GOLD COAST PROCEDURE
for REDUCING SUGAR

EQUIPMENT

1 mL or 2mL pipet
suitable volumetric flasks for diluting samples to <2%
5 mL serological pipet
4 X 10mL volumetric pipets (Class A volumetric for Solution #1)
250 mL erlenmeyer flasks
25mL or 50mL buret
hot plate
ice bath
boiling chips or beads
pipet safety bulb

REAGENTS

Solution #1 Copper Sulfate CAUTION-POISON
Solution #2 Potassium Sodium Tartrate CAUTION-CAUSTIC
Solution #3 Potassium Iodide
Solution #4 Sulfuric Acid CAUTION-CORROSIVE
Solution #5 Starch Indicator
Solution #6 Sodium Thiosulfate

PROCEDURE

1. Pipet exactly 10mL of Solution #1 (Copper Sulfate) into a 250 mL Erlenmeyer flask. Add 5mL of Solution #2 (Potassium Sodium Tartrate) and 2mL of the sample (see notes on diluting), plus 3 boiling stones or beads.

2. Run a deionized H_2O blank at the same time.

3. Put on a pre-heated electric burner and boil for only 1.5 minutes. Every flask should boil for the same duration. If solution should turn brick-red, the sample is too sweet to be in the proper range for this analysis. Dilute sample and repeat. Sample will be deep-blue for low sugar.

4. Place the flask in ice bath until cool, approximately 1.5 minutes.

5. Remove and let sit for 3 minutes or until it comes to approximate room temperature. The next 3 reagents are added consecutively to each individual flask, which must be titrated promptly

6. Add 10mL of Solution #3 (Potassium Iodide), mix well.

7. Add 10mL of 1+3 Sulfuric Acid, mix well. The solution will turn opaque yellow-brown. If it turns a creamy white color, the sugar concentration is too high. Start over with a diluted sample so that the sugar will be below 2.8%, the upper limit of the test.

8. Add 10mL of Solution #5 (Starch), mix well. Solution will turn a deep purple-brown.

9. Titrate immediately to a brownish cream color tinged with yellow with Solution #6 (Sodium Thiosulfate). The last mL must be titrated one drop per 3 or more seconds, otherwise the endpoint will be overrun due to the slowness of the reaction. It may be necessary to run a quick titration to get an idea where the endpoint will be, then rerun for accurate endpoint. The endpoint color changes are distinct and will be obvious with practice.

CALCULATION

A = # mL of Solution #6 to titrate H_2O blank.

B = # mL of Solution #6 to titrate wine sample.

% Reducing Sugar (g/100mL) = 2.8 (1 - B/A).

OR: % Reducing Sugar (g/100mL) = (28/A) (A-B) (0.1)

Multiply this result by dilution factor when appropriate.

NOTES

The theoretical result for the H_2O blank is A = 28 mL. In the real world, A > 29 mL is common and normal.

For best results, use consistency in analytic techniques between flasks in a group run at the same time.

Variable volume dispensers can be used for Solutions 3, 4, and 5.

A frequent requirement is determination of reducing sugar after inversion for a sample of dosage liqueur with a high Brix (like 60 or greater). A dilution of X50 followed by inversion with Invertase has been found to work well. Pipet 10mL of liqueur into a 500mL volumetric flask containing ca. 300mL water. Rinse the interior of the pipet once with water from the flask, draining back into the flask. Make to volume and mix well. Invert a 2mL aliquot in accordance with the "Invert Sugars-Invertase Method procedure. This produces a total dilution of X55. Continue with the Gold Coast Procedure above.

DISPOSAL

Each flask should be diluted with 15-20 L of water before sink disposal.