Title: Layer Hen Manure Analysis Report

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Byline

Poultry layer manure and litter composition data are essential for accurately determining sustainable application rates of manure to crops and pastures. This study collected some 20 samples of manure and litter from five different layer production systems from all major production regions in Australia. Compared to data previously reported for Australian layer manure and litter, there are several trends that can be observed which are likely to be the result of new management systems (belt manure removal) which produce manure with significantly shorter in-shed residence times compared to high rise sheds.

Summary

Poultry layer manure and litter composition data are essential for accurately determining sustainable application rates of manure to crops and pastures. Concentration of major plant nutrients and manure properties, such as moisture levels, also determine the usability and sale value of manure and litter.

This study collected some 20 samples of manure and litter from five different layer production systems from all major production regions in Australia. Compared to data previously reported for Australian layer manure and litter, there are several trends that can be observed which are likely to be the result of new management systems (belt manure removal) which produce manure with significantly shorter in-shed residence times compared to high rise sheds.

Nutrient levels in layer manure from caged systems are notably higher for nitrogen, phosphorus and calcium, as is moisture. Dietary effects may be contributing to these changes, however no diet data were available from previously published data for comparison.

Higher nitrogen levels are likely to be the result of lower residency times for manure in sheds and higher manure moisture content. It is not known if other affects such as diet have contributed to this.

Phosphorus levels for layer manure from caged systems tend to be 0.5% higher than previously reported. However, the range in phosphorus levels is quite high (1.1 - 3.7%) which will have a significant effect on the ideal application rate and potential value of layer manure. Phosphorus levels in spent litter (average 1.6%) tend to be lower than caged layer manure as a result of the dilution of manure with the litter substrate. This is slightly higher than previously reported.

Potassium levels in layer manure from caged systems (average 2.1%) indicate a significant resource value from this nutrient which should not be overlooked.

Significant levels of other valuable nutrients, notably calcium (average 11.3% for layer manure from caged systems), sulphur and a range of micro nutrients are also present in poultry layer manure and litter.

The handling characteristics of layer manure are primarily determined by moisture content. Moisture levels in caged layer manure samples tend to be approximately 25 – 35% higher than previously reported, with several systems producing manure with more than 70% moisture. This trend towards higher moisture levels has decreased the handling characteristics of layer manure and is likely to decrease the maximum transport distance that manure can be hauled. High moisture manures also pose spreading problems and are best handled through traditional 'muck spreaders'.

A range of contaminants were analysed including heavy metals, salt (sodium) and arsenic. All levels were well below thresholds reported by the NRMMC (2004), NSW EPA (1997) and VIC EPA (2004). Arsenic levels were well below that previously observed, averaging only 1 mg/kg across all samples.

For belt manure removal systems, it is recommended that a small scale project is established to investigate the cost benefit of manure drying systems and the optimum fan run times to dry manure to below 40%. This would result in a significantly improved product (better handing properties, spreading properties and longer possible haulage distances) which should all improve the dollar value of manure.

Considering the high carbon, moisture and nutrient levels present in poultry layer manure from newer caged systems with belt removal, further investigation into manure processing (such as bio-digestion) should be pursued. This could result in significant energy production and nutrient recovery for larger enterprises and may represent the best manure handling option, particularly for high moisture manure.

Considering the range in nutrient concentration across different shed management systems, egg producers are encouraged to take annual analyses of manure to develop a dataset for their own system. This will inform sustainable application rates and determine the best sale value for the manure or litter.