

Humic & Fulvic Acids: Testing Tells the Difference

As a grower, how do you determine quality humic acid products from less effective “imitation” products? Understanding the various testing methods is a good place to start.

While humic & fulvic acids are not new to agriculture, the powerful agronomic benefits they bring have recently been gaining much greater acceptance from the mainstream. As this wider adoption takes place, more new products are appearing on the market, often with widely varying claims of humic and fulvic content. How are these claims determined? Unfortunately, there is currently no universally standardized method for analyzing humic & fulvic acid content at regulatory agencies. Many liquid humic/fulvic products contain additives such as lignosulfonate (a by-product from the production of wood pulp), which can mimic humic and/or fulvic acid and artificially elevate test levels under some analysis methods.

Analysis Methods for Humic Acid:

Colorimetric Method

- A simple “qualitative” test for humic substances.
- Currently the primary method of testing used for registration & labelling in most US states & Canadian provinces.
- Typically gives a higher humic content result than other methods.
- The addition of adulterants (such as lignosulfonate) can significantly elevate the humic levels in a colorimetric analysis.
- Not capable of distinguishing fulvic acid from humic acid.

CDFA Method

- The “California Department of Food and Agriculture” method is a quantitative method that analyzes humic acid levels only (fulvic fraction is removed).
- Considered a much more accurate method than colorimetric for humic acid.
- More effective at detecting non-humic additives. As a result, most sulfonated products will show much lower humic acid levels.
- The CDFA method does not always adequately account for ash content. Products with high ash content can appear higher in humic content.
- Currently, this method is used only by California and Oregon for product registration & labelling of humic acid products.

HPTA Method

- A recently developed, quantitative analysis of humic acid that has been approved by the “Journal of Association of Official Agricultural Chemists” (J-AOAC).
- Currently considered the most accurate analysis of humic content.
- Much more effective at detecting and removing non-humic additives.
- As of June 2018, only utilized by Oregon and New Mexico for registration and labelling of humic acid products.
- However, the HPTA method has been proposed as an industry-wide standard by the Humic Product Trade Association.

Different Tests, Different Results of Liquid Humic Acid Products:

	Testing Method	Black Earth “Activ12”	Sulfonated Competitor
Humic Content	Colorimetric test	12%	12%
	CDFA Test	8%	2%
	HPTA Test	6.6%	<0.01%
Fulvic Content	HPTA Test	0.6%	2.8%

Table 1: Lab results from Thorton Labs, date

Analysis Methods for Fulvic Acid:

HPTA Method

- The J-AOAC has published a testing method for fulvic acid.
- Currently, the HPTA method is the only test recognized as being capable of accurately measuring fulvic acid. It measures the "hydrophobic" fraction of fulvic acid. There may be other fractions to fulvic acid (hydrophilic), but at this point there is not an accepted test to measure this.
- Results from the HPTA fulvic acid test can still be affected by the presence of lignosulfonates. The HPTA has recommended, and some states have mandated, that fulvic products be tested for sulfur content to indicate the likelihood of lignosulfonates. If sulfur test levels are above a given threshold, a more specific test (called FTIR) can provide definitive confirmation of the presence of lignosulfonates

Other Methods

- Some companies (including Black Earth Humic) have used a "gravimetric method" (which is similar to the process used for the CDFA analysis for humic acid) as a measurement of Fulvic acid.
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- This method actually measures the presence of any material that remain soluble throughout a wide pH range. This includes fulvic acid, but may include many other materials as well. Therefore, gravimetric methods are not considered highly accurate for testing fulvic acids.

Different Tests, Different Results of Liquid Fulvic Acid Products:

	Testing Method	Black Earth "ActivFC"	Competitive Product
Fulvic Content	Colorimetric test	n/a	n/a
	Gravimetric Test	3%	20%
	J-AOAC Test	1.4%	0.28%
	FTIR Analysis	Negative	Positive

Summary

- The lack of a standardized testing method can, at times, make it difficult to make accurate comparisons of different products.
- The J-AOAC method has been proposed as a standard by the Humic Product Trade Association. Your supplier should be able to explain which methods they use for their label claims and also how their products test under different analysis methods.
- Colorimetric analysis of liquid humic products can be artificially elevated through the use of certain additives. Lignosulfonate is one of the most common additives used in liquid humic and fulvic products. It may provide some agronomic benefit but should not be mistaken for humic or fulvic acid.
- Educate yourself on how humic products are tested. There are lots of good products on the market – make sure you are buying quality!
- For more information on the testing methods discussed and the proposal for a standardized testing method, please visit the Humic Product Trade Associations website: <http://www.humictrade.org>.