Application Note

Mushroom Compost

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spectroscopic analytical solutions

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Introduction

The medium for mushroom growing, called compost, is scientifically formulated of various materials such as straw, hen or horse manure, gypsum and nitrogen supplements. Preparing the compost takes one to two weeks. After the first production step called fermentation the compost is pasteurized and then after incubation is placed in large trays or beds. Next the spawn is worked into the compost and the growing takes place in specially constructed houses where the farmers can regulate the crucial aspects of heat and humidity.

It is essential for mushroom compost producers to know the amount of nitrogen, ammonia, moisture, ash and pH during every production step. It is also important to know fiber fractions like NDF, ADF and ADL.

AgriQuant A1 will provide analysis results in less than a minute and hence is an excellent choice for replacement of traditional methods, which are cumbersome and time consuming.

Analyser: AgriQuant A1

The AgriQuant A1 is based on the latest generation FT-NIR technology and has the following main features:

- Cutting edge spectral performance and best signal to noise ratio on the market
- Very easy to operate and maintain
- Strong software package with InfraQuant and Horizon QI
- Very low maintenance costs. The AgriQuant A1 has no scheduled maintenance and the light source has an expected lifetime of 10 years

Analysis:

The sample is analysed by reflection measurements in sample glasses with lid, which are rotating during analysis. By rotating the sample glass the sample is constantly mixed and effects from product heterogeneity are reduced. To ensure consistency and analysis of a large amount of the sample, the sample is crumbled in a mixer for obtaining better homogeneity before analysis.

The sample glass has a large opening for easy filling. The lid ensures that the sample is stored under stable conditions and protected from influence from the surroundings. After analysis the sample is easily stored or send to reference analysis. The size of the sample glass means that barcodes can be used, which is an advantage if many samples have to analysed. The barcode is easily read with a barcode reader connected to the AgriQuant A1.

See a video presentation of the AgriQuant A1 on our homepage: www.q-interline.com and experience how easy it is to perform the analysis on the AgriQuant A1.

Calibration

Calibrations for 1st , 2nd and 3rd phases were made with usage of 250 up to 320 samples. Each sample had 3 replicates so total amount of measurements used in those calibrations were 750 to 960. Samples were cut manually by a special knife and put into glass bottles. A good mixer can be used here too. The better homogeneity of cut sample the better analysis repeatability.

Table 1. shows the performance of the calibrations developed for all the components with chemical reference analysis available.

Fermentation (1st phase)	**Range**	**SECV**	**R2**
pH	7.4 - 8.4	0.10	0.75
Moisture	71.1 - 78.4	0.79	0.60
Ammonium	0.27 - 1.48	0.087	0.83
Nitrogen	1.4 – 2.5	0.094	0.84
Ash	18,3 - 37,2	2.39	0.49
Pasteurization & Incubation (2nd & 3rd phases)	**Range**	**SECV**	**R2**
pH	6.00 – 7.58	0.09	0.97
Moisture	59.3 – 71.6	0.92	0.85
Ammonium	0.02 – 0.22	0.021	0.83
Nitrogen	2.1 – 2.9	0.097	0.56
Ash	18,4 - 43,5	1.92	0.90
Hen Manure	**Range**	**SECV**	**R2**
pH	6.82 – 8.12	0.23	0.71
Moisture	66.5 – 86.5	1.59	0.92
Ammonium	0.06 – 4.9	0.377	0.79
Nitrogen	2.2 – 5.9	0.47	0.77
Ash	19.8 – 50.2	2.42	0.88
Gypsum	**Range**	**SECV**	**R2**
pH	7.33 – 7.77	0.06	0.74
Moisture	24.4 – 35.7	0.34	0.97

Table 1. *Pasteurization & Incubation dates joined together for one calibration working for both NDF, ADF & ADL and straw calibrations available upon request.

Conclusion

The AgriQuant A1 is a strong FT-NIR analyser for mushroom compost, supplying results in less than one minute for multiple components. With the AgriQuant A1 you can eliminate individual analysis on each constituent and save on manpower, training and time.

The AgriQuant A1 can be placed in the lab or in the factory. The InfraQuant software guides the plant personnel through the steps of the analysis and the results are displayed with easy to understand color codes. With barcode option it is possible to measure many samples each hour making the AgriQuant A1 an excellent choice for the factory or lab.

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