

Costing Silage and Hay

"Many farmers are often paying too much for their delivered hay or silage from other parts of Victoria or interstate" says Frank Mickan, Pasture and Fodder Conservation specialist, DNRE, Ellinbank. They could often purchase other feeds more cheaply if costed on the basis of quality and allowing the dry matter content. We need to be able to compare all types of feeds using the same terms and units of measurement. This is cents per mega joules of metabolisable energy(c/MJ ME), and dollars per kilogram of crude protein(\$/kg CP) on a dry matter(DM) basis. Lets look at some typical advertisements offering fodder for sale, possible pitfalls for buyers, and the effect of dry matter and quality on the final prices. Please bear with the figure work, they can save you a lot of \$\$\$!

Harry paid \$170/tonne(\$140/t + \$30/tonne for transport) for high quality clover hay(85% DM). Monica thought she was on a winner by paying \$45/round bale of silage(4' x 4', 50% DM) weighing 520 kg, which is equivalent to about \$116/t(\$86/t + \$30/t cartage). Bill paid \$110/t(\$80/t + \$30/t cartage) for round bales of silage weighing 600 kg(4' x 4', 40% DM). Tim paid about \$45/roll of hay(5' x 4', 85% DM) weighing 330 kg, equivalent to \$166/t(\$136/t + \$30/t cartage), Tom paid \$3.50/small square bale weighing 25 kg(85% DM), equivalent to \$170/t(\$140/t + \$30/t cartage).

The actual price paid for what the animal requires, ie energy, protein and fibre on a dry matter basis, is greatly affected by the **weight(dry matter + water)** and **quality** of the respective feeds. The dry matter content of hay is reasonably consistent at about 85% DM although this can vary from about 78% to 88% DM. Chopped silage can vary from about 20% to 40% DM for long chopped silage, or up to 50% DM for very short chopped(precision chopped) silage.

1. To calculate the final price/tonne DM, multiply the price/tonne(include delivery cost if appropriate) by 100, then divide by the DM percentage value. eg. Using Harry's hay from above, we get $\$140/t \times 100 \div 78(\%) = \sim \$180/t$ DM, and $\$159/t$ DM at 88%.

2. To calculate the cost as cents per kilogram DM, multiply the price/tonne DM by 100 and then divide by 1000. eg. Using Harry's final hay price/tonne DM of $\$180/t$ DM(and $\$159/t$ DM), then $\$180/t \text{ DM} \times 100 \div 1000 = 18c/kg$ DM,(and $15.9c/kg$ DM).

If Monica, Bill, tim and Tom did not know the dry matter content, or the weight of their fodder, then they likely to pay too much for their fodder! Why?

Monica's \$45/bale of silage could be anywhere from 35% DM(too wet) to 55% DM. Depending on how tight the bale was baled, and whether it is 4', or 3'10", or 4'6", etc. it may weigh from about 750 kg(35% DM) to about 480 kg(55% DM). At these above dry matter percentages this would equate to about 262 kg DM in each case, but the DM variation can be much wider in practice. At \$45/bale this is equivalent to about

\$172/t DM or 17.2 c/kg DM. However transport is on an "as is" basis, ie. wet weight basis. So Monica is needlessly carting and paying for about 270 kg water(750 - 480 kg) at a cartage rate of approximately \$30/tonne. The cartage cost would need to be added to Monica's final costing and the costings immediately following.

Bill's \$80/tonne silage could , using the 35% and 55% DM of Monica's bales, actually be costing him about \$229/t DM(22.9 c/kg DM) down to about \$145/t DM(14.4 c/kg DM) respectively depending on DM content. He will also be paying to transport excess water.

Tim's bales could vary greatly in weight depending on DM content, and particularly on how tightly the bales were pressed. His bales could weigh anywhere from about 290 kg to 400 kg, which is 3.4 to 2.5 bales to the tonne! If he is paying cartage on a per bale basis, fine, but on a number of bales/tonne, he may be "doing" money.

