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Dyadic[®] Cellulase PLUS

PRODUCT #407

(For Consideration in Food, Brewing and Animal Feed Applications)

I. INTRODUCTION:

Dyadic Cellulase PLUS is a concentrated liquid acid cellulase (E.C. 3.2.1.4) enzyme produced by the fermentation of non-GMO *Trichoderma longibrachiatum* (formerly *Trichoderma reesei*). This is a non-GMO, non-hazardous, food grade, and Kosher certified product. Products of this origin are used world-wide as processing aids in food processing, baking, starch-gluten separation, alcohol fermentation and animal feed. Its high level of cellulase and beta-1,3-1,4-glucanase allows it to break down non-starch polysaccharides (NSP) including cellulose and beta-glucans in coffee beans, fruit cell walls, distiller's grains, grasses, silage and certain cereals such as wheat, barley and rye. It should be noted that without such enzyme process aids it is difficult to process materials containing complex plant carbohydrates.

II. PHYSICAL PROPERTIES:

Appearance: Medium to dark amber liquid (Color does not affect or reflect activity)
Odor: Slight fermentation odor
pH: 4.5 ± 0.5
Density: 1.15 – 1.25
Guaranteed Activity: Cellulase 30,000 to 36,000 Units/g
Side Activity (typical): Beta-Glucanase 7,500 to 10,000 Units/g
Additional Side Activities: xylanase, pectinase, mannanase, xyloglucanase, laminarase, β -glucosidase, β -xylosidase, α -L-arabinofuranosidase, amylase, protease

III. PRODUCT CAPABILITIES:

When run as directed in this bulletin, **Dyadic Cellulase PLUS** can be utilized to accomplish the following:

1. Decrease the viscosity of plant cell wall substances such as cellulose and β -glucans within fruit cell walls, coffee beans, distiller's grains, grasses and silage and other small complex grains such as wheat, barley, and rye.
2. Break down complex carbohydrates within plant cell walls to increase utilization of highly fibrous cellulosic based materials.
3. Improve extraction of high-value products such as juice, sugars and starch.
4. Include higher rates of lower quality, lower cost distiller's grains, grasses, silage, and grains to reduce total costs.

IV. PROCESSING CONDITIONS: GENERAL

The use of an enzyme concentrate requires special handling and measuring considerations due to its low usage rate compared to the total quantity of substrate treated:

1. Dilution of the concentrate by an enzyme distributor or end user at a rate of 1:5 to 1:10 if needed.
2. Inclusion of the diluted or concentrated enzyme product into the food, brewing, or animal feed process.
3. The recommended dosage of the **Dyadic Cellulase PLUS** is between 25 and 500 grams/metric ton of treated substrate. Please contact your Dyadic representative for additional dosage recommendations.
4. In analytical tests the maximal enzyme activity is displayed at temperature of 40°C to 57°C and pH of 4.2 to 6.5.

V. STORAGE CONDITIONS / ACTIVITY:

Dyadic Cellulase PLUS has less than a 10% activity loss after 4 months when stored at 25°C (77°F) out of direct sunlight and in the original, closed container. **Dyadic Cellulase PLUS** also has less than a 10% activity loss after 1 month when stored at 38°C (100°F).

VI. INACTIVATION:

Dyadic Cellulase PLUS can be inactivated by raising the pH above 8.0 or the temperature above 90°C or a combination of the two.

VII. PACKAGING:

Dyadic Cellulase PLUS is packaged in 25 kg, 240 kg, or 1200 kg containers.

VIII. TECHNICAL SERVICE:

Information covering specific applications for this product is available from your Dyadic International sales/technical representative. We will work with your technical personnel to resolve problems and optimize your process.

IX. SAFETY AND HANDLING:

For detailed information please refer to the **Dyadic Cellulase PLUS** MSDS available upon request.

Nothing disclosed is to be construed as a recommendation to use our products in violation of any patents. The information presented is believed to be accurate. However, said information and products are offered without warranty or guarantee, except as to the composition and purity stated herein since the ultimate conditions of use and variability of the materials treated is beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale. The goods described herein are sold "as is" and "with all faults". The seller specifically disclaims all warranties in connection with the sale of the goods, both express and implied, including, without limitation, the warranties of merchantability and fitness for any particular purpose, as those terms are defined in the uniform commercial code of Florida. The seller shall not be liable for any incidental or consequential damages whatsoever.