

## Understanding the efficiency of milk production

by Alvaro Garcia

**O**PTIMIZING dairy farm profitability requires understanding and measuring milk production efficiency. Traditionally, feed efficiency, measured as pounds of feed per pound of milk produced, has been the standard benchmark. However, not every farm has access to reliable and consistent feed intake information.

In such cases, Milk Production Efficiency (MPE) offers valuable insights into how effectively a cow converts its body weight into milk. Let's explore this concept, its calculation, the benefits, and its role in dairy farm management.

### A simple calculation

Milk Production Efficiency (MPE) is a measure of the amount of milk produced by a cow relative to its body weight. It provides a straightforward way to calculate and assess the productivity of individual cows without needing detailed feed intake records.

The formula for calculating MPE is simple:

*Milk production efficiency = pounds of milk produced ÷ body weight*

Here is a sample calculation, using the following metrics:

1. Pounds of milk produced: 80 pounds per day
2. Body weight of the cow: 1,500 pounds

*Milk Production Efficiency: 80 pounds of milk ÷ 1,500 pounds of body weight = 0.0533 pounds of milk per pound of body weight*

The primary advantage of MPE is its simplicity and accessibility, requiring only the cow's body weight and milk yield. This minimal data requirement allows farmers to quickly determine MPE without extensive data collection, making it particularly useful on farms lacking detailed feed intake records.

### Make detailed decisions

The straightforward nature of

MPE facilitates its integration into regular herd management practices, providing immediate insights into the productive efficiency of different cows. This helps farm decision makers identify high and low performers without delay. By comparing MPEs, farmers can quickly identify trends and variations in productiv-

ity, leading to more informed decisions regarding breeding, culling, and overall herd management.

Focusing on individual cow performance helps modify practices, such as specific nutritional adjustments or health interventions, to enhance productivity. Understanding which cows are more efficient (and which aren't) allows for better allocation of resources, ensuring feed and other inputs are used most effectively to maximize milk production. The metric is adaptable to various farm sizes and types, making it a practical tool for a wide range of dairy farming contexts.

To effectively utilize MPE, farmers should regularly monitor and record the body weights and milk yields of cows to ensure accurate and up-to-date calculations. Comparing MPE within the herd helps identify trends and outliers, highlighting particularly efficient cows and those needing further attention or intervention.

However, MPE has its limitations, notably its lack of insight into feed

utilization. MPE does not account for the efficiency of feed conversion into milk, which can significantly vary among cows and is crucial for understanding overall farm efficiency.

### Examples from farms

Let's compare two Holsteins from a commercial dairy to determine

Daily Milk [lb]	Reference	Milk state [%]	Milk Trend 1-m [%]	Stature [in]	Angularity	Hips width [in]	Chest girth [in]	Locomotion	Weight [lb]
81.33	34.8	6	-1.2	5.69	10.73	2.24	7.2	-0.32	1116
81.33	34.8	6	-1	6.52	23.93	2.1	6.93	-0.74	1389

their MPE. Both are in their second lactation, nearly 100 days in milk, and have similar body condition scores (BCS). Each cow produces 81 pounds of milk per day. One weighs 1,116 pounds while the other weighs 1,389 pounds (see image).

*MPE of Cow 1: 81 pounds per day ÷ 1,116 pounds = 0.0726 pounds of milk per pound of body weight*

*MPE of Cow 2: 81 pounds per day ÷ 1,389 pounds = 0.0583 pounds of milk per pound of body weight*

Cow 1 has a higher MPE compared to Cow 2, indicating that it is more efficient in converting body weight into milk production. This information can help make informed decisions regarding feeding strategies, breeding, and overall herd management.

While MPE is a useful metric for evaluating milk production relative to body weight, it does not consider feed efficiency. Feed efficiency, which measures how effectively a cow converts feed into milk, is crucial for understanding overall productivity and cost-effectiveness. MPE alone does not account for variations in

feed intake and utilization, which can significantly impact overall farm efficiency and profitability.

### A method to measure

MPE reflects the difference in size between cows and accounts for the dilution of maintenance requirements. Larger cows typically have higher maintenance energy requirements. However, when comparing milk production efficiency, smaller cows may be more efficient because their lower body weight results in a higher MPE, assuming similar milk production levels.

The maintenance energy required for body functions doesn't increase proportionally with size. So, smaller cows need less energy for maintenance per pound of body weight.

Milk Production Efficiency can be a valuable tool for dairy farmers aiming to optimize productivity but lacking detailed feed intake data. By focusing on the relationship between body weight and milk production, MPE provides a straightforward measure to assess and improve individual cow performance and overall herd management. While it has its limitations, when used alongside other management practices, Milk Production Efficiency can significantly contribute to the efficiency and profitability of dairy farms. 🐄

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