

YEASTS

COMPARISON OF DRY SHEET MEDIA AND CONVENTIONAL AGAR MEDIA METHODS FOR ENUMERATING YEASTS AND MOLDS IN FOOD

(L. R. Beuchat, D.A. Mann, and J.B. Gurtler)

Several dry sheet media and conventional agar media are commercially available for enumerating microorganisms in foods. The most extensively used dry sheet method is the 3M Petrifilm system which consists of a card coated with one of several dry media containing nutrients, a cold-water-soluble gel, and 2,3,5-triphenyl tetrazolium chloride (TTC) to facilitate visualization of colonies. A plastic film attached to one end of the card protects the medium before and after depositing the test sample. The Nissui Compact Dry system consists of a modified plastic Petri plate containing a self-diffusible dry medium and a chromogenic enzyme substrate (5-bromo-4-chloro-3-indoxyl phosphate, *p*-toluidine salt) to facilitate counting. After depositing the sample on the medium, a cap is applied. Both systems offer conveniences not associated with conventional agar media. Dichloran 18% glycerol (DG18) agar is used in some laboratories as a general purpose medium to enumerate yeasts and molds in foods. This medium was formulated to favor recovery of xerophiles from low-moisture and intermediate-moisture foods but has been reported to also perform favorably with dichloran rose Bengal chloramphenicol (DRBC) agar for recovering yeasts and molds with high a_w . Exceptions are dried foodstuffs containing slow-growing xerophiles. A side-by-side comparison of the performance of 3M Petrifilm YM (yeast and mold) count plates, Compact Dry YM plates, DRBC agar, and DG18 agar for enumerating yeasts and molds naturally occurring in foods has not been reported. We undertook a study to evaluate these methods for enumerating yeasts and molds in a wide range of raw and processed foods of animal and plant origin.

We compared Nissui Compact Dry Yeast and Mold plates (CDYM), 3M Petrifilm Yeast and Mold count plates (PYM), DRBC agar, and DG18 agar for enumerating yeasts and molds naturally occurring in 97 foods (grains, legumes, raw fruits and vegetables, nuts, dairy products, meats, and miscellaneous processed foods and dry mixes). Correlation coefficients for plates incubated for 5 days were: DG18 vs DRBC (0.93), PYM vs DRBC (0.81), CDYM vs DG18 (0.81), PYM vs DG18 (0.80), CDYM vs DRBC (0.79), and CDYM vs PYM (0.75). The number of yeasts and molds recovered from a group of foods ($n = 32$) analyzed on a weight basis (CFU/g) was not significantly different ($\alpha = 0.05$) when samples were plated on DRBC, DG18, PYM, and CDYM. However, the order of recovery from foods ($n = 65$) in a group analyzed on a unit or piece basis, or a composite of both groups ($n = 97$), was DRBC > DG18 = CDYM > PYM. Compared to PYM, CDYM recovered equivalent, significantly higher ($\alpha = 0.05$), or significantly lower ($\alpha = 0.05$) numbers of yeasts and molds in 51.5, 27.8, and 20.6%, respectively, of the 97 foods tested; respective values were 68.8, 15.6, and 15.6% in the small group ($n = 32$) and 43.1, 33.8, and 23.1% in the large group ($n = 65$) of foods. The two groups contained different types of foods, the latter consisting largely (73.8%) of raw fruits ($n = 16$) and vegetables ($n = 32$). Differences in efficacy of the four methods in recovering yeasts and molds from foods in the two groups are attributed in part to differences in genera and predominant mycoflora. While DG18 agar, CDYM, and PYM appear to be acceptable for enumerating yeasts and molds in the foods analyzed in this study, overall, DRBC agar recovered higher numbers from the 97 test foods, thereby supporting its recommended use as a general purpose medium for mycological analysis.