Pearson Square Examples

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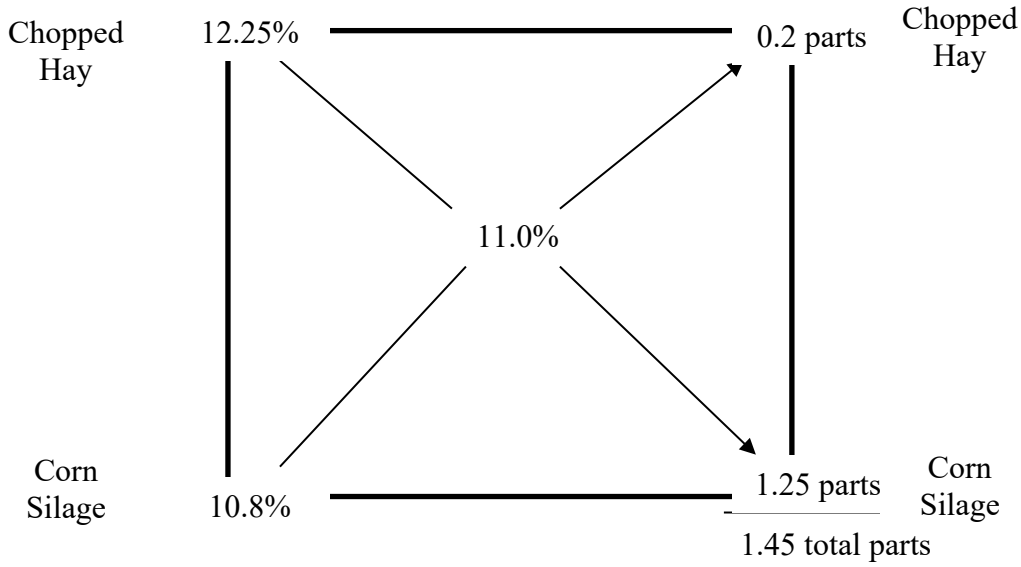
Example 1: Developing a TMR to meet CP requirements



Step 1: The value in the middle MUST be intermediate between the two values used in the left side of the square. In this example, 11% is the CP requirement for the animals. Chopped hay has 12.25% CP and corn silage has 10.8% CP.

Step 2: Disregard any negative numbers during subtraction.

Step 3: Subtract the nutrient value from the nutrient requirement on the diagonal.

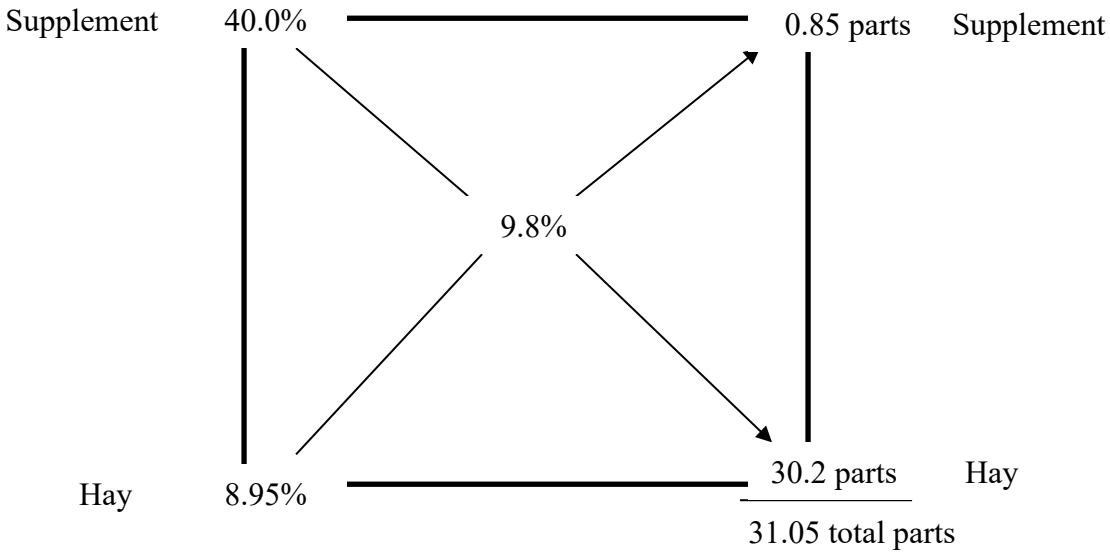
Step 4: Add the parts of each ingredient and divide by the total to calculate the percent of the ration that each ingredient will represent.

