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# Therapeutic Values of Whey Proteins – A Review

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**Abstract -** *Whey Proteins are one of the renewable products of the milk processing which can have numerous applications in the food and healthcare industries. Whey protein are usually supplied as whey protein concentrates (80% protein) and whey protein isolates (90% protein).The high protein content of these preparations made them ideal for exploitation of both the functional and nutritional properties. These are available as powders, drink or nutritional supplements and can be administered by consumer themselves. A substantial body of research has been accrued which shows that whey protein delivers benefits in all therapeutic and nutritional application fields. These fields include over nutrition, under nutrition, sustained hunger, diabetes, osteoporosis and cardio vascular disease*

***Key Words*: whey protein, whey protein concentrate, whey protein isolate. osteoporosis**

## 1. INTRODUCTION

Whey is the fluid by-product from the precipitation of milk. This is the protein appearing in the supernatant of milk after precipitation is collectively called whey protein. Whey protein which represent 20 % of the total protein content of bovine milk are commonly sold as a nutritional supplement, especially popular for sports and body building applications.

The whey is a dilute nutrient stream. Its composition is near about 94% water (6% total solids), 4.5 % lactose, 0.8% protein and 0.7% minerals (Morr, 1989b). The dried powder is obtained after the dilution of stream. The lactose content is reduced and then dried is called reduced lactose whey powder. Same reducing the mineral content of the whey by the electro dialysis is called demineralised whey. if dried then is demineralised whey powder. And when the protein content of powder is 25% or more the product is termed as whey protein concentrate.

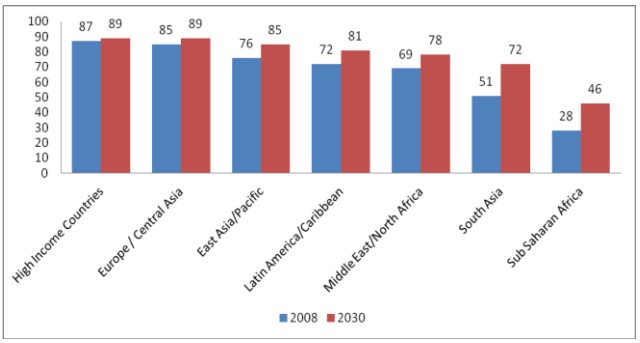
The major whey protein is β- lactoglobulin (β-Lg), with the remainder α-lactoalbumin, bovine serum albumin (BSA), immunoglobulin and peptide components including lactoferrin, lactoperoxidase, lysozyme and growth factors (Qi & Onwulata, 2011; Raikos, 2010). The composaition of whey products are given in table 1.1.

Whey protein ingredients have become increasingly important in functional food over the last many years. Whey proteins are used in infant formulae and also in muscle nutrition due to their high nutritional value. Whey proteins also have functional benefits because of their gelling and water binding capacity. They also have substitute for various ingredients for improved sensory properties.

**Table 1.1 Typical proteins in cheese whey and some of their characteristics (Anon, 2001)**

| Protein | Abundance (%) | Molecular weight | Isoelectric point |
|---|---|---|---|
| β-lactoglobulin | 48 | 18,400-36,900 | 5.2 |
| A-lactoalbumin | 19 | 14,200 | 5.1 |
| Proteose-peptone | 20 | 4000-80,000 | 5.1-6.0 |
| Serum albumin | 6 | 69000 | 4.8 |
| Immunoglobulins | 8 | 160,000 | 5.5-6.8 |

Poor life style choices such as poor diet, lack of physical activities, stress are the main contributors in the development of preventable chronic diseases including obesity, hypertension, cardio vascular diseases and several types of cancer. According to health, nutrition and population family of the world Bank's Human Development Network ( Nikolic, Stanciole & Zaydaman, 2011), these non communicable diseases not only in developed countries but also in developing & poor countries.




Whey protein is considered as a high- quality protein. According to Digestible Indespensable Amino Acid Score ( DIAAS) method developed by The Food and Agricultural Organization of the United Nations (FAO),which measure the digestion of specific amino acids rather than crude protein levels. The therapeutic value of whey protein has grown significantly due to a growing awareness between the diet and health. This study shows the therapeutic and medical nutrition application of whey protein.

**Therapeutic Values of Whey Protein**

**1) Helping to reduce Under nutrition**

Acute malnutrition, resulting from severe under-nourishment due to insufficient calorie and protein intake where an individual has low weight. Inadequate nutrition of women during pregnancy can result in intrauterine growth retardation (IUGR) of the fetus and delivery of an infant with low birth rate (< 2500g). Low birth weight is a risk factor for childhood stunting (Aryastami et al., 2017). Stunting is a slow cumulative process that can begin that can begin in utero when pre conception and pregnant female lack sufficient key nutrients.

Whey protein recently demonstrated to be an effective and affordable recovery agent for malnutrition in young children (Bahwere et al., 2014; Stobaugh et al., 2016).

**2) Immune health**

Whey proteins are rich in the free cysteine which enhances the production of GSH which is important in immune regulation. Ingestion of bovine milk whey proteins, either as a supplement in an adequately balanced diet or as the only protein source in a balance diet, consistently enhanced secondary humoral anti-body responses following systemic immunization with ovalbumin, compared with other protein sources such as soybean protein isolate and ovine colostrums whey proteins (Wong & Watson,1995).

**3) Diabetes**

Diabetes, a chronic disease that is linked to the obesity and heart disease, it affects 10% of adults globally (WHO, 2016b). For the management of type 2 diabetes whey protein supplementation was an effective contributor (Jakubowicz & Froy, 2013; Jakubowicz et al., 2014). Whey proteins have shown promise for improving insulin secretion in patients with type 2 diabetes (Pasin & Comerford, 2015). Whey protein provides more value than equal amount of lower quality proteins that are often higher in fat and cholesterol. In addition, whey protein helps control blood glucose levels and has been shown to be beneficial for weight measurement

**4) Cardiovascular diseases**

Cardiovascular diseases are the main cause of death in developed world, with high blood pressure being a leading modifiable risk factor (Mozaffarian et al., 2016). With the average life expectancy rising each year, it becomes increasingly important to adopt a nutritious diet and regular exercise programme to help maintain a healthy cardiovascular system. Whey protein should be part of that nutritious diet. The consumption of whey proteins lowere ambulatory blood pressure and improved vascular reactivity ( Fekete, Giromini, Chatzidiakou, Givens & Lovegrove, 2016). The current evidence from randomized controlled trials indicates that whey protein supplementation has only a modest effect on lipid metabolism, with a lowering effect on triglycerides, but no effect on total cholesterol, low density or high density lipoprotein cholesterol (Zhang et al., 2016). In vitro and experimental animal studies suggest that peptides derived from glycomacropeptide and lactoferrin may inhibit platelet aggregation and thrombosis. In addition, whey protein may reduce blood cholesterol levels or have a favourable affect on blood lipids levels (Fitzgerald and Miesel,2000;Pins and Keenan, 2002).

**5) Osteoporosis**

Dairy products are widely recognized for their benefits in osteoporosis due to their high level of available calcium. A Japanese company has been successful in producing and marketing a whey protein based ingredients, Milk Basic Protein (MBP) that stimulate proliferation and differentiation of osteoblastic cell. According to Snow Brand Milk, MBP is a multifunctional protein that act directly and indirectly on bone cells to reinforce the bone itself. Daily doses of MBP 40 mg appears to be sufficient to produce significantly increased bone mineral density and reduced bone resorption.

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