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Letters to the editor

Sir: We have recently evaluated two related procedures for quickly estimating the content of glucosinolates in rapeseed. In the first rapid procedure (1), commonly known as the "Tes-Tape procedure," a small sample of seed is crushed. The crushed seed is mixed with a quantity of activated carbon empirically determined to be the amount needed to absorb endogenous glucose. Water is added and, after the glucosinolates have been hydrolyzed by the seed enzymes, the excess glucose is estimated using a semiquantitative, glucose specific test paper containing glucose oxidase, peroxidase, and the chromogen o-tolidine. This method was reported to be relatively sensitive and accurate (1) and has been used, in various modifications, as a screening procedure for low glucosinolates rapeseed in plant breeding programs, at crushing plants and in quality monitoring programs.

The second procedure (described as the Tes-Stick Procedure (2)) is actually a simplification of the first procedure to a kit form. The kit consists of a plastic bag with a quick seal, two plastic tubes which are graduated for addition of seed and water, and a cardboard stick which has a wick, carbon and glucose test paper incorporated onto it. To estimate glucosinolates, a sample of seed (measured with the plastic tube) is crushed with a hammer in the plastic bag. Water is added and mixed with the crushed seed, and after the glucosinolate hydrolysis is complete the wick of the cardboard stick is placed in the liquid. The glucosinolate content is then estimated semiquantitatively as in the first procedure.

The two procedures were used to estimate the glucosinolate content of 115 samples of rapeseed from the Grain Research Laboratory's 1978 New Crop Survey (3). The samples had previously been analyzed for total glucosinolates by the method of Wetter and Youngs (4) which determines glucosinolates spectrophotometrically by the ultraviolet absorption of thiourea derivatives of the isothiocyanate split products. The samples tested included 48 samples of "Canola" seed (glucosinolates 3 mg/g as 3-butenyl isothiocyanate or less and erucic acid 5% or less) and 67 samples of rapeseed with glucosinolate contents ranging from 3.1 mg/g to 14.6 mg/g. Seventy-six of the samples graded No. 1 Canada Rapeseed (CR) while 39 of the samples were graded No. 2 CR or No. 3 CR. Correlations between the three procedures are shown in Table I. The correlations were reasonably high and not significantly different. Grade did not significantly effect the correlations.

The primary use for the two rapid procedures is to detect Canola types of rapeseed. For ca. 90% of the samples the rapid tests indicated correctly whether or not the sample was Canola (Table II). Examination of the data showed that in most of the cases where the test failed, the glucosinolate levels were close to the 3 mg/g cut-off level indicating that this error rate should not impose a severe penalty on the tester.

TABLE I

Correlation Coefficients (R) between Glucosinolates as Determined by Three Procedures fro 115 Samples of Rapeseed

	Wetter & Youngs	Tes-Tape
Test-Tape	0.805	
Tes-Stick	0.854	0.850

TABLE II

Effectiveness of Rapid Tests in Distinguishing Low-Glucosinolate Rapeseed

	Tes-Tape	Tes-Stick
No. of samples of Canola indicated as not Canola (n = 48)	6	4
No. of samples of high-glucosinolate seed indicated as Canola (n = 67)	5	6

Both rapid tests require between 7 and 9 min to complete a single sample. Overlapping of up to three samples is possible. The Tes-Stick procedure seems somewhat less sensitive than the Tes-Tape procedure with the cut-off for Canola being a color reading of 2 for the Tes-Stick and 3 for Tes-Tape. The major advantages to the Tes-Stick procedure are its simplicity and cleanliness relative to the Tes-Tape procedure. Some difficulties noted with the Tes-Stick procedure were: (a) difficulty in manipulation within the relatively small bag—especially for analysts with large hands; (b) tendency of certain seed lots to puncture the bag when crushed, (these punctures can be sealed with tape); (c) some sticks lose their wick action due to loss of adhesion with the cardboard (or sometimes for unexplained causes).

In summary, we have found that both the Tes-Tape and newer Tes-Stick procedures are suitable for distinguishing between types of rapeseed with high and low glucosinolates levels.

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Sir: L. Hedler et al. have recently reported their finding of considerable concentrations of carcinogenic nitrosamines in edible vegetable oils and margarine (Hedler, L., C. Schurr, P. Marquardt, Determination of Volatile N-Nitro Compounds in Various Samples of Edible Vegetable Oils and Margarine, JAOCS 56:681 [1979]). Since the authors mentioned that some measurements were carried out by us with the thermal energy analyzer, we want to make the following comments.

As discussed in detail with Dr. Hedler, the measurements carried out by us in no way can be interpreted as confirmation of nitrosamine contents in the foods analyzed. We received some extracts, in order to compare nitrosamine contents as determined by Dr. Hedler, with those found by our own method. We expressed our doubts that the results found in the extracts reflect nitrosamine contents in the original samples and suggested that a contamination in the laboratory and/or artifact formation during workup of the samples might have caused the positive results in the extracts. Having ten years' experience in trace analysis of environmental N-nitroso compounds, we cannot but underline that reports on the occurrence of nitrosamines in environmental samples or body fluids can only be considered as reliable when any possibility for artifact formation or contamination has been convincingly excluded by appropriate test procedures. Our own group in a comprehensive and systematic survey of food from the German market (about 3000 samples) could not find any indications for nitrosamine contents in oils and margarine (Preussmann, R., B. Spiegelhalder, G. Eisenbrand, and C. Janzowski, N-Nitroso Compounds in Food, Proc. 9th Intern. Symp. Princ. Takamatsu Res. Fund, Tokyo, Japan, Jan. 23-25, [1979]). In this investigation, N-nitrosodiethylamine (NDEA) was found in only very few cases and in concentrations not exceeding 1.5 ppb, in some foods, but not in oils and fats.

The regular finding of NDEA in extracts of oils and margarine in addition to NDMA, in sometimes astonishing concentrations, as reported by Hedler et al. supports the view that the nitrosamine contents reported in this paper do not reflect the situation in foods.

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