Top ten tips of alpaca nutrition

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1. How much to feed?

Alpacas will eat approximately 1.5% of their body weight as dry matter to maintain body weight (i.e. not growing, pregnant or lactating; Table 1).
Feed up to maintenance requirements with palatable, digestible roughage (leafy, green pasture, hay, silage).
E.g. 70 kg alpaca:

70 kg x 1.5% of body weight = 1.05 kg as dry matter (DM) i.e. all water removed from feed

1.1 kg DM x 100/20 = 5.3 kg lush pasture/day (grass with 20% DM content)
1.1 kg DM x 100/90 = 1.2 kg pasture hay/day (hay with 90% DM content)

Growing alpacas and late-pregnant and lactating females will eat about 2-2.5% of their body weight as dry matter. Feed up to maintenance requirements with *palatable, digestible* roughage (leafy, green pasture, hay, silage). Then supplement with energy/protein as required (good quality lucerne hay/oats/lupins/peas).

Table 1. Summary of feed requirements in alpacas.

Feed requirements Av. female 60-80 kg Av. male 70-90 kg	**Maintenance** (> 2.5-3 years of age)	**Growth** (crias should double birth weight by 50 days of age)	**Lactation** (peak milk output 2-4 weeks post-partum)
Dry Matter Intake (DMI % BW/d)	1.5% (1.1-1.6%)	1.8-2%	2-2.5%
Crude Protein %	8-10%	14% < 12mo 12% > 12mo	13-15%
Crude Fibre %	25%	20-25%	20-25%
Neutral Detergent Fibre (% BW/d)	0.8-1.0%	0.6-0.8%	0.8-1.0%

2. Body condition score to monitor if feeding too much or too little

Based on the 1 (emaciated) – 5 (obese) system used by the Australian Alpaca Association Inc., body condition scoring involves palpation of various parts of the body to ascertain the degree of body fat cover (or lack thereof; Figure 1). Gut fill and foetal size does not interfere with scoring. Ideal body condition score for a non-lactating, non-pregnant animal is body condition score (BCS) 2.5-3.

The first area to feel is the backbone near the last ribs. Do not palpate over the pelvis, as alpacas invariably feel skinny here due to their lack of muscling. The muscles over the vertebrae should be flat (triangular cross section) and the backbone palpable for a BCS 3. Animals that are too thin have concave musculature and animals that are too fat have convex fat and muscle bulging. Confirm your initial estimate of BCS by palpating the ribs at the point of the elbow. In an animal of BCS 3, you will just feel the ribs. Leaner animals have more prominent ribs, fatter animals' ribs are more difficult to feel, or may be unpalpable if very fat. Lastly, observe and palpate the hairless areas between the front legs and back legs to back up your score. Practise and consistency are the most important features of body condition scoring.

- Growth: 3
- Maintenance: 2.5-3
- Females at full term: 3
- Working males: 2.5-3

Palpate musculature over the backbone at the level of the last ribs.

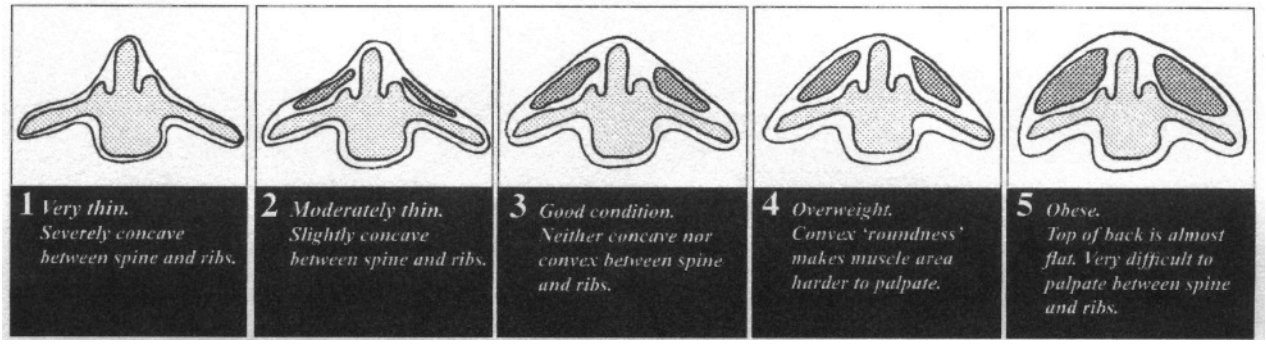

Figure 1: Alpaca Note 4: Body Condition Score of Alpacas. Prepared by AAA Inc. Education and Training Sub-committee.

Aim for body condition scores somewhere between BCS 2.5 and BCS 3

If alpacas are too fat, feed less. If alpacas are too thin (e.g. during growth, pregnancy or lactation), feed more, better quality feed. If some alpacas in the same paddock are too fat and some are too thin, then divide the group and feed accordingly.

3. Pasture and water will supply most nutrients

Alpacas require four main ingredients in their diets: *water, energy, protein and fibre*.

