use.

A carbohydrate molecule is made of many different glucose molecules



Carbohydrase breaks down carb molecules



A protein molecule is made of many different amino acids



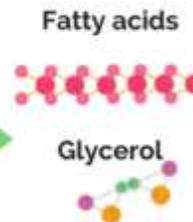
Protease breaks down protein molecules



A fat molecule is made of fatty acid and glycerol molecules



Lipase breaks down fat molecules



## DIET vs DISEASE

For more information, visit [DietvsDisease.org](http://DietvsDisease.org)

Why should I supplement them if my body makes them?

There are a variety of reasons why you might benefit from taking additional digestive enzyme supplements:

- Disease

Some diseases cause your body's ability to create digestive enzymes to be either decrease or become defunct. Diseases that specifically affect the pancreas (Pancreatitis, Cystic Fibrosis and Pancreatic Cancer for example) will drastically reduce production.

The pancreas is your main digestive enzyme factory, if it is under attack or malfunctioning then you'll be lacking the nutrition-absorbing elements. If you suffer from Crohn's or Coeliac disease then the effect is similar.

- Bodily disorders

Even without a specific disease, the body may have its digestive enzyme production affected by:

- Food allergies, parasitic infection or other low level inflammatory disorders.
- Ageing – unfortunately as we get older our bodies become less efficient. Although this specific effect can be reduced by aging healthily.
- Chronic Stress – the most common cause. When we were cave-people our bodies were programmed to react to danger with a huge release of adrenaline to prepare us to fight a danger or run from it (flight). Chronic stress puts the body in this state on a fairly constant basis and while we're in this state, the body puts digestion right at the bottom of its priorities. Therefore, digestive enzymes are produced at a far lower rate.

- Denaturing of natural enzymes

Even those enzymes created naturally in our bodies and within our food can be rendered inert (denatured) and made useless.

The denaturing process can be caused by any of the following:

- Fluoride exposure
- Drugs and alcohol
- Irradiation
- Canning
- Food Processing
- Heating above 118 F (essentially cooking)

As you can see, enzymes have a tough fight to get into your system before they can even start fulfilling their role. Ironically, when damaged enzymes enter the body the immune system treats them as a possibly dangerous foreign invader. This can lead to an immune response and can then cause inflammation and other side effects.

Processed foods contain a huge number of denatured enzymes. When they all enter your system, the body considers itself under attack and responds accordingly. In order to quickly break down the food digestive enzymes are required. Even though this type of food has little nutritional benefit, good quality enzymes are needed to break it down.

What benefits will I see after taking digestive enzyme supplements?

Read through the following list of common ailments and see which (and I bet there's at least 1) match you:

- Heartburn
- Indigestion
- Flatulence
- Undigested food in stools
- Feeling tired and lacking energy
- Food intolerance
- A diet of processed foods

If you can tick off any of this list then you may benefit from taking digestive enzyme supplements. Each of them can be traced back to issues with your digestive system. Feeling tired and lacking energy, for instance, is caused through your body working in overdrive after a hearty meal. When your body digests food it can take roughly 80% of your total energy. If you don't have sufficient enzymes to assist with the breakdown of foods this can cause an immense strain. Furthermore, the food is likely to not be digested fully leading to undigested food in stools and also, you'll be missing out on those key nutrients!

Once you begin to help your body by taking on board additional enzymes to assist the digestive process you'll start to see the benefits. The ailments described above could be reduced leading to a happier and healthier lifestyle.

### The Top 4 Benefits

Supplementing your body's natural supply of enzymes will bring a variety of great benefits. Here are our top 4:

1. Reduce Stress on the Digestive System – As we've discussed, when there's a lack of natural enzymes your digestive tract is under strain. Increase the amount and you'll relieve the pressure on your system.
2. Reduces Inflammation in the Gut – When your body is under strain or stress, inflammation occurs to protect itself. When your gut becomes inflamed it can be uncomfortable and painful leading to an unpleasant bloated feeling. A reduction of inflammation means a reduction in pain.
3. Improves Digestion of Food – With the power of extra enzymes the food you eat can be harvested more efficiently and more effectively for the nutrients within. Your body will no longer be starved of these important elements.
4. Reduces Food Sensitivities and Allergies – If you suffer when eating specific food groups you'll no doubt have found that sometimes eating them cannot be helped, no matter how careful you are. By supporting your digestive system through enzyme supplements you're offering it the best chance of a painless process.

### Digestive Enzymes and IBS

People who suffer from IBS often struggle to digest a specific section of food groups known as **FODMAP** (see below) carbohydrates.

