

FOOD ACIDS IN THE HUMAN BODY

The acidulants, malic acid, fumaric acid, and citric acid, occur naturally in all living organisms of both the vegetable and animal kingdom. They all play an integral part in the normal respiratory processes in living cells. These compounds are formed in the metabolic cycles in the cells of plants and animals. The acids provide the cell with energy and the carbon skeletons for the formation of amino acids. This takes place in the Krebs cycle.

Food consumption by man is essential for providing energy to keep the engine of the human body running. A bite of food first gets broken up physically in the mouth and mixes with the alkaline saliva, which initiates hydrolysis of starch and sugar. It is then swallowed and passes into the stomach where it is mixed with hydrochloric acid (0.25% to 0.5%) and various enzymes. Here it undergoes mechanical as well as chemical breakdown of especially protein.

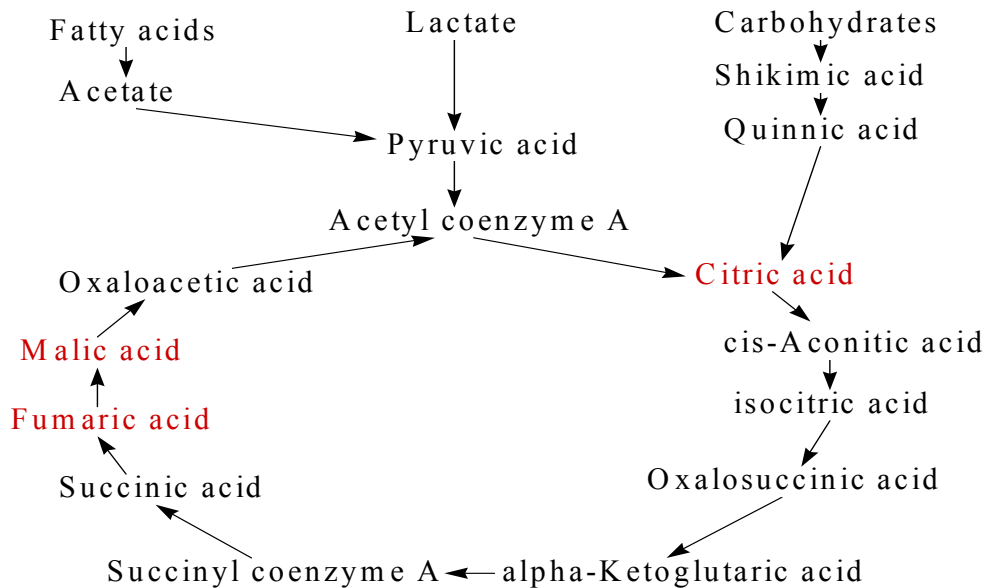
No absorption (except alcohol absorption) takes place in the stomach. After the stomach phase the food passes on into the small intestine where hydrolytic breakdown of the food is completed under mildly alkaline conditions in the presence of more enzymes and an emulsifier (bile). This is also the zone of absorption, where nutriment is absorbed

through the intestinal wall into the bloodstream in the form of amino acids, mono-saccharides, glycerol and emulsified fatty acids. The residue passes through the large intestine, where the main activities of water absorption and proliferation of bacteria takes place, and is in due course excreted.

A compound absorbed into the blood stream, has one of three fates thereafter.

1. It may interfere with the normal workings of the body and will - unless it kills the host first - be converted, probably in the liver, to some innocuous compound which will be filtered out by the kidneys and excreted in the urine.
2. It may simply not fit any metabolic pattern in the body and, when it reaches the kidneys, will be filtered out and excreted in the urine.
3. It may be metabolised, that is, involved in nourishing the body.

Fatty acids, glycerol, and carbohydrates - the food constituents that provide energy - together with amino acids in excess of the amount required for protein building, are broken down (metabolised) in the tissues by a variety of complicated routes, all culminating in an oxidation system known as the Krebs cycle. Thus, has the third of the three fates mentioned above. The Krebs cycle is shown in simplified form below.



This system, variously referred to as the Krebs cycle or the tricarboxylic acid cycle, is a metabolic intermediate cycle involving the terminal steps in the conversion of carbohydrates, fats or proteins to carbon dioxide and water with the concomitant release of energy necessary for growth, movement, luminescence, chemosynthesis and reproduction. The cycle also provides the carbonaceous materials (carbon skeletons) from which amino acids and fats are synthesised by the cell. The Krebs cycle can operate in two directions, i.e. metabolically but also anabolically.

As is clear from the above discussion, the food acids, malic acid, fumaric acid and citric acid, are contained in most of the cells of the human body and those of most other organisms. This of course does not mean that these compounds can never be toxic, they certainly can be, as can water and oxygen, if present in abnormal amounts, but it does mean that they are prima facie acceptable to the body and that routes for their disposal exist. Several, possibly all, are constituents of blood.

This information was compiled by Isegen:

Telephone No: +27 31 9133200

Fax No: +27 31 9025636

Postal address:--

ISEGEN South Africa (Pty) Ltd

PO Box 26127

Isipingo Beach 4115

Republic of South Africa

The information in this document is correct and accurate as far as can currently be ascertained. No guarantee, whether expressly stated or implied, is given in respect of any actions resulting from the use of the information contained herein.