Ensure access to fresh clean water at all times. The daily requirement of water is 30-80 mL/kg body weight per day (3-8% BW/day). So a 70 kg alpaca requires 2.1-5.6 litres water per day. The amount of water drunk is lower when grazing green pasture (20% DM) compared with hay (90% DM). Alpacas will drink more water in hot weather and when lactating. Check water troughs daily, clean them weekly.

Pasture will supply most energy, protein and fibre needs. Remember that *pasture intake is driven by quality of feed, not quantity*. The proportion of each depends on plant maturity (Figure 2). It will also satisfy most vitamin and mineral requirements.

Total ration (100 %) = protein % + energy % (sugars and fats) + fibre (cell walls) % + minerals %

Note that as the proportion of one nutrient increases in a ration, the proportion of other nutrients must decrease.

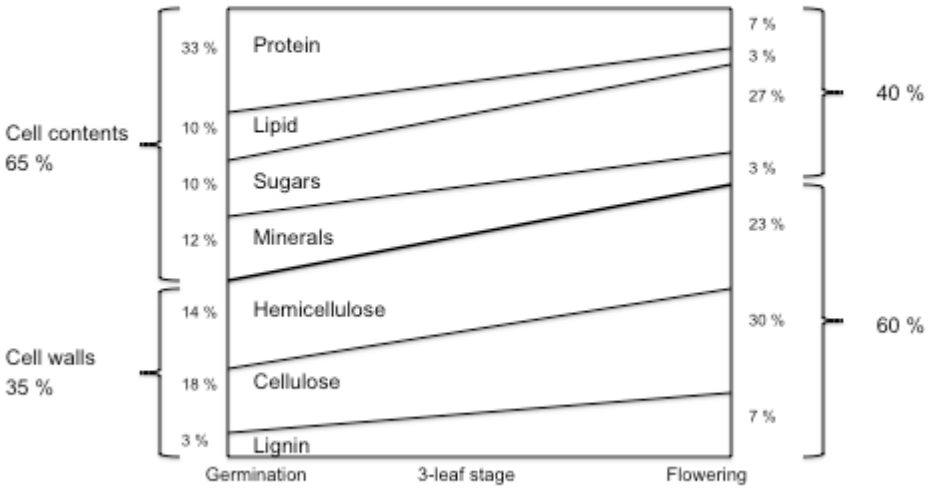

Figure 2. Feeding value of grass and how it changes with different stages of maturity [adapted from (Beever, Offer et al. 2000)].

Greener pastures contain more protein, therefore as pasture matures, protein decreases. Crude protein content of feed required for maintenance is 8-10%. Higher levels are required for growth (12-14% CP), pregnancy (12% CP) and lactation (13-15% CP).

4. Feed long-stemmed roughage

Alpacas need palatable, digestible, long-stemmed roughage (leafy, green pasture, hay and/or silage greater than 4 cm in length) to keep their fore-stomachs functioning normally. A diet based on very short (or non-existent under drought conditions) pasture, chaff and grain/pellets or very lush spring pasture is not adequate to keep the stomach healthy. Ensure ad lib, long-stemmed, palatable, digestible pasture/hay at all times if pasture fibre is limited. A rough estimate of plant fibre content in pasture may be gained by *manually testing the breaking strength* of plant matter – more mature plants contain more fibre (thicker cell walls, more lignin) and are more difficult to break and are thus less palatable and less digestible.

Feed intake is driven by quality of feed, not quantity. 120/%NDF = amount DMI as a % of BW possible/day: e.g. if straw NDF is 80%, then DMI = 1.5% of BW is possible; if clover hay NDF is 45%, then DMI = 2.7% of BW is possible

Observe alpacas to see if there is enough fibre in the diet:

- > 50% of recumbent alpacas should be chewing their cud
- Body condition score adequate – adequate fibre in the diet is required for fat deposition
- Faecal consistency – % fibre vs % DM in diet

5. Vitamins

Many of the *water-soluble vitamins* (vitamins B, C) are provided by the microbes that live in the fore-stomachs, so healthy alpacas do not require supplementation if they are healthy.

Of the *fat-soluble vitamins*, vitamins A and E are available from green grass (even from green weeds that come up after brief summer rain) so only need supplementation if pasture is completely dry for more than 8-10 weeks.

Vitamin D supplementation is required in alpacas. Inject all alpacas less than 3 years of age, and all females due to give birth in winter/early spring (to fortify colostrum) with 2000 iu vitamin D/kg body weight under the skin or into the muscle. Administer in late autumn, mid-winter (and early spring in higher latitudes like Tasmania, New Zealand, Europe, Canada). Read the label on the bottle to determine vitamin D concentration to determine what volume to administer.
E.g. A 20 kg cria needs 40,000 iu vitamin D. If there is 75,000 iu per mL vitamin D in your selected source of vitamin D, then the cria would need approximately 0.5 mL of solution injected. Too much vitamin D can be toxic.

6. Minerals

Are minerals deficient in the surrounding area in sheep and cattle? Ask the local Department of Agriculture, district veterinarian and neighbouring farmers for information. If in doubt, sample soils, pasture and/or alpacas to determine if mineral levels are adequate, before supplementation.