Tom is in a similar boat with his square bales. At 40 bales/tonne, bales must weigh about 25 kg each, but many are often as light as 20 kg each. At \$3.50 each, 25 kg bales may cost \$170/t(\$30 cartage included), but the 20 kg bales will cost \$205/tonne. At 85% DM. This works out to 20.6c/kg DM and 24.1 c/kg DM respectively.

Pricing feeds on a cents per kilogram basis is still not accurate enough. Each person needs to know how much they have paid for their energy in cents per mega joules of metabolisable energy(c/MJ ME), and \$/kg protein on a dry matter(DM) basis. To allow this farmers need to have their feed analysed as provided by FEEDTEST (\$40/sample). FEEDTEST kits are available from most DNRE offices. The results are reported in terms of dry matter and moisture percentages, percentage digestibility and crude protein , and metabolisable energy as MJ ME/kg DM.

To enable the next step I have used calculation No. 2 and allowed for cartage, product weights and dry matter contents as listed in the second paragraph to calculate the c/kg DM value for each person's fodder. eg. Eg, using Harry's final hay price/tonne DM of \$200/t DM(now including \$30/tonne cartage) then $\$200/t DM \times 100 \div 1000 = 20c/kg DM$. Monica's silage would cost 23.2c/kg DM, Bill's silage would cost 29 c/kg DM, Tim's would hay cost 19.5c/kg DM, and Tom's squares would cost 20c/kg DM.

3. To calculate the ultimate cost of cents per mega joule of metabolisable energy, divide the cents/kilogram DM by the MJ ME value of the feed. eg. If Harry's hay tested at 9.4 MJ ME/kg DM, then $20c/kg DM \div 9.4 = 2.13c/MJ ME$. If it tested out at 10.5 MJ ME/kg DM then $20c/kg DM \div 10.5 = 1.90c/MJ ME$.

The quality of most pasture silages and hays fall within the range of 7.5 - 10.5 MJ ME/kg DM. Using the c/kg DM as calculated in Formula 2, Monica's silage could be costing her from 3.1 - 2.21c/MJ ME(using Formula 3), and 3.87 - 2.76c/MJ ME for Bill's silage. Tim's round bales of hay may cost him 2.60 - 1.86c/MJ ME, and Tom's hay 2.67 - 1.90c/MJ ME. When deciding which feed to purchase another consideration may be the feed's palatability. That is, how well the animals will clean it up. Poorer quality silages will be more palatable than poorer quality hay and so there will be less waste at feeding out.

4. To calculate the cost of crude protein as cents per kilogram of crude protein, multiply the cents/kilogram DM by 100, then divide by the crude protein percentage value, . eg. If Harry's FEEDTEST analysis for his hay reported 16 % CP, and cost 20c/kg DM, then $20\text{c/kg DM} \times 100 \div 16(\%) = 125\text{c/kg CP}$, i.e.\$1.25/kg CP. If his hay had tested at 11% CP, then it would cost \$1.82/kg CP.

Most pasture silages and hays fall within the range of 5 - 22 % CP. Using the c/kg DM, Monica's silage could be costing her from \$4.64 - \$1.05c/kg CP(using Formula 3), and \$5.80 - \$1.32c/kg CP for Bill's silage. Tim's round bales of hay may cost him \$3.90 - \$0.89c/kg CP, and Tom's hay \$4.00 - \$0.91c/kg CP. When deciding which feed to purchase the dry matter content, energy needs and feed palatability should also be considered.

If farmers are after energy and/or protein, they can now compare their fodder price to that of other sources of energy and/or protein such as cereal grains, lupins, brewer's grain, carrots, bread, etc. If fibre is the limiting factor, then they would need to examine fibre sources only such as silage and hay, but taking into account the dry matter and quality factors.

Another consideration when buying feed may be its palatability. That is, how well the animals will clean it up. Poorer quality silages will be more palatable than poorer quality hay and so there will be less waste at feeding out.

These figures are examples only. Use your own actual feed quality values for your calculations.