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Ration Rx: Least Cost Dairy ration Formulation by Computer

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# Ration



## Least Cost Dairy Ration Formulation by Computer

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### *Balanced Rations*

FEED RATIONS FOR DAIRY CATTLE must be properly balanced with nutrients in order to obtain maximum potential milk production, desired growth of young cattle and normal herd health.

When feed ingredients are expensive, and particularly when large quantities must be purchased, opportunities frequently exist to choose alternative feeds that result in substantial savings in feed costs.

*Ration Rx is a computer model for formulation and analysis of rations for dairy cattle designed by Stephen B. Harsh, Extension Farm Management Specialist; Donald Hillman, Extension Dairy Specialist; James H. Schoonaert, Extension Agricultural Agent.*

BY DONALD HILLMAN AND DAVID GRUSENMEYER  
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RATION  $\text{R}_x$  IS A TEL-PLAN PROGRAM of Michigan State University. It utilizes a shared-time computer located at the University of Michigan, Ann Arbor. Input and output are accomplished via a touch-tone telephone or teletype terminal, from any telephone location by knowledgeable, authorized users.

Ration  $\text{R}_x$ , the Least-Cost Dairy Ration Formulation program developed at Michigan State University, was designed to formulate rations that meet recognized nutrient requirements while using home-grown feeds and other ingredients available to farmers.

Ration  $\text{R}_x$  allows you to tailor-make the ration as required for your particular farm situation while insuring that it is nutritionally sound and formulated with the least-cost combination of available ingredients.

Rations can be balanced for:

- Milking cows
- Dry cows
- Growing heifers (200 lb. plus)
- Dairy steers

OR

A Ration Evaluation can be performed for any of the above classes of cattle. This allows you to enter your feeding information and the computer calculates how much of each nutrient is provided in comparison to requirements.

### *How Can I Benefit from the Ration - Balanced $\text{R}_x$ ?*

That depends on whether your cows are presently receiving a nutritionally balanced ration and milking at their potential rate, and how much you could reduce feed costs by considering alternative feed ingredients.

### *Increase Milk Production*

If your ration is seriously out of balance, you undoubtedly will receive a substantial increase in milk production under Ration  $\text{R}_x$ . If it is now adequately balanced you may not get an increase but may still greatly reduce feed costs. Rations commonly get out of balance when you change sources of forage or forage quality changes

as the season progresses. In a recent study, one-third of the herds received an average increase of 200 pounds milk per day. Increases of up to 20 pounds milk per cow daily have been observed after Ration  $\mathcal{B}$  balancing.

### **Reduce Feed Cost**

Feed costs commonly are reduced 7 to 10 cents per cow daily by selecting the least-cost combination of feed ingredients. Also, feeding the appropriate amount of feed often can reduce feed costs for cows in late lactation, dry cows, or growing heifers.

### **Avoid Nutrition-Related Health Problems**

Several disorders of cattle such as milk fever, ketosis, displaced abomasum, low conception, rickets, grass tetany and simple malnutrition may be related to faulty nutrition or nutrient imbalances. The use of an  $\mathcal{B}$  balanced ration will eliminate or reduce the occurrence of many of these problems.

### **How Is a Ration Balanced?**

The computer estimates feed consumption and determines the amount of nutrients required daily and the concentration of nutrients required in the ration for a given body weight, production level and milk fat test of lactating cows, or for given body weight of dry cows, and expected growth rate of youngstock. Rations are balanced for energy, protein, crude fiber, calcium, phosphorus, magnesium, salt, and non-protein nitrogen. It also controls the ratios of Ca:P and certain other nutrients.

Standard nutrient values for some 200 feedstuffs are stored in the computer. You select the feeds you want considered for your ration and apply current local prices to them for determination of daily feed costs. Feed analysis information, such as moisture, protein fiber or mineral content, that you have for particular feeds, from a lab analysis, can be used in the computer. If feed analyses are not available, "normal" composition values are used.

### **What Nutrients Are Not Considered**

Certain minor elements such as iron, manganese, zinc and cobalt are commonly found in mineral supplements containing trace minerals and are not included in the calculations. Vitamins A, D and E are not included because they are rarely analyzed in feedstuffs, reliable standard values are not available, and supplementation is relatively inexpensive. B complex vitamins are not considered since they are normally fermented in the rumen of cattle and provided in common feeds.

### **A Ration Evaluation**

If you provide the amounts of particular feeds now being fed to any class of dairy cattle, the computer will calculate how much of each nutrient is provided in comparison to expected intake and requirements for dry matter, energy, protein, fiber, calcium, phosphorus, etc. and will also calculate feed cost per cow daily.

### **A Ration $\mathcal{B}$ (Prescription)**

A prescription will call for one or more rations that are nutritionally balanced and least-cost for each class of cattle. The computer will prescribe the amount of each ingredient to be included in a grain mixture for your size batch, or fed separately as you prefer, and the amounts of grain mix, hay, haylage, silage or other feeds to be fed daily. If you prefer a pre-mix, it will prescribe the pounds of each ingredient to be included for a particular size pre-mix batch and the amount of pre-mix to be included in the grain mix. Or it will prescribe the amount of each ingredient to be included in a complete feed ration and the amount of that ration to be fed per head daily.

The feed cost per head daily, pounds of dry matter and protein, units of energy, calcium, phosphorus and percent fiber in the balanced ration are described. Break-even prices for each of the feeds considered in the problem allow you to compare the relative value per 100 pounds of other feeds, and indicate the price at which they would be substituted for in order to keep the ration least-cost.

### **Do Others Use MSU Ration $\mathcal{B}$ ?**

Yes! In 1973, the MSU system performed 4,737 ration balances. In 1974, there were 6,929. The program is currently being used in 18 states and is the most heavily used Tel-Plan program.

### **How to Get a Ration $\mathcal{B}$ Balance**

Contact your County Agricultural Extension Agent  
Cooperative Extension Services  
Michigan State University

(usually at your county seat)  
OR  
Your D.H.I.A. Supervisor