Criteria of Analysis of Low Molecular Weight Humic Substances

By: Michael Karr, Ph.D. CPSS

CellXCell™

Percent of LMWHS* by Weigh t	= 3.0% +
E_4/E_6 Ratio	= 18
Total Salts	= 17 mS/cm
Salt Index (Salts / %HS)	= 5.7
pH	= 5.5

*Low Molecular Weight Humic Substances

There are 4 criteria that indicate the quality of product containing humic substances. They are:

- Percentage by Weight
- E_4/E_6 Ratio
- Total Salts & Salt Index
- pH

Percentage by Weight

The percentage by weight is an important criterion in determining the quantity of humic substances in a product. Naturally, higher percentages are preferable. CellXCell™ has a minimum of 2.0% fulvic acid and LMWHS by weight.

The E_4/E_6 Ratio

The E_4/E_6 ratio is determined by comparing the amount of blue light absorbed by a sample of humic substances to the amount of yellow-orange light absorbed.

The higher E_4/E_6 ratio, the smaller and more bioactive are the molecules. High ratio humic substances, like LMWHS and the included fulvic acids, have yellow-orange-red colors that appear pure and bright. The higher ratios confirm the presence of the smaller sized and more bioactive molecules in humic substances, hence the term low molecular weight.

Low ratio humic substances tend to have colors that are dull and a grayish reddish-brown. These heavier molecules are found in the humic acid and humin fractions of humic substances, and they are much less biologically active than the LMWHS.

The E_4/E_6 ratio of CellXCell™ is 18.0. The LMWHS in CellXCell™ are compared to the following laboratory standards from the IHSS (International Humic Substances Society) to ensure that the high standards met or exceeded.

IHSS Peat Fulvic Acid Standard E_4/E_6 ratio = 14.0
IHSS Leonardite Humic Acid Standard E_4/E_6 ratio = 4.5

Total Salts and Salt Index

The total salts measure uses milliSiemens/cm, a technical measure of salinity. The salt index measures the salts as a percentage of humic substances. The lower the total salts and the salt index, the purer the quality of the product. CellXCell™ has a total salts measure of 17.0 mS/cm, and a salt index of 8.5%

High salt levels are a common result of using a base-acid chemical extraction method. Fulvic acids are LMWHS that have been extracted using these chemical procedures, thus are soluble at pH 2.0. CellXCell™ has a low salt index due to the fact that the extraction of the LMWHS is performed by biology and physics, instead of the use of chemicals. CellXCell™ contains all LMWHS, not just the fraction soluble at pH 2.0 (fulvic acids).

pH

The pH level of CellXCell™ is about 5.5. This reflects the naturally slight acidic nature of LMWHS. An acceptable level should be between pH 4.0 – 9.0. pH levels outside of this range are too acidic or alkaline to be directly consumed.

All four criteria should be taken into consideration when determining the quality of a product purporting to contain humic substances, especially fulvic acid. It is our belief that any product containing fulvic acid should disclose these technical parameters for the benefit of the consumer.