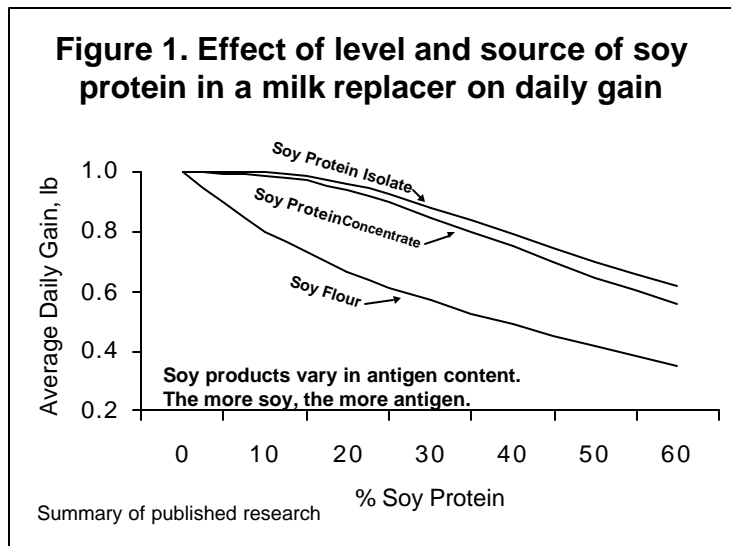


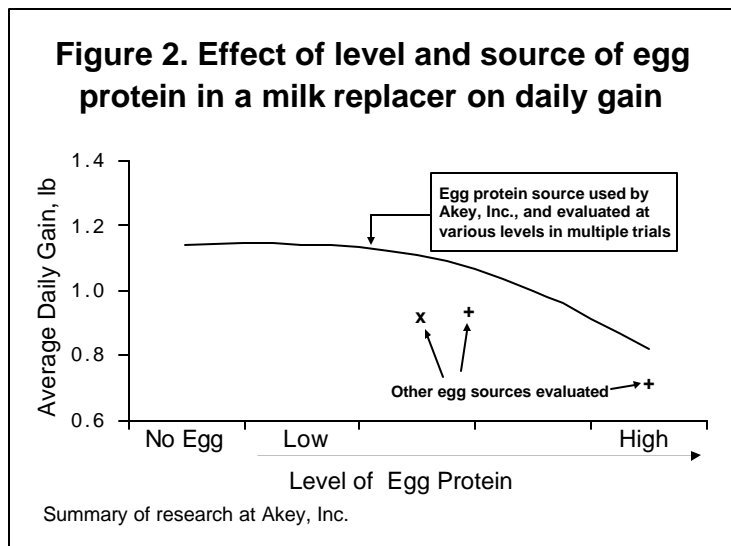
## Milk Replacer Research Using Soy and Egg Proteins in Milk Replacers

Egg proteins have been used in milk replacers (MR) for several years; however, the use of egg protein as an alternative protein is not as popular as the use of various soy proteins. Soy proteins have typically been and still are less expensive per unit protein than egg proteins. However, soy proteins have been recognized to have anti-nutritional factors (antigens) that will reduce the absorption of nutrients and growth rates of young calves when used at high levels. Both egg and soy proteins are less expensive per unit protein than milk proteins.

Soy proteins for milk replacers are well researched. Figure 1 shows the effects of increasing the level of soy protein on rate of gain in neonatal calves. This summary of published research shows that as the level of the three main types of soy proteins (soy flour, SF; concentrate, SPC; or isolate, SPI) increases, gains decrease. The least refined soy protein, SF, should not be used in a MR because, it results in depressions in gain. However, SPC and SPI can be included at levels up to 15 or 20% of the protein without affecting gains. Exceeding these levels will depress gains.



Egg proteins in calf MR have not been researched extensively. Akey, Inc., has evaluated the use of various sources of egg protein in calf MR in several research trials. We have observed a large performance difference among sources of egg. Figure 2 shows the daily gain response to adding various levels of egg protein to MR. The solid line is the summary of multiple trials evaluating the level of a single source of egg. This source of egg can substitute well for milk protein up to the optimum level.



Other sources of egg have been evaluated (as shown by the symbols in Figure 2) and gains have been considerably lower. The reason for the difference in gains among sources of egg could be the proportion of egg white to yolk, drying temperatures, contamination, or other handling conditions of the egg prior to drying. Akey, Inc., only uses the source of egg denoted by the solid line. This source of egg is guaranteed salmonella-free.

Table 1 shows the calf performance when two egg sources were included at 20% of protein in a MR. There is a \$12.50 difference in value per calf between the two sources of egg. Knowing the quality and subsequent calf performance characteristics of egg sources is very important to the bottom line of the person raising the calves. Table 2 shows the value of combining the appropriate levels of soy and protein with milk protein to lower the feed costs per unit gain without sacrificing performance in neonatal calves. Taking advantage of the knowledge gained from research allows Akey, Inc. to supply the industry with performance oriented, cost-effective nutritional products.

**Table 1. Performance and value of milk replacers with equal levels of egg protein from different egg sources compared to all milk protein**

Milk Replacer	Daily Gain, lb	Starter Intake, lb	Fecal Score, 1=Normal 5=Severe	Total Medicine Treatments	Value of Gain over Starter & Medicine, \$/head
All Milk Protein	1.13	1.20	1.54	5.25	\$53.57
Akey Egg	1.12	1.19	1.54	4.60	\$53.54
Alternate Egg	.93	1.04	1.59	5.50	\$41.03

Assumed costs: \$.15/lb for the starter, \$2/medicine treatment, and \$1.50/lb of calf gain.

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**Table 2. Performance and value of Akey Infiniti milk replacer which contains a blend of milk, soy, and egg proteins compared to all milk protein products**

Milk Replacer	Daily Gain, lb	Value of Gain Over Starter & Medicine, \$/head	Feed Costs/lb Gain, \$/lb
Akey White Gold	1.05	\$47.18	\$.817
Akey Infiniti	1.03	\$47.39	\$.806
Commercial MR A	.91	\$39.12	\$.919
Commercial MR B	.89	\$34.86	\$.937
Commercial MR C	.85	\$34.04	\$.974

Assumed costs: \$.15/lb for the starter, \$.65/lb for Infiniti MR, \$.70/lb for the other MR, \$2/medicine treatment, and \$1.50/lb of calf gain.

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