

## Some aspects on the use of milk powder in treating malnourished children

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### The Use of Whey or Skimmed Milk Powder in Fortified Blended Foods for Vulnerable Groups<sup>1,2</sup>

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#### Abstract

Fortified blended foods (FBF), especially corn soy blend, are used as food aid for millions of people worldwide, especially in developing countries. The use of whey or skimmed milk powder (WPC or SMP) in FBF is discussed.

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**TABLE 7** Effects of adding WPC or SMP to FBF

#### Adding WPC or SMP to FBF

Advantages	Improves the protein quality, measured as PDCAAS. With improved protein quality it is possible to reduce the total amount of protein in the blend, which could have potential metabolic advantages. Allows for a reduced content of soy and cereal and thereby a reduction of potential antinutritional effects. Likely to improve weight gain, linear growth, and recovery from malnutrition, but studies are needed to confirm this. Improves flavor; SMP more so than WPC.
Disadvantages	Increases the price considerably, which is an important limiting factor in all relief feeding. Adds lactose to the product, which could potentially have negative effects, but which is not likely to be important in the amounts suggested.

**TABLE 7** Conclusions of adding WPC or SMP to FBF

Using whey (WPC34%) compared with SMP	
Advantages	Has been 25–33% less expensive up to early 2007. Has a slightly better protein quality measured as PDCAAS, but not likely to be important. Potential beneficial effects on the immune system and muscle synthesis have been suggested, but convincing evidence is lacking. Relevant to perform studies to examine this further. We have not been able to identify studies suggesting that casein-dominated milk powders such as SMP have advantages over whey.
Disadvantages	Might in the future be more expensive than SMP. Might not be as widely available as SMP. Does not improve flavor to the same degree as SMP.

**TABLE 4** Typical prices of SMP, WP, and FBF. March 2007<sup>1</sup>

Commodity	US\$/kg product	US\$/kg protein
SMP	2.35	6.73
WPI > 90%	7.26	8.07
WPC80%	6.27	7.84
WPC34%	2.64	7.76
WP (13%)	1.10	9.17
CSB <sup>2</sup>	0.38 (0.36–0.40)	2.18
WSB <sup>2</sup>	0.47 (0.40–0.54)	2.35

<sup>1</sup> Sources: USDA, National Agricultural Statistics Service and WFP.

<sup>2</sup> Values are means (ranges).

**Whey is again cheaper than DSM – approximately 25%**

## Lactose content w/w%

- SMP 51%
- WPC 34% 50%
- WPC 80% 10%
- WPI >90% ~1%
- Casein ~0%

## Lactose intolerance

- Not likely to be a problem in blended food where milk is added
- Lactose content can be reduced by using a more concentrated whey product like WPC80%
- However, animal studies support that lactose might have a beneficial effect on growth
  - High digestibility
  - Enhanced calcium absorption
  - Beneficial luminal effects

## Cow's MILK AND LINEAR GROWTH IN INDUSTRIALIZED AND DEVELOPING COUNTRIES

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**Key Words** growth factors, IGF-I, insulin, noncommunicable diseases, bioactive peptides

■ **Abstract** The strongest evidence that cow's milk stimulates linear growth comes from observational and intervention studies in developing countries that show considerable effects. Additionally, many observational studies from well-nourished populations

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## Conclusions on cow's milk and linear growth

- The strongest evidence that cow's milk stimulates linear growth comes from observational and intervention studies in developing countries
- Additionally, many observational studies from well-nourished populations also show an association between milk intake and growth
- These results suggest that milk has a growth-stimulating effect even in situations where the nutrient intake is adequate.

## The potential of using weanling pigs as a model for treating malnourished children



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Gastrointestinal and body growth in colostrum-deprived piglets in response to whey, casein or soy protein diets

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- Newborn term piglets
- Injection of sow serum and antibiotic treatment
- Tube fed – formula with 55 g protein/L
- Protein source
  - Whey n=11
  - Casein n=11
  - Soy protein hydrolysate n=10
- 6 days intervention
- Dexa day 1 and 6, LM test at day 6



## Results

- Weight gain:
  - Whey 21%<sup>a</sup>
  - Casein 10%<sup>b</sup>
  - Soy -2%<sup>c</sup>
- Relative weight of small intestine lower in soy piglets
- Stools
  - Whey yellow soft
  - Casein yellow watery - some abdominal distention
  - Soy persistent fatty



Change in body composition, espec. lean body mass, is an important outcome of treatment of malnutrition

The PEA POD Infant Body Composition System installed at Jimma University, Ethiopia September 2008



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