

# The DIY (Do It Yourself) Alpaca Feeding System



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The recession has been hard on everyone, including alpaca producers. Decreased sales and rising feed prices have forced producers to look for ways to cut expenses. Feed costs are one area where producers can make savvy changes to save money and improve herd health and productivity. The DIY (do it yourself) alpaca feeding program includes:

- Regular body scoring, two to four times a year
- Weaning most males off of pelleted supplements (including crumbles)
- Use of simple, pre-formulated one-to-three ingredient protein/energy supplements
- Substitution of locally purchased mineral mix for pricier specialty mixes
- Daily and preventive use of probiotics to keep animals healthy and reduce vet bills

Moving away from pelleted feed may seem scary because there is a serious lack of information about alternatives available to producers. In fact, this program, taken as a whole, may sound daunting. Please be aware that each of the individual steps listed above can also be taken without the rest

and still reap economic and health rewards. However, when all the above steps are taken together, they work synergistically.

### DIY Alpaca feeding basics

Alpacas must have the following:

- Free-choice clean water
- A roughage source (may be either pasture or hay), provided free-choice for animals at or below ideal weight. (Grazing and manger time should be restricted for obese alpacas.)
- Free-choice mineral mix appropriate for the location

**Note:** A protein/energy supplement is not listed. The only time one should be fed is during lactation, or for any animals that are underweight. The trick is to separate protein/energy sources from vitamins and minerals. That is the only way a producer can gain real control of their animals' intake.

### Body scoring

It is difficult to over-emphasize the importance of body condition scoring (BCS) or "body scoring." Body scoring requires the producer to feel the area immediately adjacent to the spinal processes. The two most popular systems use a scale of

1 to 5 or 1 to 10, with either 2.5 or 5 being ideal. An animal's condition will directly impact both its health and its productivity. Those that are either under- or overweight will have reduced fertility, and perhaps reduced fetal and cria survival as well. There is a list of health problems associated with obesity, including foot and leg problems and fatty udders. Body scoring on a regular basis can help keep animals close to their ideal weights.

### Body scoring should always be done:

- **Prior to parturition**—this alerts the producer to animals with subpar or borderline weight going into a very critical time. Lactation is the most energy-demanding period in a female's life. It is difficult, if not impossible, to gain weight during early lactation.
- **Prior to weaning**—animals that were flagged prior to delivery can be double-checked and even have the cria weaned early if the weight loss is severe enough. There is a window of three to four months immediately following weaning when energy demand for milk production is zero and energy required for growth of the next fetus (fetal hypertrophy or enlargement) is minimal. This is the most efficient time for female weight gain. Fetal hypertrophy and lactation have priority over maternal needs; they have first dibs on any groceries that come in the front door. If feed energy is inadequate, then the dam's body is utilized instead. Fat deposits are exhausted, followed by conversion of muscle protein to energy via gluconeogenesis (literally meaning, "glucose from a new source"). Survival of the offspring is a biological imperative.

Body scoring is particularly important for pregnant and nursing females, because lactation creates a high energy demand.



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**Body scoring at these additional times is strongly recommended:**

- **Between weaning and the next successive lactation**—how well is the feeding program working? Are the underweight girls gaining sufficiently quickly to be ready for the next lactation?

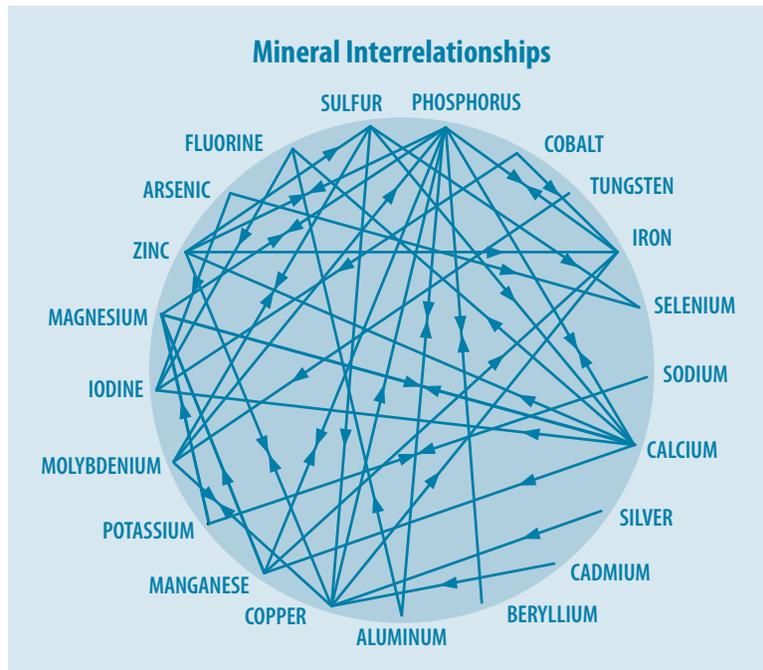
- **Between parturition and weaning**—diet manipulation can limit weight loss during the most demanding phase.

