



## QUALITY CONTROL PROCEDURES

### I INTRODUCTION

Bovine Serum is used in yeast morphology studies for the rapid presumptive identification of *Candida albicans*.

### II PERFORMANCE TEST PROCEDURE

1. Using a sterile loop or sterile wooden applicator stick, inoculate representative samples by lightly touching a yeast colony and making a very light suspension of cells in the serum. Incubate the tubes at  $35 \pm 2^\circ\text{C}$  for 2 – 3 h.
2. Place a drop of the yeast suspension on a clean microscope slide and place a clean cover glass over the suspension.
3. Examine under a low-power microscope; use the high-power objective to confirm the presence or absence of germ tubes.
4. Expected Results

Organisms	ATCC™	Germ Tube Formation
* <i>Candida albicans</i>	10231	+
* <i>Candida pseudotropicalis</i>	8553	–

\*Recommended organism strain for User Quality Control.

### III ADDITIONAL QUALITY CONTROL

Examine the tubes for signs of deterioration as described under "Product Deterioration."

## PRODUCT INFORMATION

### IV INTENDED USE

Bovine Serum is used in yeast morphology studies for the rapid presumptive identification of *Candida albicans*.

### V SUMMARY AND EXPLANATION

Bovine Serum is used for the germ tube test, which is one of the simplest and most valuable tests for the presumptive identification of *C. albicans*.<sup>1</sup> Germ tubes are short initial hyphae emanating directly from yeast cells. Over 90% of *C. albicans* isolates produce germ tubes in bovine serum after a short incubation period.<sup>2</sup>

### VI PRINCIPLES OF THE PROCEDURE

Clinical isolates of *C. albicans* produce germ tubes when incubated in serum at  $35 \pm 2^\circ\text{C}$  for 2 – 3 h.<sup>3,4</sup> A drop of the serum is examined microscopically for germ tubes after incubation of the serum inoculated with yeast cells. Germ tube formation occurs to the highest degree with inocula containing  $10^5 - 10^6$  cells per mL.<sup>1</sup> Although pooled human serum has been found to be a good substrate for the germ tube test, bovine serum works well and alleviates problems with the potential presence of *C. albicans* antibody, hepatitis viruses or human immunodeficiency virus (HIV).<sup>3</sup>

### VII REAGENTS

**Formula:** Bovine Serum, 0.5 mL per tube.

**Warnings and Precautions:** For *in vitro* Diagnostic Use.

Tubes with tight caps should be opened carefully to avoid injury due to breakage of glass.

**Storage Instructions:** On receipt, store tubes in the dark at  $2 - 25^\circ\text{C}$ . Avoid freezing and overheating. Do not open until ready to use. Minimize exposure to light. Tubed media stored as labeled until just prior to use may be inoculated up to the expiration date and incubated for recommended incubation times.

**Product Deterioration:** Do not use tubes if they show evidence of microbial contamination, discoloration, drying, or other signs of deterioration.

### VIII SPECIMEN COLLECTION AND HANDLING

This product is not for use in isolating organisms from clinical specimens.

Observe established precautions against microbiological hazards throughout all procedures. Prior to discarding, sterilize contaminated materials by autoclaving.

### IX PROCEDURE

**Material Provided:** Bovine Serum

**Materials Required But Not Provided:** Ancillary culture media, reagents, quality control organisms and laboratory equipment as required.

**Test Procedure:** Using a sterile loop or sterile wooden applicator stick, lightly touch a yeast colony and make a very light suspension of cells in the serum. Incubate the tubes at  $35 \pm 2^\circ\text{C}$  for 2 – 3 h.

Place a drop of the yeast suspension on a clean microscope slide and place a clean cover glass over the suspension. Examine under a low-power microscope; use the high-power objective to confirm the presence or absence of germ tubes.

**User Quality Control:** See "Quality Control Procedures."

Quality control requirements must be performed in accordance with applicable local, state and/or federal regulations or accreditation requirements and your laboratory's standard Quality Control procedures. It is recommended that the user refer to pertinent CLSI guidance and CLIA regulations for appropriate Quality Control practices.

### X RESULTS

The blastoconidia of other yeasts, e.g., *C. tropicalis*, must be distinguished from those of *C. albicans*. The short initial hyphae (germ tubes) produced by *C. albicans* are not constricted at the junction of the blastoconidium and the germ tube, whereas initial hyphae of *C. tropicalis* are accompanied by blastoconidia which are larger than those of *C. albicans* and there is a definite constriction where the initial hyphae joins the blastoconidium.<sup>3</sup>

## XI LIMITATIONS OF THE PROCEDURE

For identification of microorganisms, the organism must be in pure culture. Morphological, biochemical and/or serological tests should be performed for final identification. Consult appropriate texts for detailed information and recommended procedures.<sup>1,3</sup>

## XII AVAILABILITY

Cat. No.	Description
297458	BBL™ Bovine Serum, Pkg. of 100 size K tubes

## XIII REFERENCES

1. Kwon-Chung, K.J., and J.E. Bennett. 1992 Medical mycology. Lea & Febiger, Philadelphia.
2. Mackenzie, D.W.R. 1962. Serum germ tube identification of *Candida albicans*. J. Clin. Pathol. 15:563-565.
3. Warren, N.G., and H.J. Shadomy. 1991 Yeasts of medical importance, p. 617-629. In A. Ballows, W.J. Hausler, Jr., K.L. Herrmann, H.D. Isenberg, and H.J. Shadomy (ed.), Manual of clinical microbiology 5th ed. American Society for Microbiology, Washington, D.C.
4. Larone, D.H. 1995. Medically important fungi: a guide to identification, 3rd ed. American Society for Microbiology, Washington, D.C.

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