

Waters

Lab Highlights

FOOD ADDITIVES
82.600.046.003.026

DETECTING CAROB ADULTERATION OF COCOA POWDERS USING LC ANALYSIS OF SUGARS

From an economic standpoint carob is an attractive adulterant for cocoa powders. Since carob powder is recommended as a legitimate cocoa extender at levels up to 50%, it is feasible that adulteration could result in an extra profit per truckload of cocoa powder. For instance, if carob is \$0.50 per pound and cocoa is \$2.50 per pound, a 10% carob could be a tempting way to reduce costs.

Additionally, the convenient LC analysis of the individual sugar composition of cocoa powders from different types of beans and/or processing conditions is of interest to manufacturers.

Examination was made using Waters equipment (1) which showed that the analysis of individual sugars could detect the presence of carob in cocoa powder. The method was essentially that of Hurst and Martin (2) using the μ Bondapak Carbohydrate Analysis Column.

Results

In carob flour, using the LC analysis, sucrose is the predominant sugar followed by fructose and dextrose. This is contrasted to the finding that cocoa powders contain no measurable amounts of fructose.

These analytical results suggest that fructose can be used as a good indication for the presence of carob in cocoa powder at levels as low as 3%.

Improved Analysis

"The HPLC method offers advantages of rapidity and ease of analysis along with a relatively low cost. In addition it can provide more information about the carbohydrate content of confectionary ingredients and products with greater accuracy than older wet chemical methods. There is practical value in this HPLC method with a detection capability down to at least 3% carob, because the cost of addition and mixing along with the risk of getting caught would probably not offset the cost savings afforded by 3% adulteration. The only other means of detecting carob in cocoa powder to our knowledge is a microscopic method published late in 1977 as a laboratory bulletin by FDA. Since this microscopic method yields qualitative rather than quantitative results, it could be used to confirm the findings of the HPLC method."(1)

Brian Bidlingmeyer

2/28/82

- (1) Albright, F. R., Schumacher, D. V. and Major, R. A., Food Engineering (May) 110-111 (1978).
- (2) Hurst, W. J. and Martin, R. A., Jr., J.A.O.A.C., 60, 1180 (1977).