Chopped Hay: (0.2 ÷ 1.45) × 100 = 13.8%
Corn Silage: (1.25 ÷ 1.45) × 100 = 86.2%

Step 5: Check the calculation: 13.8 lb chopped hay × 12.25% CP = 1.69 lb CP
86.2 lb corn silage × 10.8% CP = 9.31 lb CP

100 lb total ration — 11 lb CP or 11% CP

Example 2: Calculating the use of a supplement



CP requirement for replacement heifers = 9.8% CP
1400 lb mature weight
Currently weighs 1020 lbs
BCS 5
Gaining 2 lb/d

Step 4: Add the parts of each ingredient and divide by the total to calculate the percent of the ration that each ingredient will represent.

Hay: (30.2 ÷ 31.05) × 100 = 97.3%
Supplement: (0.85 ÷ 31.05) × 100 = 2.7%

Step 5: Check the calculation: 97.3 lb hay × 8.95% CP = 8.71 lb CP

$$\frac{\text{2.7 lb supplement} \times \text{40\% CP}}{\text{100 lb total ration}} = \frac{\text{1.08 lb CP}}{\text{9.8 lb CP or 9.8\% CP}}$$

Heifers eating 2% of BW per day
20.4 lbs DM/day

Hay: 20.4 lbs × 97.3% = 19.8 lbs hay DM per day
Supplement: 20.4 lbs × 2.7% = 0.55 lbs supplement DM per day

Example 3: Using More than 2 Ingredients

- Preparing a 15% CP mixture
- Supplement
  - 50% Soybean meal with 54% CP
  - 50% Corn gluten feed with 24% CP
- Grain mixture
  - 60% Corn grain with 10% CP
  - 40% Soyhulls with 12% CP

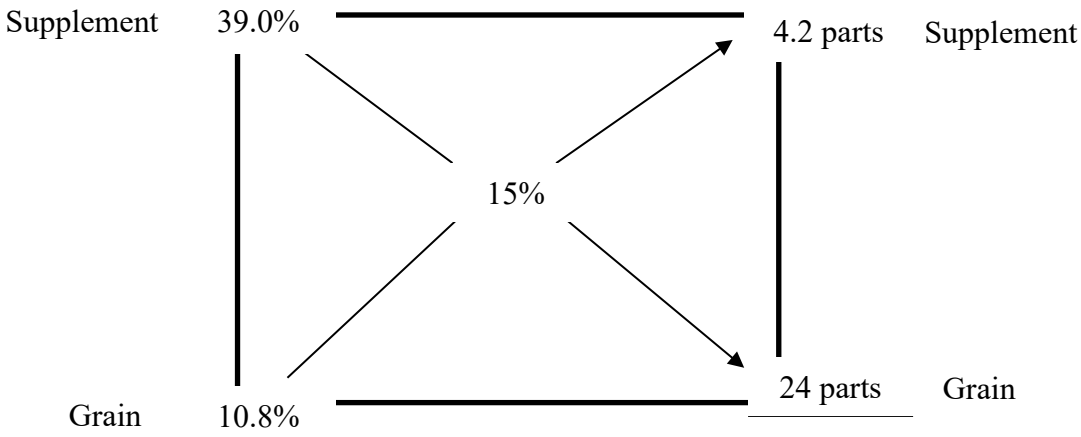
Step 1: Calculate CP in the Supplement

50% SBM × 54% CP = 27% CP
50% CGF × 24% CP = 12% CP → 39% CP supplement

Step 2: Calculate CP in the Grain

60% Corn × 10% CP = 6% CP
40% Soyhulls × 12% CP = 4.8% CP → 10.8% CP supplement

Step 3: Pearson Square



Step 4: Determine how many parts of each ingredient

- Supplement
  - 4.2 parts × 50% = 2.1 parts SBM → (2.1 ÷ 28.2) × 100 = 7.45% SBM
  - 4.2 parts × 50% = 2.1 parts CGF → (2.1 ÷ 28.2) × 100 = 7.45% CGF
- Grain
  - 24 parts × 60% = 14.4 parts corn → (14.4 ÷ 28.2) × 100 = 51.06% Corn
  - 24 parts × 40% = 9.6 parts SH → (9.6 ÷ 28.2) × 100 = 34.04% SH

Step 5: Check the solution

- 7.45 lb × 54% CP = 4.02
- 7.45 lb × 24% CP = 1.79
- 51.06 lb × 10% CP = 5.11
- 34.04 lb × 12% CP = 4.08

→ 15 lb CP or 15% CP