Absorption of Vitamins

Prepared by Dr.K.Radhika,

Assistant Professor, Department of Agricultural Engineering

Vitamins are organic molecules necessary for normal metabolism in animals, but either are not synthesized in the body or are synthesized in inadequate quantities and must be obtained from the diet. Essentially all vitamin absorption occurs in the small intestine.

Absorption of vitamins in the intestine is critical in avoiding deficiency states, and impairment of intestinal vitamin absorption can results from a number of factors, including intestinal disease, genetic disorders in transport molecules, excessive alcohol consumption and interactions with drugs.

Absorption of Water-soluble Vitamins

Most water soluble vitamins are available for intestinal absorption from two sources: 1) the diet, and 2) synthesis by microbes in the large intestine or, in the case of ruminants, the rumen. These dual-origin vitamins include biotin, folic acid, pantothenic acid, riboflavin and thiamin. Ascorbic acid can be synthesized by many animals, but not by primates or guinea pigs, in which it is a true vitamin and must be obtained from dietary sources. Niacin is also a bit different - it can be synthesized within the body from tryptophan but is also absorbed in the intestine from dietary sources.

Water soluble vitamins of dietary origin are absorbed predominantly in the small intestine, whereas those synthesized by microbes in the large intestine are absorbed there. For most of these vitamins, specific carrier-mediated transport systems have been identified that allow uptake from the intestinal lumen into the enterocyte and for export from the basolateral surface of the enterocyte. Some of these transporters are sodium-dependent, while others are not.

Absorption of Fat-soluble Vitamins

The fat soluble vitamins A, D, E and K are absorbed from the intestinal lumen using the same mechanisms used for absorption of other lipids. In short, they are incorporated into mixed micelles with other lipids and bile acids in the lumen of the small intestine and enter the enterocyte largely by diffusion. Within the enterocytge, they are incorporated into chylomicrons and exported via exocytosis into lymph.