

**The Development and Commercialization of Aerobic Digestion
of Poultry Manure to Produce Bio-Active Fertilizers
April 2016 Update**

By far the biggest achievement was our harvesting procedure – By using a screw press we are literally able to wring out nearly all of the nutrient solution – the yield now is greater than 90% [previously 40 to 50% product capture was the best we could get].

The use of a flocculation agent increased the amount of solution harvested but there was a substantial loss of nutrients. [\[see Trial 7 Decant vs Residual w Flocc Agent\]](#).

The biggest advantage of this new harvest procedure is we can offer more solutions for trials (please advise if you have any contacts who would be interested in trialing these nutrient solutions).

The use of nitric acid as a pH control agent (Trial 7) appears to have increased the baseline temperature from 50°C to 60°C; the run also had a near 5 day plateau at 65°C [\[see Trial 7 Fermentation Graphs\]](#). The broth went from 10 to over 40°C in less than 24 hours.

[Phosphoric acid runs usually take 3 days to attain 60°C – [\[see Temp overall trials 1 to 7\]](#) is an overlay of most fermentation run temperatures to date.] See the [Nutrient Overlays for H₃PO₄](#) for “phosphoric acid runs” where a specific nutrient concentration for each run is graphed together; the nutrient concentrations were “normalized with regard to % dry matter” i.e. the concentration was divided by the % dry matter in order to account for the amount of feedstock processed i.e. the more manure fed to the bioreactor the greater the expected nutrient concentration.

The use of nitric acid is elevating (considerably so) the nitrate concentration. Trial 7 Nutrient Profile Data using Nitric Acid Instead of Phosphoric [\[see Trial 7 Nutrient and Minerals Graphs\]](#). Very high concentrations of ammonium (4,500 to 3,000 ppm) and nitrate (3,500 to 2,700 ppm) were observed with considerably less phosphate (150 to 200 ppm). Potassium in comparison to phosphoric acid runs showed a slight decline (feedstock variability?) it ranged from 1,200 to 900 ppm.

The nutrients do seem to be more consistent throughout the ‘nitric acid run’ - the concentrations increase for the first few days then the values ~ stabilize. Most noticeably the horizontal asymptotic curves (typical of the phosphoric runs) are absent.

Currently, we are trialing sulphuric acid as the control agent – this will reduce the nitrate level. So far, nutrient solutions from nitric acid runs need to be diluted up to 100 fold (due to high nitrogen levels) – this causes an excessive dilution of micronutrients.

All analytical samples are filtered using a 0.45 µm filter that retains most, if not all, microbiology cells - then for extractable metals the samples are digested with a weak acid. The nutrient contribution from microbial biomass has yet to be assayed.