WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
Ministry of Health

231, de Saram Place, Colombo 01000, Sri Lanka
Tele: + 94 11 2695112, Fax: +94 11 2696583, E mail: epidunit@sltnet.lk
Epidemiologist: +94 11 2681548, E mail: chepid@sltnet.lk
Web: http://www.epid.gov.lk

Vol. 40 No.35 **24th – 30th August 2013**

VER SRI LANKA - 2013

Whey Protein

Background

Proteins are organic compounds made of amino acids arranged in a linear chain and folded into a globular form. They are also known as polypeptides. Proteins are made up of more than one polypeptide chain connected together.

Proteins are derived from various sources such as milk, meat, egg, soy, wheat etc Milk has two proteins: casein and whey protein. Whey protein is more soluble than casein and also has a higher quality rating. Whey is highly bioavailable and boasts having the highest biological value (BV) of any protein source. Therefore, a whey product may be an excellent choice for those looking for a protein product that can be readily used by the body to build mass (Table 1)

This can further be proven using the Protein Digestibility Corrected Amino Acid Score (PDCAAS) which is a new system that determines the protein quality and is utilized to establish the percent daily value for the nutrients on food labels. The maximum PDCAAS is 1.00, and whey protein has a PDCAAS of 0.99-1.00. Whey protein contains little to no fat, lactose, or cholesterol, and is a rich source of essential amino acids. PDCAAS values of some selected protein types are shown in table 2.

Table 1-protein types and their bio availability

Protein Type	Protein digestibility corrected amino acid source	Biological Value (BV)	Protein Digestibility% (PD)
Whey Protein	1.0	100	99
Whole Egg	1.0	88-100	98
Casein	1.0	80	99
Soy Protein concentration	1.0	74	95
Beef Protein	0.92	80	98
Wheat gluten	0.25	54	91

History

Around 2500 years ago, Hippocrates recommended some drinks to enhance the immune system, power and the muscle growth rate of the body. These old time energy drinks were known as serums. Serums were rich in lactose, minerals and fast absorbing proteins. In the late 16 th century, Switzerland was the place where the importance of whey protein was rediscovered. It was noticed by the farmers that the pigs which slopped on whey developed faster than the pigs which slopped on something else. So, the farmers started drinking the whey themselves.

Whey was an important by-product of cheese production from the first commercial cheese factory in the city of New York. Cheese makers used to dump large amount of whey into lakes and rivers or they used it for irrigating crops. Farmers soon realized that it was not the best use of the whey which was produced, and hence they started mixing the liquid whey with barley or grain to produce high-protein animal feed. In the past 20 years, whey protein has changed from being a waste product of cheese making to a highly valued product rich in nutritional and functional properties.

Protein Source	PDCAAS
Whey protein	1.0
Casein	1.0
Milk protein isolate	1.0
Soy protein isolate	1.0
Egg white powder	1.0
Ground beef	1.0

Contents ***Page***

Whey Protein

Whey protein is a high-quality protein powder from cow's milk. Milk has two proteins: casein (approximately 80%) and whey protein (approximately 20%). Whey proteins are the proteins remaining soluble at pH 4.6 and 20°C after the removal of caseins from milk. (Please refer table 3 for more details)

Amino Acids in Whey Protein

Whey protein is loaded with the essential and non-essential amino acids with few carbohydrates and little fat content. It contains the amino acid cysteine which can be used to make glutathione (GSH). However, this amino acid is not essential for the synthesis of GSH and some studies have suggested that the amount of cysteine in the diet may have little effect on GSH synthesis. However, another study suggested that large amounts of whey protein can increase cellular GSH levels. GSH is an antioxidant that defends the body against free radical damage and some toxins, and studies in animals have suggested that milk proteins might reduce the risk of cancer.

Table 3-Composition of whey proteins

Chemical constituent	Percentage
α-Lactalbumin	11.3-16.5
B-Lactalbumin lactoglobulin	37.9-49.0
IgG	5.0-8.0
Glycomacropeptides	15.0-20.0
Lactoferrin	1.3-1.8
Bovine serum albumin	3.0-5.0

Major forms of whey protein are,

- Whey protein concentrate
- Whey protein isolate
- Hydrolyzed whey protein

Whey protein concentrates (WPC)

WPCs are available in various protein concentration levels such as 34% (WPC34), 50% (WPC50), or 80% (WPC80). Concentrates contain a low level of fat and cholesterol but, in general, have higher levels of bioactive compounds, and carbohydrates in the form of lactose. 70-80% protein content is more available as protein powder supplement.

Whey protein isolate (WPI)

It is the purest form of whey protein and contains 90% or greater protein with minimal lactose (<1%) and virtually no fat and is of high cost. Isolates are processed to remove the fat and lactose, but are usually lower in bioactive compounds.