Body scoring should be used with any feeding program. It should guide the producer on the effectiveness of what, and how much, to feed. Bag labels routinely recommend over-feeding; the idea is to sell feed. Be aware that scale weights are not the same thing as body scoring. The latter requires a hands-on approach. Both can be done in the same session. Record both body scores and weights.

### Adult males and protein/energy supplements

Most adult males do not need protein and energy supplements. The main exceptions are those that are underweight. Let's face it, males spend most of their time fighting, playing, and breeding. None of these activities even comes close to the energy required to nurse a cria. When pelleted supplements are fed in order to meet mineral needs, over-feeding can result. Males can become obese and expensive feed is wasted. Males' mineral requirements can be met by a good local mineral mix, as described below.

Some producers feel that weaning males off of pellets is cruel and unjustified. Too many males have been raised on pellets since weaning. Do not deprive them of



**Figure 1. Mineral interactions (Mulder chart)**

well have been done outside the academic arena. However, results are considered “anecdotal” unless they have gone through rigorous review and statistical analysis. Anecdotal results have their own value, especially since they can lead to university trials and eventual publication.

Mineral mixes “formulated

for alpacas” are either based on requirements for cattle, sheep, or goats, or worse, by guess and by golly. Do you really want to pay extra for such a product?

Gestation/lactation supplements, fiber nutrients, and free-choice minerals are often fed in combination and can lead to over-mineralization. Minerals are inter-related—when one is fed in excess, one or more other minerals may become deficient (see figure 1). More is not better where minerals are concerned. Over-mineralization can lead to reduced productivity (including fertility issues, cria birth rate and survival, and fiber quality).

An alternative is to feed a protein/energy supplement that does not contain minerals, along with a mineral mix that contains only vitamins and minerals. Tune out the hype and check out your local feed mill or feed store. There is a range of products that may be available in your area. First, look for an all-purpose mix designed for most livestock (pigs, chickens, cattle, sheep, and goats). These usually contain both fat- and water-soluble vitamins (vitamins A, D, E, and K, and B-vitamins, respectively), as well as minerals.

While most B-vitamins are generated by microorganisms in the healthy adult rumen, most fat-soluble vitamins are not. Make sure these are in any mineral mix you are considering. An all-purpose mix

their daily treat all at once—that would induce stress and resentment. Wean them off of pellets slowly. Reward their good behavior with the occasional small amount of oats or cracked corn.

### Local mineral mixes

One way that any producer can save money is to buy local mineral mixes. Although local mineral mixes are suggested for anyone considering the DIY system, they may be used with any feeding system.

For any producers who are convinced they should only use a mineral mix “formulated for alpacas,” here is some food for thought:

Precious little alpaca nutrition research has been published in peer-reviewed journals (e.g., the *Journal of Animal Science* or the *Journal of Nutrition*). In fact, as of January, 2012, there is only one peer-reviewed paper that has anything to do with nutrition (Reiner et al., 1987), and that one has nothing to do with minerals.

A glance at the chapter on mineral nutrition in the *National Research Council's Nutrient Requirements of Small Ruminants* (a compendium of peer-reviewed nutritional research on sheep, goats, New World camelids, and cervids), and one is likely to notice that there are no sections that describe the mineral requirements of camelids. This is not because they don't need minerals, it is because there is no research to cite. NRC publications are used by nutritionists to formulate diets.

