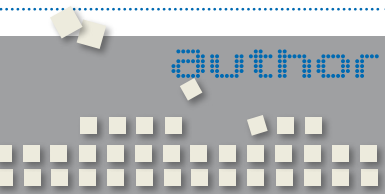


Why Whey?

Whey on YouTube: Mind the Kids



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Whey products have reached the Internet: a quick Google search shows 9,050,000 entries for “Whey” and roughly 2,000,000 for “Whey and Women”, and more than 300,000 Whey Blogs, respectively. YouTube as a major video and music platform of the younger generation registers at least 2,200 entries on “Whey”, many of them being videos of companies advertising whey products for muscle enhancement and weight control, typically addressing the kid’s interest in funny, partly crazy action.

“Under YouTube you would find anything like whey product information, education, discussion fora and recipes”, said Karin E Nielsen, Executive Director, Bio2Com ApS during a Whey Innovation Conference organised by FI Europe and IDF in June. Marketing channels like Web sites, YouTube, E-books, Games and MMS will become more and more important. Mothers still form a very influential consumer group, but kids are expected to become self-confident decision-makers quickly and mothers’ influence on purchase decisions seems to be shrinking.

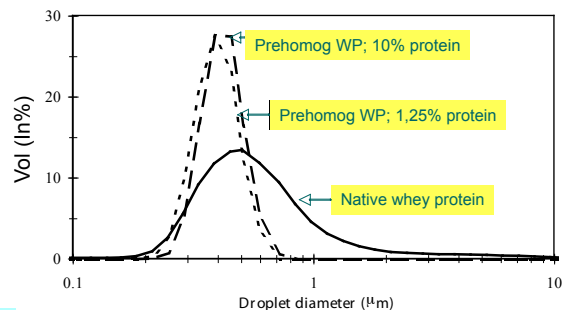
Muscle gain, weight control and satiety?

Fonterra is actually examining the muscle protective effects of whey for the aging population. “Poverty of the flesh” describes the process of muscle decrease over the age of 30. One reason is the age-reduced response to amino acids. Younger people are known to have a 50% higher protein synthesis compared to elderly, stated Fonterra nutritionist Elizabeth Reid.

According to latest studies, rapidly digested whey protein was more efficient than the slowly digested casein in increasing the post-

Effect of ‘Pre-homogenisation’ of whey protein on subsequent emulsification efficiency

- Oil droplet size distribution of emulsions stabilised by “pre-homogenised” (450 bar, 1 pass) whey protein prior to oil addition (20%) and subsequent homogenisation



Pre-homogenisation of native whey protein improves emulsification efficiency and is independent of protein concentration

Source: Phil Kelly & Brendan O’Kennedy, TEAGASC, Moorepark Food Research Centre, Fermoy, Co. Cork-IRELAND



prandial net protein synthesis. Whey protein has a high nutritional quality, good digestibility, promotes weight loss and modulates satiety. The problem of lactose intolerance can be solved by hydrolysis resulting in higher solubility while doubling sweetness. Demineralization of permeate has become cheap by nanofiltration and calcium is easily removed through ion exchange. Hydrolysed lactose comprises 50% of the sweetness of sucrose, the resulting galactose can be isomerized to tagatose which shows 92% sweetness of sucrose but only 34% of its calories. Whey derived oligosaccharides are increasingly used in baby foods. Hydrolysis also improves solubility and digestibility of feeding stuffs for animals.

The only problem is taste, some blogs talking about hydrolysed whey products say “just recently bought some whey protein powder to gain some muscle and OMG does it taste like ****”. But that can be masked easily when mixed with other ingredients.

Technological advancements

In recent years, TEAGASC Moorepark Food Research Centre (MFRC), Ireland has developed and optimised the technology for the manufacture of alpha-lactalbumin enriched whey protein concentrate. Actually, MFRC Dairy Researcher Dr. Phil Kelly explores the

performance of whey-based emulsions in model systems and food formulations. “The ever growing range of functional and nutritional properties of whey proteins creates challenges for food formulators and application of technological processes”, said Kelly, who is also Chair of the IDF expert panel on dairy science and technology. Whey proteins are susceptible to heat denaturation, aggregation and x-linking, they have a lesser steric stabilising capacity than casein and whey stabilised emulsions are susceptible to heat-induced flocculation and thickening. Research at MFRC has shown that pre-treatment of whey proteins prior to introduction of oil, in food formulation, can play a major role in the rheological behaviour of the final product.

Shear forces (e.g. homogenisation) change the conformational state of proteins, enhance their emulsification efficiency and their reactivity to added salts.

Heat denaturation/unfolding of the protein molecules is concentration dependant. The higher the concentration, the greater the aggregation and therefore the greater the effect on emulsification efficiency and subsequent rheological behaviour. Replacement of a small proportion of WPI with Na caseinate (0.15%) prevents droplet flocculation and heat-induced emulsion viscosity increase.



Whey Innovation Conference organised by Fi Europe and IDF in June: "Claims need to meet sophisticated, scientifically validated criteria"

No data, no claims

The legal framework for claims is set by EU Regulation (EC) 1926/2006 on nutrition and Health Claims made on foods. This somehow scary ruling limits industry's efforts to establish new products by requiring any such claims to meet most sophisticated, scientifically validated criteria. Expert lead discussions clearly showed that there is a huge potential for new whey based products in the near future. However, applicants experience sharp negative reactions from the European Food Safety Authority, the EC institution charged with the evaluation of claims.

In regard to risk reduction claims, risk factors must be measurable. In that case biomarkers and symptoms could be considered. "However, in the case of a poor diet it will be difficult to demonstrate it is really a risk factor", said Judith Bryans, Director, UK Dairy Council.

As IDM inquired during a discussion round of the FIE/IDF Amsterdam Conference the EFSA procedure is different from the Food and Drug Administration procedures in the U.S. where more flexibility and a more liberal approach is applied. The EC Commission therefore must look at these differences when it comes to importation into the EC of products made in the U.S.

And now we know why whey.

Cold gelation



Dr. Arno Alting, NIZO food research, and his tailor-made WPI aggregates (photo: NIZO)

At Nizo Food Research (NL), science has recently focused on innovative processes such as cold gelation of WPI. Arno Alting (photo) demonstrated at the Whey Innovation Conference how NIZO assists the industry in arriving at tailor-made WPI aggregates. WPI aggregates with different isoelectric points have different, pH-dependant points of gela-

tion. SDS gel electrophoresis showed disulfide cross-linked aggregates at acidic conditions after gelation. This S-S stabilized protein network forms a very strong gel. Experiments underline that hardness is defined by the number of thiol groups rather than by structural properties. In conclusion, the net electric charge determines pH of gelation, the formation of disulfide bonds preferably takes place at a pH lower than 3.5. Dr. Alting: "The resulting S-S Bonds attribute strongly to mechanical properties while preventing syneresis. Cold gelling particles can be applied in yoghurt for acid-induced gelation of heated milk, for tuning flavour perception, and for e.g. whey protein protein-based encapsulates with air as a fat replacer in ice cream."