Hydrolyzed whey protein (WPH)

Hydrolysates are predigested, partially hydrolyzed whey proteins that, as a consequence, are more easily absorbed, but their cost is generally higher. Highly hydrolyzed whey may be less allergenic than other forms of whey. They are very bitter in taste. Hydrolysis process breaks down protein chains into small fractions called peptides

Benefits of Whey Protein

Whey protein contains the highest concentration (23-25%) of branched-chain amino acids (BCAAs) of any single protein source. This BCAA content is important to athletes because BCAAs are an integral part of muscle metabolism and are the first aminoacids sacrificed during intense exercise and muscle catabolism.

Whey also has the ability to enhance endogenous GSH production. GSH is the body's most powerful naturally occurring antioxidant and also plays a role in immune system support.

Whey protein contains quadrapeptides, which have been shown to have opioid effects. This is another powerful functional property that may help decrease the sensation of muscle soreness following intense weight training. Due to its excellent amino acid profile, solubility and digestibility, whey has a very high BV. BV is a measure of how well a protein is utilized by the body. One of the more interesting functional properties of whey protein is its ability to help stimulate IGF4 (Insulin –like growth factor) production. Whey has been shown to reduce cholesterol by inhibiting low-density lipoprotein (LDL) production.

Whey protein has antibacterial, anti-viral activity; also, it reduces liver damage, improves immune system function, digestive function, and blood pressure, and reduces gastric mucosal injury.

Side Effects

Many people cannot tolerate nor have allergic reactions to milk or other dairy products that contain lactose. These people have what is called lactose intolerance. Such lactose intolerant people may develop allergic reactions after having whey protein which is made from milk. However, two forms of this protein - WPIs and WPHs - are processed to remove the fat and lactose, and therefore they might not cause allergy to such people who cannot tolerate milk products.

Whey protein consumed in very high quantities can affect kidney functions negatively. Extremely high doses of whey protein exert unbearable pressure on liver and may lead to liver damage. Again, if whey protein is taken excessively, it can lead to an imbalance of minerals in the bones, causing loss of bone mineral density. This can lead to osteoporosis. Another probable side effect of consuming whey protein is that it can lead to an increase in the pH of blood. Excess protein in the blood makes it difficult for the kidney to metabolize it.

Summary

Whey protein is a pure, natural, high-quality protein from cow's milk. It is a rich source of all of the essential amino acids needed on a daily basis by the body. In its purest form, as WPI, it contains little to no fat, lactose, or cholesterol. Whey protein has one of the highest PDCAAS (a measure of protein bioavailability) and is more rapidly digested than other proteins such as casein. Whey is available in three major forms, i.e. WPCs, WPIs or WPHs. Whey proteins are both easily digested and have excellent metabolic efficiency, giving the protein a high BV. They contain the highest percentage of protein source and BCAAs. BCAAs help stimulate protein synthesis or muscle growth, which is important in muscle building and muscle retention. Whey may also support a healthy response to stress and help maintain healthy levels of the brain's neurotransmitters.

Source-
Whey protein,available from
http://www.scholarsjournal.in/article.asp?issn=2249-5975;year=2011; volume=1;issue=2;spage=69; epage=77;aulast=Gangurde

Compiled by Dr. Madhava Gunasekera of the Epidemiology Unit

Table 4: Selected notifiable diseases reported by Medical Officers of Health 17th - 23rd August (34th Week)

