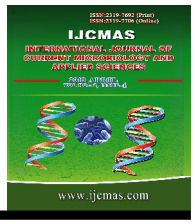
Int.J.Curr.Microbiol.App.Sci (2013) 2(4): 152-154

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 2 Number 4 (2013) pp. 152–154**
http://www.ijcmas.com



Review Article

Health augmenting properties of whey

Rita Narayanan*

*Department of Dairy Science, Madras Veterinary College.
Tamil Nadu, India
**Corresponding author e.mail ID: ritanarayanan@yahoo.com*

Whey is the liquid part of the milk remaining after separation of curd in cheese making. It contains all the constituents of milk except casein, fat and fat soluble vitamins. It is also rich in calcium, phosphorus, essential amino acids and most importantly, water soluble vitamins. The presence of these ingredients makes whey a highly nutritious product (Parekh, 1997).

Bovine milk has about 3.5% protein, 80% of which are caseins and the remaining 20% whey proteins. It contains proteins, lactose, vitamins, minerals and traces of fat (Krissanen, 2007).

In, India chhana is in great demand for the preparation of rasogolla, sandesh and their variants and here whey is obtained as a by product in the manufacture of chhana. The contribution to the total production of whey in different parts of India is not precisely known, although the contribution is expected to be substantially large. Disposal of whey possesses a serious problem to the dairy industry because if the high organic content. It has been estimated that the biological oxygen demand (BOD) of whey ranges from 38,000 to 46,000 ppm as compared to 200 ppm in case of sewage (NDRI, 1978), thus making its disposal a costly proposition. The degree of composition of whey varies depending upon its source eg., chhana whey, cheddar cheese whey, and acid casein whey etc., Chhana whey contains relatively less amount of ash and more amount of lactose, which makes the by-product much more useful as a fermentation base as compared to other sources of whey (Misra, 2000).

Whey could be used in the formulation of nutritive soft drinks or high protein beverages and might be used in with the addition of fruit juices to utilize the potential of whey solids.

Whey proteins are complete, high biological value (HBV) protein. They are a good source of sulfur containing and branched chain amino acids (BCAA). The products made from whey fall into two categories. There are those that are used as products in their own right, such as whey butter and others that form ingredients in a large number of manufactured foods, including ice cream, baked goods, confectionery, meat products, soft drinks,

margarines and spreads (Parekh, 1997). Whey proteins are highly soluble over a wide range of pH and their solubility at low pH is possibly unique. They have good aeration properties and produce firm gel on heating (Puranik, 2006).

Table.1 The following table evaluates the nutritional vale of whey protein with other available proteins.

Types of protein	Average Biological Value
Whey protein	104
Whole Egg protein	100
Milk Protein	92
Beef protein	78
Casein	73
Potato protein	69
Wheat protein	45

Whey Proteins are easily digested and contain an amino acid profile that meets the entire essential amino acid requirement set by the World Health Organisation (FAO/WHO). Beta lactoglobulin is approximately 50% of the total whey protein content in bovine milk. It binds calcium and zinc and has partial sequence homology to retinol binding proteins. Alpha lactalbumin represents 25% of the total whey protein content in bovine milk. Seventy percent of protein in human milk is like whey protein and 41% of that protein is like alpha lacto albumin. Alpha lactalbumin accounts for 28% of the total protein in human milk. Hence bovine alpha lactalbumin is strongly advocated to humanize infant formulas. Serum albumin and immunoglobulins are blood proteins that become incorporated into milk and are recoverable as minor whey proteins (Rosemary Walzem, 1999)

The two other proteins in whey are lactoferrin and lactoperoxidase. Lactoferrin, a milk protein that is now being commercially isolated from whey, has been identified as one of the most interesting nutraceutical food ingredient. It is reported to stimulate intestinal cell growth and the growth of bifidobacteria. The iron binding ability and the ability to transport iron are other recognized benefits of lactoferrin. Lactoferrin is also a selective antimicrobial agent. Through its ability to chelate free iron, it controls Gram negative bacteria and yeast that need iron for growth. (Alan Hugunin, 1999). Lactoperoxidase is an enzyme that has bacteriostatic property. It is used to control acidity development and shift in pH during refrigerated storage. Glycomacropeptide peptide is present in sweet whey but absent in acid whey. This can suppress appetite via stimulation of the pancreatic hormone cholecystokinin release.

Whey is a good source of electrolytes including sodium and potassium, which are required during diarrhea therapy. Minerals such as calcium, magnesium, and phosphorus are present in solution and also partly bound to proteins. Zinc is present in trace amounts (Zadow, 1992). Lactose also promotes absorption of magnesium and zinc ions, which even in trace amount helps in better diarrhoeal management (Ziegler and Fomon, 1983). Over the past two decades, there has been a worldwide increase in the consumption of dairy products containing probiotic bacteria. Focus has generally been on incorporation of selected strains of Bifidobacterium spp. and Lactobacillus spp. into fermented dairy

products. Although some attention has been directed towards the organoleptic characteristics of the product, most publications concerning probiotic bacteria have focused on the human health aspect.

Lactose from whey is an important precursor for prebiotic products. For example galacto oligosaccharides can be produced when lactose is enzymatically hydrolysed. These oligosaccharides are generally recognized as safe (GRAS) as they are constituents of milk and can be produced from ingested lactose by resident intestinal bacteria (Rosemary Walzem, 1999).

Whey carbohydrates are currently the best understood prebiotics. Whey proteins may be particularly effective in situations where host nutrition or intestinal competence is compromised such as during cancer treatment. Functional properties of whey proteins, such as emulsifying water/fat holding, foaming, thickening and gelling properties also make them interesting food ingredients (Hall, 1997).

References

Alan Hugunin., 1999.Whey products in yogurt and fermented dairy products. US00E Monograph.

Hall G.M., and O.Iglesias. 1997. Functional properties of dried milk whey. Food Sci. Technol. Int. 3:381-383.

Krissansen, G.W., 2007. Emerging health properties of whey proteins and their chemical implications. J.Am.Coll.Nutr. 26: 713-723.

Misra,A.K., 2009. Whey management in Dairying. Diary Year Book. 4th Edn, pp 125.

Parekh, J.V., 1997. What's new in whey products. *Dairy India*. 5th Edn. pp.397.

Puranik, D.B., 2006. Whey protein concentrate - A novel functional food ingredient. Dairy year Book. 3rd Edn. pp.220-223.

Rosemary Walzem., 1999. Health enhancing properties of whey proteins and whey fractions.US00E Monograph.

Zadow, J.G., 1992. Whey and lactose processing. Elsevier Applied Science, London.

Ziegler, E.E., and Fomon, S.J. 1983. Lactose enhances mineral absorption in infancy. J. Pediatr. Gastroenterol. 2:288-294.