

'ME'? MegaJoules .What?

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Everyone is talking about 'ME' but what is it? To put it simply, we have all heard of drymatter, 'ME' is all about how much energy is in that drymatter. Unfortunately the abbreviation 'ME' is not the correct one to define forage energy concentration.

Researchers have been guilty of spreading a term that is not strictly the one originally defined to describe forage energy concentration. The original term defining forage energy was 'm/d'. Most nutritionists still use this term so if you come across it in the future you will understand what it is. For the purpose of this article I will use the term 'ME'.

What is forage energy? The units defining forage energy are MJME/kgDM. That is megajoules of metabolisable energy per kilogram of drymatter.

So what are megajoules of metabolisable energy? Joules are a unit of energy, metabolisable indicates the energy comes from the 'usable' portion of the forage.

An average pasture quality has an 'ME' of about 10MJME/kgDM. Therefore 1 kgDM has 10 MJME.

A poor quality pasture may have an 'ME' of 8MJME/kgDM

A high quality forage may have an 'ME' of 12 MJME/kgDM

These figures are relatively typical and they show the potential to increase forage energy content by 50%.

To work out the energy content of an area we multiply mass and 'ME' together. A paddock that has 2000kgDM/ha and an 'ME' of 10MJME/kgDM has 20,000MJME/ha.

How is this 'ME' measured?

When a sample is sent to the lab it will be analysed using an NIR (Near infrared reflectometry) analyser. This tool emits near infrared light and measures the light that is reflected from the forage. These results are compared to many calibrations. Calibrations are potentially produced from two sources. The first is a device called a bomb calorimeter in which the dry forage is ignited inside an enclosed unit surrounded by water. The increase in water temperature is defined as the energy content of the forage. The other method is a complex system where an animal is fed in an enclosed unit where all outputs and inputs are measured. The most common and cheapest is the bomb calorimeter technique.

There are several tools for assessing these 'ME'. The Pastureplan™ programme assesses 'ME' on different forages nationwide every two weeks. Similarly the 'Pasture quality workshops' use the programme 'Qgraze' to estimate the 'ME' given a visual dissection. 'Feed planning' outlines the principles to set up a feed plan entailing much of this information, and containing animal 'ME' requirement tables.

What about the animal what is their energy requirement?

Believe it or not the energy requirement of an animal is calculated using the surface area of the animal. The calculation converts the animals weight into a surface area.

The calculation is as follows:

Sheep maintenance energy requirement = $0.6 * LW$ to the 'power' of 0.75 (to do this power calculation you need a scientific calculator and hit 'shift' then the 'x' button and the figure 0.75. Or on a spreadsheet the ^ button i.e. $=0.6 * 55^{0.75}$)

An example is say a 65 kg ewe through early pregnancy:

- Maintenance energy requirement = $0.6 * 65$ to the power of 0.75
- MJME/an/d = 13.7

The daily energy of this animal to maintain itself is 13.7.

If we know the 'ME' of the forage then we can calculate the herbage mass required i.e. for an 'ME' of 10 MJME/kgDM the intake required is 1.37 kgDM/an/d. These equations are the basis for many winter feed budgets. The 'ME' requirements for growth or weight loss are not as easy to calculate. For these figures see the Meat NZ/Wools of NZ booklet 'A guide to improved lambing percentage, 200 by 2000'.

A quick note to help understanding. MJME can be converted to calories through multiplication. So essentially using MJME is just like describing the energy supply or requirement for humans. I think that the unit of a joule was used because it is a term better known in the scientific community? We could easily convert the figures and talk about the calorie requirement of our stock and the calorie supply of our pastures!

Long term it would be good if farmers talk about total energy production on their properties placing less emphasis on herbage quantity and quality. Why do we talk about pasture quality and quantity as separate entities when we can talk about the forage energy provision or animal energy requirement incorporating both?