

# VANDERBILT

## *Technical Data*

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## **VANZYME<sup>®</sup>**

### **Starch Liquefier**

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## **VANZYME<sup>®</sup>** Starch Liquefier

### Paper Department

Enzymes are biocatalysts. As catalysts, they can greatly influence chemical changes without entering into or becoming part of the chemical reaction. Contrary to popular opinion, enzymes are not living organisms. Rather, they are proteins produced by, and extracted from, living matter such as yeasts, molds or bacteria. Their action is independent of the living cell that produced them. They perform many functions, each unique to the specific enzyme.

There are two classes of amylase enzymes:  $\alpha$ -amylases, which are starch liquefying enzymes, and  $\beta$ -amylases, which are starch saccharifying enzymes. **VANZYME** products are  $\alpha$ -amylase enzymes of bacterial origin. They act upon starches to reduce viscosity by liquefying and partially converting the starch to soluble dextrans, with the formation of a minimum amount of sugars.

**VANZYME** powder has a standardized strength of 4,200 SKB units per gram. It is available in bulk or in 19 gram water-soluble packets called **VANZYME SOL- PAKS<sup>®</sup>** Packing. The packets dissolve quickly, permitting rapid distribution of the enzyme throughout the starch slurry.

When using the bulk powder form of **VANZYME**, it is recommended that a solution of the **VANZYME** in 0.025% calcium chloride or 1% borax be made. This dilution makes it easier to accurately add the **VANZYME** to the starch slurry volumetrically rather than by weight. The **VANZYME** solution is stabilized by the presence of calcium chloride or borax. A small amount of insoluble matter may be present in the **VANZYME**; this does not detract from the activity of the **VANZYME'S** activity. **VANZYME SOL- PAKS** make the accurate addition of the enzyme easier because they are of standard weight.

The procedure for the determination of the  $\alpha$ -amylase activity of **VANZYME** is available upon request.

## RECOMMENDED STARCH CONVERSION PROCEDURE

### A) THE AMOUNT OF VANZYME:

The amount of **VANZYME** required for starch conversion depends on the starch concentration and the viscosity requirement of the final starch solution, and also upon the type of starch, the solids of the starch slurry, the cooking equipment, etc. It is suggested that the amounts of **VANZYME** given below be used for the first trials, with subsequent increases or reductions to produce the desired starch properties:

<u>Starch Concentration</u>	<u>VANZYME (grams/100 pounds of starch)</u>
Less than 10%	2 to 5
10% to 20%	3 to 8
20% to 30%	6 to 15
30% to 40%	10 to 30
40% to 50%	15 to 45

### B) STARCH CONVERSION PROCEDURE:

- 1) Disperse the starch in the required amount of water.
- 2) Add the **VANZYME** powder dissolved in calcium chloride or borax (see page 1), or the unopened **SOL- PAKS**.
- 3) Adjust the pH of the dispersion to 7.0 to 7.5 with borax or soda ash. It is recommended that buffered unmodified pearl cornstarch be used. The pH of the starch will drop as the conversion proceeds. The optimum pH for enzyme conversion is 6.6 to 6.8.
- 4) Heat the starch slurry to the gel temperature, and if necessary, turn off the agitator until the gel begins to thin. The gel temperature for cornstarch is 70°C (158°F).
- 5) Continue raising the temperature until the conversion temperature is reached. The recommended conversion temperature for cornstarch is 77 to 80°C (170 to 175°F).
- 6) Hold the temperature until the desired viscosity is attained. An amount of **VANZYME** should be used that gives a conversion time of approximately 30 minutes (see section A above).
- 7) Inactivate the **VANZYME** by raising the temperature to 98°C (210°F) and holding at that temperature for 10 minutes. Alternatively, the **VANZYME** can be inactivated by reducing the pH of the starch to 3.5. Readjust the pH to neutral prior to use.
- 8) Cool the starch to running temperature by the addition of fresh cold water.

VANZYME and SOL- PAKS are registered trademarks of R.T. Vanderbilt Company, Inc.

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