

Food Science: Increasing Crop Yields with Fluorescence**Introduction**

Protein-containing plants are staples in the diets of all countries. The ability to produce enough crops is essential to the well-being of all citizens, for people have to have enough to eat before they can advance to higher endeavors.

Uncontrollable changes in weather such as the amount of rainfall, the occurrence of frost, wind erosion, etc., can be detrimental to the success of a harvest. The stress in plants induced by these effects may be mitigated or at least partially counterbalanced by the informed use of irrigation, fertilizers, and so forth. To take steps to offset stress, a farmer must know what steps to take while the crop is still growing and before it is too late to be of any benefit.

Results

Figure 1 shows spectra taken from two different soy plants (one stressed and one unstressed) *in situ*: both were still growing in the field. The FLUOROLOG®'s double-emission monochromator rejected possible stray-light interference that might have hidden the relevant features. In addition, the fiber-optic accessory permitted direct observation of these samples that were obviously too large to fit in a normal sample compartment.

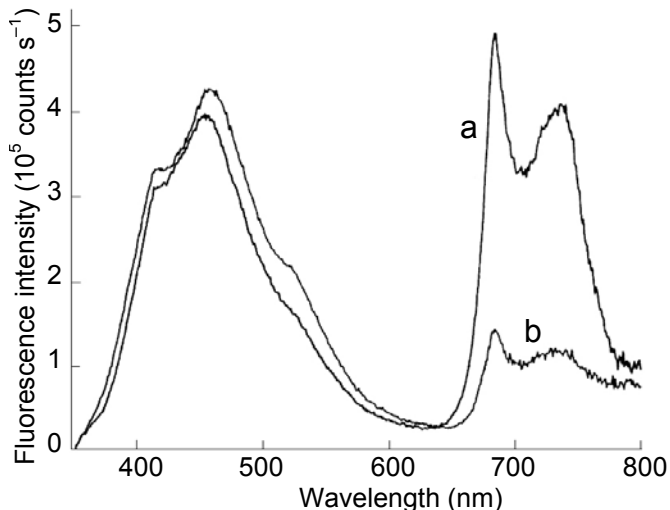


Figure 1. *In situ* emission spectra from (a) soy green, and (b) soy yellow.

The data in Figure 1 reveal that the unstressed plant (soy green) has a significantly more-intense emission in the IR region, relative to the visible, than does the stressed plant. This IR fluorescence is a predictor of crop yield, and thus may indicate how to salvage what might otherwise be an agricultural disaster.

Conclusion

Food science can benefit by the analytical information available from fluorescence. Especially useful for agricultural and biological studies are the following FLUOROLOG® features:

- effective stray-light refection
- a fiber-optic probe for large and difficult samples
- the unique ability to measure fluorescence spectra in the IR region of the spectrum.

Copyright © 2000 Jobin Yvon Inc.

Printed in the USA

In the USA:

Jobin Yvon Inc.
3880 Park Avenue
Edison, NJ 08820
Tel: 1-732-494-8660
Fax: 1-732-549-5157
E-Mail: fluorescence@jyhoriba.com
1-800-533-5946

In France:

Jobin Yvon S.A.
16-18, rue du Canal
91165 Longjumeau cedex
Tel: (33) 1/64.54.13.00
Fax: (33) 1/69.09.93.19

Germany: 89/46.23.17-0
Italy: 2/57.60.30.50
U.K.: 020/204.81.42



HORIBA GROUP