

Calculating the Fertilizer Value of Broiler Litter

Given below is a procedure to calculate the value of broiler litter based on prevailing retail selling prices of common fertilizer materials containing nitrogen (N), phosphorus (P) expressed as P₂O₅ (the oxide expression used in the fertilizer industry), and potassium (K) expressed as K₂O. Because different fertilizer materials contain different concentrations of N, P, and K, the first step will be to calculate the cost per pound of each of the primary nutrients expressed as N, P₂O₅, and K₂O contained in them. Steps in this assessment are as follows:

STEP I. Cost per pound of available nutrients.

Calculate the cost per pound of available nutrient as follows:

Cost per pound = retail price per ton divided by the pounds of nutrient per ton.

Nutrients per ton are given below for N, P, and K fertilizers. For example:

With urea selling at \$600 per ton, and because urea contains 920 pounds of N per ton from the table below, the cost is $\$600/920 = \0.65 per lb of N. A similar calculation for P and K fertilizers can establish their retail costs.

NITROGEN FERTILIZERS	Nitrogen Content	
	%	lbs N/ton
Ammonium nitrate	34	680
Ammonium sulfate	21	420
Urea	46	920
UAN solution	32	640

PHOSPHORUS FERTILIZERS	P ₂ O ₅ Content	
	%	lbs P ₂ O ₅ /ton
Triple superphosphate	46	920
Monoammonium phosphate	52	1040
Diammonium phosphate	46	920

POTASH FERTILIZERS	K ₂ O Content	
	%	lbs K ₂ O/ton
Muriate of potash	60	1200
Sulfate of potash	50	1000
Sulfate of potash magnesia	22	440

STEP II. Determine the equivalent N, P₂O₅, and K₂O values per ton of litter. Using the calculated price for N, P₂O₅, and K₂O in step 1, go to step II tables below for each nutrient and find the equivalent fertilizer value per ton of litter for N, for P₂O₅, and for K₂O.

Nitrogen (N) value of litter

Cost of N	\$ per pound of N						
	0.40	0.50	0.60	0.70	0.80	0.90	1.00
Litter value	\$ per ton @ 3.1% nitrogen with 50% available¹						
	12.40	15.50	18.60	21.70	24.80	27.90	31.00

¹ For litter applied for row crops and incorporated into the soil, multiply its nitrogen value times 1.3.

Phosphate (P₂O₅) value of litter

Cost of P	\$ per pound of P2O5						
	0.40	0.50	0.60	0.70	0.80	0.90	1.00
Litter value	\$ per ton @ 3.1% P2O5 with 90% available						
	22.32	27.90	33.48	39.06	44.64	50.22	55.80

Potash (K₂O) value of litter

Cost of K	\$ per pound of K2O						
	0.30	0.40	0.50	0.60	0.70	0.80	0.90
Litter value	\$ per ton @ 2.8% K2O with 100% available						
	16.80	22.40	28.00	33.60	39.20	44.80	50.40

STEP III. Add the total fertilizer value for N, P, and K in dollars per ton of litter.

As an example, for N, P₂O₅, and K₂O, valued at \$0.60, \$0.50, and \$0.30 per pound respectively, the litter value based only on the N, P, and K values would be \$18.60 + \$27.90, + \$16.80 = \$63.30 per ton. If less than three of the nutrients are needed for a particular crop and field, just add the value of the nutrients that are needed. For pastures that have received litter for many years, soil test P and K values may be high. If so, P and K fertilizers are not needed. In such a case, applying the litter to this pasture may be wasteful if only N is needed for the pasture. In the example above, the P and K value was equal to \$44.70 per ton, more than enough value to purchase an amount of N fertilizer equal to the N contained in one ton of the litter (valued at \$18.60). In this case, the poultry farmer could then sell the litter to other farmers that need all three nutrients for crop production, and use the money from the sale to purchase N fertilizer for the pasture. *Special notes:* There is additional value from micronutrients, but it is difficult to determine because micronutrients are often in adequate amounts in agricultural soils. In addition, there is evidence that less agricultural lime is needed when poultry litter is used for crop production (Endale et al., USDA-ARS Southern Piedmont Experiment Station). We estimate this liming value at \$3 per ton.

The above calculations are based on average values of nutrients in broiler litter at the UGA laboratory. A web based calculator is at <http://aesl.ces.uga.edu/fertcalc.htm> for analysis values that differ from those given above. Broiler litter should be tested to accurately determine its nutrient content (contact your county agent for information about litter testing). Broiler litter is not as

convenient to use as commercial fertilizer and it has additional costs for hauling and spreading that depend on local conditions.

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