**FODMAP** is an acronym best kept as an acronym which means:

**Fermentable** – food stuff fermented by bacteria in the large bowel

**Oligosaccharides** – “oligo” translates to “few” and “saccharide” to sugar. Chains of individual sugar molecules.

**Disaccharides** – “di” meaning two, a double sugar molecule.

**Monosaccharides** – “mono” meaning single, a single sugar molecule.

**And Polyols** – non-intoxicating alcohol-based sugars.

Essentially, these are all elements that the body struggles to digest naturally. Even in healthy diets. Sufferers of IBS struggle even more with these. The breakdown can create unpleasant by-products and effects such as diarrhoea, pain, bloating and gas.

It has been found, in theory, that if you supplement with a digestive enzyme that contains alpha-galactosidase (an amylase carbohydrate digesting enzyme) then it may help when digesting starchy carbs.

A low FODMAP diet, as well as supplementing additional digestive enzymes, can combat the symptoms of IBS. The key items to watch out for on food labels are additional complex carbohydrate sugars such as Fructose, Lactose and Fructans. Reduce these in your diet for a smaller FODMAP impact.

### What foods can I eat to increase digestive enzymes?

If you're hoping to further boost your digestive enzyme count then you might want to consider foods which will create a surplus thanks to the nutrients within them. You'll want to ensure that your diet is rich in raw and living foods with an overall aim of these making up 75-80% of your diet with the remainder being healthy cooked foods such as brown rice, quinoa, sweet potatoes and cruciferous vegetables (such as broccoli, cabbage, cauliflower).

If you're planning on including cruciferous vegetables we'd recommend steaming them as a boiling process can strip them of all their valuable nutrients. Steaming actually helps your digestion as the process breaks down the cellulose wall which makes digestion harder.

In terms of protein when you cook grass-fed red meats we recommend a medium-rare finish for similar reasons to above. Whilst the thicker proteins are cooked down the vast majority of the nutrition is left for your consumption.

**(Note for Justin:** perhaps an information frame such as the following?)



## What type of digestive enzymes should I take?

Whenever purchasing a new product you'll go through a similar process of consideration. Here are the key areas that you should consider when looking to buy a new digestive enzyme supplement:

- **Quality vs Price** – Everyone loves a bargain! When it comes to digestive enzymes, however, we can't recommend you go for the cheapest you can find. The cheaper they are the more likely that the quality will be low. Digestive enzymes need to survive your stomach's acidic conditions before they can get to work, a cheap product won't manage this.
- **Source** – Where do the enzymes come from? There are 3 major sources when it comes to production: fruit, animal and plant. Fruit (usually from isolated pineapple or papaya) can work for some people but are generally seen to be the weakest form. Animal, also known as pancreatin, are not suitable for vegetarians or vegans but do have success for some people. Plant enzymes, usually sourced from fungus are the most stable, survive the initial digestion process best and have the broadest range of ability.
- **Multiple Enzymes in one tablet** – You're far more likely to see benefits if you select a multi-enzyme supplement. When searching for your product you'll want to search for one which includes; proteases, lipases and amylases/carbohydrases in order to target the different food groups.
- **Ingredients** – just because it's a supplement doesn't mean it might not contain hidden allergens so be sure to check the labels. If you suffer from a typical allergy you'll want to make sure it is clearly marked on the label. If it doesn't say "*contains no: sugar, salt, wheat, gluten, soy, milk, egg, shellfish or preservatives,*" you need to assume that it does.

## How should I take digestive enzymes?

The bottom line is that you should take the supplements with food. Just before you eat is ideal but if you can't or forget then during/after a meal is also helpful. When the supplements are mixed with your food they are given the greatest chance of surviving the high acidity of the stomach. Aim for within 30 minutes either side of your meal.

Earlier we mentioned quality of product. If you've invested in a high-quality product you won't need a high dose to begin to receive the benefits. 1-2 capsules of a high-quality supplement should be enough with a main meal. The majority of people don't feel the need to take them when having a small snack unless they're having a very problematic time with their digestion.

When you've found a dose that works for you, and you're seeing benefits we'd recommend continuing it, especially when you see symptoms beginning to subside. No more bloating, no more indigestion and say goodbye to uncomfortable bathroom trips. If you don't see the benefits try slowly increasing your dosage by one pill per meal and allowing a 3-day test period. This will give you enough time to evaluate your progress.

Digestive enzymes are at their most effective when used in individuals with isolated lactose intolerance or suffer from IBS. Another treatment method known as PERT (Pancreatic Enzyme Replacement Therapy) allows patients to be prescribed prescription pancreatic enzymes to combat exocrine pancreatic insufficiency. This is a diagnosis completed by a qualified physician and only those diagnosed should attempt to use PERT supplements.

## Warnings

Overall digestive enzymes, as an over-the-counter product, are considered to be safe for a healthy user. However, it is recommended that you consult your physician before undertaking any change of diet or begin using supplements.

Some research has shown that alpha-galactosidase based supplements can reduce the effectiveness of some diabetes medication. Therefore, those who suffer from diabetes should consult a physician before use or avoid completely.

Any user of PERT medication should be monitored closely by a medical professional.