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ENZECO® INVERTASE USE IN CONFECTIONS

BACKGROUND

ENZECO® INVERTASE is a liquid enzyme preparation derived from a specific strain of yeast. It hydrolyzes sucrose into glucose and fructose. This process will convert a crystalline sucrose solution into a liquid, often referred to as invert sugar. This is a necessary step in the manufacture of certain confectionery products including truffles and other chocolates with cream centers.

ADVANTAGES TO USING ENZECO® INVERTASE

Producing this type of confection involves the manufacture of a center, usually through starch molding, which is then enrobed in chocolate. The center must be firm enough to withstand the handling and processing, yet will soften to a desirable creamy consistency by the time the consumer eats the product. Invertase causes this transformation, by converting the crystalline sucrose present in the center, to the syrup phase. It would not be possible to handle a cream consistency directly from the starch molds, without the use of Invertase.

In addition to the softening that occurs, there are other benefits to this type of process. The fructose that is generated is hygroscopic, and helps to minimize the drying of the confection. This, in combination with the prevention of sugar crystallization, will increase the shelf life of the product by maintaining a desirable consistency for an extended period of time. Also, the process reduces the water activity, which helps to minimize microbial growth and contamination.

APPLICATIONS AND PROCESSING

The center can consist of many different components. These include dairy cream, milk products, chocolate, sugar, corn syrup, starches, egg albumin, gelatin, fruit pieces, nuts, flavors, acids, colors, and Invertase.

It is important to consider the activity or strength of the Invertase, before substituting Invertase from one supplier for another supplier's Invertase. ENZECO® INVERTASE has an activity of 10,000 Sumner Units per gram. An Invertase described as "Single Strength" is approximately 3,000 Sumner Units per gram. "Double Strength" Invertase is approximately 6,000 Sumner Units per gram. At 10,000 Sumner Units per gram, ENZECO® INVERTASE

is more than a "Triple Strength" Invertase. Therefore, for each gram of "Single Strength" Invertase that is currently being used, only 0.3 gram of ENZECO® INVERTASE would be needed for the same level of activity. Similarly, for each gram of "Double Strength" Invertase being used, only 0.6 gram of ENZECO® INVERTASE would be needed.

In new formulations, a starting point for the amount of ENZECO® INVERTASE would be 0.2 - 0.4%. However, more or less may be needed depending on the components of the center, and the amount of time that the product has to react – the more Invertase, the sooner the center will soften. There is not a risk associated with overdosing the Invertase. When all of the inversion has occurred, the reaction will stop, and the end-point has been met.

The components of the flavors, acids, and possibly colors may react with the Invertase. Therefore, it is recommended that all of the components be thoroughly mixed together, **before** the Invertase is added. It may be necessary to reheat the mixture to the melting temperature before adding the Invertase to ensure that the Invertase has an opportunity to be thoroughly mixed. Invertase performs optimally at a temperature range of 60- 70^{O}C, and is rapidly deactivated at temperatures greater than 80^{O}C. Therefore, it is recommended that the Invertase be added after the cream mixture has fallen below 7O^{O}C.

The inversion will begin immediately, however the full softening of the center may not occur for 1-2 weeks. If a more rapid softening is required, additional Invertase should be added.

CONCLUSION

Cream-centered confections are a high quality, highly desirable treat, because of their rich taste and creamy mouth feel. Consumers are usually willing to pay a high price for these products, because of their taste and quality. Therefore, it is in the manufacturers' best interest to make these products using ingredients such as ENZECO® INVERTASE, which will help to optimize that quality.

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SAMPLE FORMULATIONS

Chocolate Butter Creams

Fondant Sugar	77.6%
Water	10.0%
Salt	0.2%
Enzeco® Invertase	0.3%
Butter	4.5%
Chocolate Liquor	7.5%
Flavor	To taste

- Mix the fondant sugar, water, salt and flavor until thoroughly mixed.
- Melt the chocolate liquor and butter together, and add to the previous mixture.
- Keep mixing until all ingredients are well blended, applying heat if necessary.
- Add invertase after temperature has cooled to at less than 70° C.
- Deposit centers while warm; or form centers after the mixture has cooled and formed.
- Enrobe firm centers with chocolate.

Fruit Puree Creams

Fondant Sugar	85.5%
Egg Albumen	1.0%
Water	6.0%
Salt	0.1%
Enzeco® Invertase	0.4%
Fruit Puree	7.0%
Flavor, Citric Acid & Color	To taste

- Mix fondant sugar, egg albumen, and water until thoroughly mixed.
- Add salt, flavor, color, and acid, and mix for 1 additional minute.
- Add fruit puree and invertase, and mix until uniform.
- Allow the product to stand until cooled and firm to allow for forming. If the product is to be deposited, heat to necessary consistency (less than 70° C).
- Enrobe firm centers with chocolate.