Acid, water-logged soils (annual rainfall > 500 mm) contribute to selenium deficiency. Selenium deficiency may be treated using an annual depot injection under the skin of barium selenate. Alternatively, alpacas may be supplemented by short-acting oral preparations at a rate of 0.1 mg/kg BW *orally* every 4-6 weeks. Do not *inject* alpacas with sodium selenite or sodium selenite as it can cause peracute liver failure and death.

7. Feeding supplements

Beware of feeding unnecessary supplements that may be costly, labour intensive to feed out and/or toxic to camelids. Do not feed out supplements designed for use in horses and pigs as they have different digestive systems and different mineral requirements. In the words of the late Dr Murray Fowler, University of California (Davis), “the most toxic plant for alpacas is the food-processing plant”.

Unless pellets are being used exclusively to deliver a specific supplement (e.g. zinc to assist with facial eczema prevention), avoid feeding pellets as they are usually rapidly digestible, very low in fibre and will cause acidosis and possibly death. In the words of Dr LaRue Johnson, Colorado State University, “you do not have to feed alpacas pellets because they make their own”.

8. Access for all

Animals should have access to long-stemmed fibre at all times (e.g. in drought conditions, consider placing a large round bale of pasture/oaten hay in the paddock). If supplementary feeding of concentrates (eg grain, pellets) is required, make sure all animals can access the feed at the same time. Feed can be put out

directly onto the ground, but wastage may be reduced by feeding in long troughs (e.g. guttering, old conveyor belting laid out on ground, shade cloth attached to fence).

Introduce new feeds over a period of 10-14 days to allow adaptation to the new feed. Once adapted to the new feed, feeding twice as much, every second day will save time and money, but more importantly will allow shy-feeders access to supplements. The dominant animals will fill up quickly and move away when full, allowing the shy feeders to eat the supplements later in the day/overnight.

9. Feed wastage

If supplements remain at the next feed out, or hay is being wasted, animals are being fed too much (do their body condition scores reflect this?) Ensure that growing, pregnant and lactating animals are fed appropriately with good quality feed and feed the left-over portions to non-pregnant/non-lactating females, wethers etc.

10. Use good quality feedstuffs & keep it simple

Feed intake is driven by quality of feed, not quantity. Get pasture/hay/supplements feed-tested so quality is known. *Feed alpacas up to maintenance requirements* (go back to Point 1!) *with good quality pasture/hay/silage*. Supplements for growth, pregnancy and lactation may be met by providing energy with cereal grains (e.g. oats – preferred over wheat/barley due to higher fibre content) and protein with lucerne hay and lupins (Table 2). Complicated recipes containing scoops of this and cupsful of that do not alter cria sex or kill worms, but may waste owner time, energy and money.

Table 2. Nutritive values of some commonly available stockfeeds
(adapted from *Feedtest 2014* and *Drought Feeding Management of Sheep, Agriculture Victoria 2007*).

Feed Type	Av. metabolisable energy (range) (ME MJ/kg DM)	Av. crude protein (range) (CP %DM)	Crude Fibre (%DM)	Neutral detergent fibre (NDF %DM)
Spring pasture	11 (8-14)	25 (15-30)	23	38
Dry pasture feed	6 (3-8)	5 (4-8)	40-60	70-80
Pasture hay (mid-season)	7 (6-7)	11 (8-16)	28-32	49-56
Grass hay	6 (5-7)	8 (5-10)	32	56
Clover hay (early)	8.5 (7-9.5)	18 (15-20)	28-30	42-46
Oaten hay	7 (6-7)	8 (5-10)	32	56
Straws	5 (4-8)	4 (2-5)	50-70	80
Lucerne hay	8.5 (7-9)	20 (16-25)	24-28	45-50
Mixed pasture silage	8 (6-10)	11 (5-19)	29-35	45-60
Oats	11 (9-12)	9 (6-12)	12	26-35
Wheat, barley	12 (11.5-13)	10 (8-14)	2-5	12-20
Maize	13 (13-14)	9.5 (7.5-12)	2-5	12-20
Lupins	12 (12-14)	32 (28-36)	15	24
Peas	12 (11.5-12.5)	24 (20-27)	15	24

USE GOOD HUSBANDRY TECHNIQUES. KEEP GOOD RECORDS. WRITE DOWN TREATMENTS/MATING DATES/MEAT WITHHOLDING TIMES.

NO PRODUCTS ARE REGISTERED FOR USE IN ALPACAS. CONSULT YOUR VETERINARIAN AND ALWAYS READ THE LABEL BEFORE USING ANY OF THE PRODUCTS MENTIONED. *NEVER* USE ANY PRODUCT IN ALPACAS THAT IS NOT REGISTERED FOR USE IN FOOD PRODUCING ANIMALS.

FOR ANY SIGNS OF UNUSUAL OR SERIOUS ANIMAL DISEASE, RING THE DISEASE WATCH HOTLINE: 1800 675 888.