Nutritional studies involving alpacas may

Energy sources (added at approx. 65%)		Protein sources (added at approx. 25%)		Other (added at 10%)	
Ingredient	CP(%)	Ingredient	CP(%)	Ingredient	CP(%)
Cracked corn	9.0	Soybean meal	41.1	Beet pulp	11.0
Rolled or crimped oats	13.0	Alfalfa meal	19.0	Flax seed	33.6

Table 1. Ingredients and crude protein levels used in simple two- or three-ingredient protein/energy supplements (NRC)

is preferred because most mineral mixes formulated specifically for cattle or sheep usually lack most B-vitamins. Many B-vitamins are involved in energy metabolism. Animals that do not have a functioning rumen, or are stressed, unhealthy or not eating normally may not have an adequate supply. Such animals must be supplemented via a mineral mix, vitamin paste or concentrated probiotic paste or drench. Not all probiotic products contain vitamins—read the label.

If you live in an area with high soil copper levels, consider a mineral mix formulated for sheep. Sheep mineral is formulated without copper. If copper is not an issue, look at the cattle mixes. Some stores or mills offer different mineral mixes for different seasons of the year. This is to coordinate with pasture quality or the feeding of hay. If your animals are on dry lot, then choose the mineral mix intended for winter feeding.

If you have a large farm, or grow your own forages, then consider getting your soil tested and having a mineral mix formulated specifically for you.

Many producers complain that their animals will not eat mineral mixes. First, keep the mix fresh and out of the weather. Second, mix it with a small amount of grain (i.e., cracked corn) to encourage interest. Control the amount of grain to keep the mineral mix disappearing at the expected rate. On the other hand, if the mineral mix is disappearing too quickly, even without the addition of grain, then add salt. Start by adding a small amount; adjust up or down to get the desired disappearance. Note: animals in dry lot get bored and may eat more than they actually need. Do not expect alpacas to instinctively know what minerals they need, and to regulate their intake based on that requirement.

### Simple pre-formulated protein/energy supplements

Above is a table of common ingredients used in protein/energy supplements. These supplements primarily supply energy (approximately 85 percent). Most dietary protein is broken down by microbes in the rumen and used for either of two things: building microbial bodies (microbial protein); or conversion to energy, which is then absorbed as volatile fatty acids (VFAs).

Microbes are digested by alpaca enzymes once they pass into the small intestine. Microbial protein usually supplies all the protein alpacas require. Additional protein may be needed if the animal is on poor quality roughage. Poor quality pasture or hay may lack sufficient nitrogen for microbial protein synthesis. We feed the microbes, in turn, they feed the alpacas. The VFAs produced by microbial digestion are easily absorbed by the finger-like projections (papillae) that line the rumen.

Protein/energy supplements are formulated to 15 percent crude protein (CP). However, to simplify formulation for the DIY system, the actual CP of the pre-formulated supplement may be less. Increase or decrease the amount of the supplements listed below depending on changes in body score, either up or down.

**IMPORTANT:** Always base any adjustment of intake on body score.

### A simple solution

Consider the simplest solution: start with one ingredient, either rolled or crimped oats.

Why oats? Because they contain both more CP and more total fiber (a combination of soluble and insoluble complex carbohydrates) than other grains. Energy from fiber is released more slowly compared to corn and does not provoke founder. Although controversy exists regarding the threat of founder in alpacas, the same

metabolic scenario occurs in pseudo-ruminants, such as alpacas, as in other livestock. The rapid release of VFAs from the fermentation of large amounts of either soluble carbohydrates (grain) or protein can overwhelm the usual route for VFA absorption and assimilation. Primary symptoms involve the feet.

At first glance, one might feel that there is no financial benefit to feeding oats, since a 50-pound bag may cost almost as much as some pellets. However, there is actually more energy in a cup of oats than there is in the same quantity of many pelleted feeds. This is because pellets contain more than protein and energy, including vitamins, minerals and fillers that dilute the energy value.

Regular body scoring is critical when feeding oats. Producers are likely to be surprised that they may have to decrease oat intake to maintain animal condition. Although alpacas may hesitate to eat oats at first, they will be downing them with gusto within a day.

