CALCULATING A COMPOST APPLICATION RATE
BASED ON FERTILIZER NEEDS

1) First, you need a fertilizer recommendation based on a soil test. For more information on soil sampling, see CSU factsheet 0.500. For more information on selecting a laboratory, see CSU factsheet 0.520. These factsheets are available at: http://www.ext.colostate.edu/pubs/crops/pubcrop.html#soil

2) Fertilizer recommendations are typically made as lbs N, P\textsubscript{2}O\textsubscript{5}, or K\textsubscript{2}O per acre. Be sure to use the corresponding analysis from your compost test report. Convert these figures to lbs/ton by multiplying % by 20.

3) Since compost is like a slow-release fertilizer, we assume only 20% of the N in the compost will be plant-available the first year after it is applied. For phosphorus, we assume 40%. For potassium, we assume 60%. These are rough estimates of availability. Multiply your compost analysis by these availability factors.

4) Then step-by-step, calculate your N, P\textsubscript{2}O\textsubscript{5}, and K\textsubscript{2}O needs by dividing the lbs/acre required by the lbs/ton in the compost. The result will be in tons of compost to apply per acre.

Example:
The soils lab recommends 100 lbs N/acre and 40 lbs P\textsubscript{2}O\textsubscript{5}/acre. The compost results show 1.7% N, 1.3% P\textsubscript{2}O\textsubscript{5}, and 1.5% K\textsubscript{2}O. How much compost should you apply?

First, convert compost results to lbs/ton.

\begin{align*}
1.7\% \text{ N} \times 20 &= 34 \text{ lbs N/ton} \\
1.3\% \text{ P}_2\text{O}_5 \times 20 &= 26 \text{ lbs P}_2\text{O}_5/\text{ton} \\
1.5\% \text{ K}_2\text{O} \times 20 &= 30 \text{ lbs K}_2\text{O/ton}
\end{align*}

Then, correct for availability.

\begin{align*}
34 \text{ lbs N/ton} \times 0.20 &= 7 \text{ lbs available N/ton} \\
26 \text{ lbs P}_2\text{O}_5/\text{ton} \times 0.40 &= 10 \text{ lbs available P}_2\text{O}_5/\text{ton} \\
30 \text{ lbs K}_2\text{O/ton} \times 0.60 &= 18 \text{ lbs available K}_2\text{O/ton}
\end{align*}

Finally, divide the fertilizer recommendations by the available nutrients.

\begin{align*}
\frac{100 \text{ lbs N/acre}}{7 \text{ lb av. N/ton}} &= 14 \text{ tons/acre} \\
\frac{40 \text{ lbs P}_2\text{O}_5/\text{acre}}{10 \text{ lb av. P}_2\text{O}_5/\text{ton}} &= 4 \text{ tons/acre}
\end{align*}