RDHS	Dengue Fever		Dysentery		Encephaliti		E Fever		F Poisoning		Leptospiros		T Fever		V Hepatitis		H Rabies		Chickenpox		Meningitis		Leishmaniasis		WRCD %	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	219	6850	7	152	1	15	3	102	0	39	0	147	0	6	3	62	0	1	1	291	2	38	0	0	**69**	**31**
Gampaha	60	2534	7	144	0	11	3	38	0	26	3	253	1	13	2	143	0	0	2	119	3	71	0	5	**73**	**27**
Kalutara	15	1227	3	127	0	17	1	61	0	14	2	276	0	2	0	17	0	0	1	194	1	53	0	0	**46**	**54**
Kandy	36	1344	6	107	1	8	0	16	0	7	0	55	1	86	1	70	0	0	1	95	0	10	0	2	**78**	**22**
Matale	8	349	1	76	0	4	1	20	0	3	0	49	0	4	0	33	0	0	1	38	0	29	2	8	**69**	**31**
NuwaraEliya	5	183	0	118	0	2	0	9	0	4	0	21	0	54	0	18	0	0	3	79	0	11	0	0	**69**	**31**
Galle	9	624	0	81	0	12	0	3	0	79	4	159	2	40	0	10	0	1	5	233	0	41	0	0	**74**	**26**
Hambantota	4	240	0	37	0	3	0	11	0	30	1	152	0	54	1	74	0	0	1	80	1	38	0	222	**58**	**42**
Matara	5	365	1	64	0	9	0	20	0	27	1	119	4	62	1	128	0	2	0	201	1	56	0	63	**82**	**18**
Jaffna	9	540	5	177	0	7	1	282	0	84	0	7	0	326	0	14	0	1	0	122	3	49	0	0	**83**	**17**
Kilinochchi	0	45	1	18	0	0	0	10	1	5	0	9	0	16	0	0	0	0	0	2	0	7	0	6	**50**	**50**
Mannar	0	57	5	40	0	1	0	57	0	14	0	11	0	18	0	2	0	0	0	11	1	5	0	1	**100**	**0**
Vavuniya	0	58	0	35	0	12	0	8	0	13	0	48	0	2	1	3	0	2	0	20	0	27	0	7	**50**	**50**
Mullaitivu	0	98	0	12	1	2	0	7	0	34	0	36	0	6	0	1	0	2	0	8	0	4	0	12	**40**	**60**
Batticaloa	1	464	6	212	0	4	0	3	0	15	1	30	0	2	0	10	0	3	4	36	0	7	0	0	**86**	**14**
Ampara	4	127	3	85	0	0	0	4	1	7	0	29	0	1	0	3	0	0	2	63	0	12	0	2	**71**	**29**
Trincomalee	7	175	1	50	0	3	0	5	0	1	0	57	0	10	0	3	0	1	0	32	0	4	0	26	**50**	**50**
Kurunegala	25	2312	3	127	1	30	0	33	0	21	7	226	2	30	1	41	0	1	4	277	1	91	0	35	**78**	**22**
Puttalam	9	728	0	53	1	6	0	15	0	35	1	28	0	12	0	5	0	0	1	65	4	26	0	7	**62**	**38**
Anuradhapura	3	405	1	69	0	13	0	3	0	30	2	290	0	18	0	17	0	1	3	135	0	82	15	294	**63**	**37**
Polonnaruwa	11	318	0	51	0	1	0	13	4	57	0	143	0	3	0	24	0	1	1	111	0	16	2	115	**57**	**43**
Badulla	4	377	7	139	0	3	0	14	0	8	1	44	2	63	0	39	0	0	5	95	0	51	0	5	**82**	**18**
Monaragala	3	181	2	85	0	4	0	19	0	20	2	185	5	45	1	69	0	1	0	39	0	19	0	9	**55**	**45**
Ratnapura	20	1431	1	279	2	82	1	35	0	16	7	271	0	47	7	242	0	1	2	122	3	64	0	8	**83**	**17**
Kegalle	16	868	2	95	0	11	0	19	0	8	3	142	0	63	3	169	0	0	1	235	0	89	0	0	**82**	**18**
Kalmune	1	482	1	120	0	2	0	3	0	96	0	7	0	2	0	4	0	0	3	68	0	8	0	1	**46**	**54**
SRI LANKA	**474**	**22382**	**63**	**2553**	**07**	**262**	**10**	**810**	**06**	**693**	**35**	**2794**	**17**	**985**	**21**	**1201**	**00**	**18**	**41**	**2771**	**20**	**908**	**19**	**828**	**70**	**30**

Source: Weekly Returns of Communicable Diseases (WRCD).

***T=**Timeliness refers to returns received on or before 23rd August , 2013 Total number of reporting units 339. Number of reporting units data provided for the current week:236 C** Completeness

A = Cases reported during the current week. **B** = Cumulative cases for the year.**H Rabies***= Human Rabies, **E Fever***=Enteric Fever, **F Poison*** =Food Poisoning, **T Fever***=Typhus Fever, **V Hepatitis***=Viral Hepatitis

Table 1: Vaccine-Preventable Diseases & AFP

17th – 23rd August (34th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2013	Number of cases during same week in 2012	Total number of cases to date in 2013	Total number of cases to date in 2012	Difference between the number of cases to date in 2013 & 2012
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	00	00	00	00	00	00	01	58	52	+ 11.5 %
Diphtheria	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Mumps	01	01	01	04	03	01	03	00	00	14	64	1081	3269	- 66.9 %
Measles	36	03	15	00	04	06	04	02	44	114	02	2335	38	+ 6044.7 %
Rubella	00	00	00	00	00	00	00	00	00	00	-	21	-	-
CRS**	00	00	00	00	00	00	00	00	00	00	-	06	-	-
Tetanus	00	00	00	00	00	00	00	00	00	00	00	13	08	+ 62.5 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	-	00	-	-
Japanese Encephalitis	00	00	00	00	00	01	00	00	00	00	-	65	-	-
Whooping Cough	00	00	01	00	00	00	01	00	01	03	00	41	34	+ 20.6 %
Tuberculosis	04	05	03	00	07	00	07	12	53	91	142	5638	5905	- 04.5 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS =**Congenital Rubella Syndrome

AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH

Dengue Prevention and Control Health Messages

To prevent dengue, remove mosquito breeding places in and around your home, workplace or school once a week.

PRINTING OF THIS PUBLICATION IS FUNDED BY THE WORLD HEALTH ORGANIZATION (WHO).

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

ON STATE SERVICE

Dr. P. PALIHAWADANA
CHIEF EPIDEMIOLOGIST
EPIDEMIOLOGY UNIT
231, DE SARAM PLACE
COLOMBO 10