**IMPORTANT:** Never switch from pellets to any of the supplements listed here “cold turkey.” Always gradually introduce the new feed. For example, feed 75 percent pellets with 25 percent oats for several days. Then increase it to 50/50 for several more days. The process should take a minimum of two weeks to accommodate shifts in rumen microbial populations.

Here are some other options.

#### ■ Two-ingredient supplements

- Cracked corn **OR** rolled/crimped oats (75% or 0.75) **and** Soybean meal (25% or 0.25)
- Cracked corn **OR** rolled/crimped oats (50% or 0.50) **and** Alfalfa meal (50% or 0.50)

### ■ Three-ingredient supplements

- Cracked corn **OR** rolled/crimped oats (65% or 0.65) **and** Soybean meal (25% or 0.25) **and** Whole flax seed **OR** beet pulp (10% or 0.1)

- Cracked corn **OR** rolled/crimped oats (45% or 0.45) **and** Alfalfa meal (45% or 0.45) **and** Whole flax seed **OR** beet pulp (10% or 0.1)

### How to use these formulas

Say you want to mix the supplement in a large (clean) garbage can. Buy 50-pound bags of the ingredients you want to use. Call local mills and feed stores to save leg work—not all mills stock all of the above ingredients. In some cases, mills can order what you need. Ingredient availability may limit which formula you ultimately use.

Guess-timate how much that garbage can will hold (in round numbers to make it simpler). Then multiply the decimal number listed after the percent in the formulas above to get the amount that has to be weighed out for each ingredient. A 33-gallon trash can might be able to hold 100 pounds if all the ingredients are dense (such as corn, soybean meal, and flax seed). Some experimentation may be necessary.

Most alpaca producers have access to a flat-bed scale to weigh their animals. These can also be used to weigh out each ingredient. Use separate containers to hold each ingredient, especially if you are not sure the finished product will fit in the garbage can.

Layer ingredients into the garbage can, but only in an amount you can easily mix by hand (with a hand tool of some kind). Some muscle will be required here. Do not expect your final product to be perfectly mixed. Not every mouthful has to be perfectly formulated. It all gets mixed again once it is in the alpaca anyway.

The final product can be stored in the garbage can as long as it is kept tightly sealed.

If hand mixing isn't your bag, find a local mill that will mix a larger batch of your chosen formulation. They can also bag the finished product. Store it in a rodent- and



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insect-proof structure. Mills usually require minimum batches of 500 or 1,000 pounds.

### Probiotics

You have probably noticed a recurring theme regarding microorganisms. We feed them so they can feed the alpacas. To put it bluntly, alpacas would not be able to survive, let alone multiply, without them. These vital players also happen to be vulnerable to stress: whether emotional (weaning, change in location, herd- or pen-mates, or owners), nutritional (both changes in quantity and quality of feed), or environmental (extremes and fluctuations in temperature or unseasonable temperatures, either hot or cold).

Rumen microorganisms are also killed by antibiotics. Most antibiotics available for use in alpacas are broad-spectrum. They kill with all the finesse of a nuclear bomb. Use antibiotics (including products sold by veterinarians to treat or prevent ulcers) with great caution.

Although it can be minimized, stress can never be totally avoided. Fortunately there is a safe, natural solution. Products that

contain high concentrations of beneficial microbes (probiotics or direct-fed microbials) are sold in some feed stores and online. They usually come in two distinct concentrations: a lower concentration for daily feeding, and a much higher dose for prevention or treatment of illness.

The probiotics meant for daily feeding usually come in a dry form that can be easily mixed with any of the protein/energy supplements listed above. The dry form is the easiest to use and has the best palatability.

Concentrated forms used for treatment and prevention usually come in either a paste or drench. Either form can be used for sick animals and should be given orally to those that are not eating. Look for guaranteed total microbial content of around 109, or 1 billion CFU (colony forming units).

Prevention is always cheaper than treatment, especially when a vet is involved. Use concentrated probiotics for several days before and after major stresses such as weaning, transportation, and showing.

Although the DIY system is more effective when all the above steps are followed, individual steps can be included in conventional feeding systems. Body scoring, switching from pellets to a home-made protein/energy mix, locally-purchased mineral mixes, and probiotics are powerful tools to reinvestigate herd health and productivity.

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