Open Access Journal
International Journal of Medical Research and Pharmaceutical Sciences
Volume 4 (Issue 3): March 2017 ISSN: 2394-9414
DOI- 10.5281/zenodo.345445 Impact Factor- 3.109

COMPARISON OF MILK AGAR WITH CHOCOLATE AGAR FOR SAMPLING OF HOSPITAL AIR AND DOOR SWAB SAMPLES

Sayan Bhattacharyya[*1], Dhiorendra Kumar[2], Shweta Singh[3], Abhishek Sengupta[4], Asim Sarfraz[5], Nahid Anjum[6], Ankur Kumar[7] & Priyadarshini[8]

*[1]Assiatnt Professor, Microbiology, AIIMS Patna
[2,4,5&6]Senior Resident, Microbiology, AIIMS Patna
[3,7&8]Tutor, Microbiology, AIIMS Patna

Keywords: *Milk Agar, Chocolate Agar, Door Swab etc.*

Abstract

Air sampling and hospital environmental sampling are routine procedures for hospital infection control measures and nosocomial infection surveillance. Samples were taken from general wards, outpatient departments and laboratories, thrice from each site.Chocllate agar made from human blood and milk agar were used. Milk agar was superior to chocolate agar in retrieving *S. aureus* and *Bacillus cereus* , which produced distinct golden yellow pigment and colonies with surrounding halo on it, respectively. Hence milk agar can be a good replacement for chocolate agar and other media for air and other hospital environmental sampling.

Introduction

Air sampling and hospital environmental sampling are routine procedures for hospital infection control practice and nosocomial infection surveillance protocols(1). Different methods are there in the literature for air sampling, like settle plate method, slit sampling and others(2). Settle plate method is a means of passive air sampling by which particels containing aerial bacteria deposit on surface of nutrient media at the rate of about 0.46 cm/second(3). Usually the 'complete particle' floating in air (microorganism in association with the 'carrier' particle) is 12 μm in diameter or more(4). The Settle plate method is very suitable for operation theatres air sampling because they do not create any turbulence. Chocolate agar handling may be hazardous and it can be difficult to make, and nutrient agar may be not as sensitive in recovery of colonies from air as compared to chocolate agar. Milk agar is a good enriched medium that enhances pigment production in Staphylococci and other bacteria. So our study was aimed at comparing milk agar with chocolate agar for settle plate air sampling and recovery of colonies from swabbing door of hospital wards and departments

Materials and methods

This was a laboratory based observational study carried out in the Department of Microbiology of the institute from August 2016 to december 2016.Samples were taken from general wards, 2 different outpatient departments and 3 laboratories, thrice from each site. Air was sampled by settle plate method while door swab sample was taken by sterile cotton swab moistened with saline. In settle plate emthod, chocolate agar and milk agar plates were kept open in the respective sites, 1 meter above floor and 1 metre way from walls. Air sampling and door swab inoculation was done on buffalo milk agar (composition: Nutrient agar 67 ml + buffalo milk 34 ml), sterilised by autoclaving at 110 deg C and 10 lbs/in^2 pressure for 10 minutes . Chocolate agar was prepared by adding 10 ml outdated human blood from blood bank to autoclaved nutrient agar (HiMedia, India; 90 ml) at 75 deg C temperature and subsequently pouring the plates. Plates were incubated at 37 deg C for 24 hours. Door swab samples were streaked on both these media, and sample was collected using strile cotton swab stick moistened with sterile peptone water. Samples were taken thrice from each site. *Staphylococcus aureus* was identified by positive slide and tube coagulase tests from colonies showing Gram positive cocci in clusters by Gram stain(5). *Bacillus cereus* was identified by Gram positive bacilli with subterminal non-bulging spore on Gram stain from colonies, and positive motility on semi solid agar and positive lecithinase ativity on Egg yolk agar, and positive mannitol fermentation reaction with no hemolysis on blood agar(6).

Volume 4 (Issue 3): March 2017 ISSN: 2394-9414
DOI- 10.5281/zenodo.345445 Impact Factor- 3.109

Results and discussion

Milk agar was superior to chocolate agar in retrieving *S. aureus* and *Bacillus cereus* , which produced distinct golden yellow pigment and dry, flat colonies with surrounding halo on it, respectively. Also it was better for growing filamentous fungi like *Aspergillus* spp., which formed cottony colonies at a faster rate on this medium as compared to chocolate agar . Gram negative bacilli produced translucent colonies on both media.

Number of colonies were same in both media on all occasions. Details are given in fugres 1 and 2 (see bottom).

Conclusion

Milk agar can be a good replacement for chocolate agar and other media for air and other hospital environmental sampling. Gillespie in his book said that lactose milk agar can be a good medum for observing lacthinase activity of bacteria as there was a zone of opalescence arouns thie colonies on this medium in otherwise lecithinase positive bacteria(7). Milk agar has been used in routine clinical microbiology lab for a long time, mainly as litmus milk agar for characterisation of anaerobic bacteria(8). This is all the more important because handling cholcolate agar made from human blood may be dangerous on account of fear of transmission of bloodborne infections , and can also lead to subptimal colomy recovery due to indiscrimate human consumption of antibiotics(9).

References

1. *Napoli C, Marcotrigiano V, Montagna MT. Air sampling procedures to evaluate microbial contamination: a comparison between active and passive methods in operating theatres. BMC Public Health201212:594-97.*
2. *Ehrlich R, Miller S, Idoine LS. Evaluation of Slit Sampler in Quantitative Studies of Bacterial Aerosols. Appl Microbiol. 1966; 14(3): 328–330*
3. *abharwal ER, Sharma R. Estimation of microbial air contamination by settle plate method: are we within acceptable limit. Sch Acad J Biosci 2015; 3(8):703-707.*
4. *Sandle T, Settle plate exposure under unidirectional airflow and the effect of weight loss upon microbial growth. European J Parenteral Pharmaceutical Sci 2015; 20(2): 45-50.*
5. *Boerlin P, Kunhert P, Methods for Identification of Staphylococcus aureus Isolates in Cases of Bovine Mastitis . J. Clin. Microbiol. 2003 ; 41(2):767-771.*
6. *Tallent et al. Efficient Isolation and Identification of Bacillus cereus Group. J AOAC Int 2012;95(2):446-51.*
7. *Gillespie SH. Medical Microbiology Illustrated.1994 . Butterworth-Heinemann, United Kingdom.*
8. *Webster GF, McGinley KJ. Use of Litmus Milk Agar for Presumptive Identification of Cutaneous Propionibacteria. J Clin Microbiol 1977;5(6):661-62.*
9. *Egwuatu TO, Ogunsola FT, Okodugha IM, Jide B, Arewa DG, Osinupebi OA.. Effect of Blood Agar from Different Animal Blood on Growth Rates and Morphology of Common Pathogenic Bacteria. Adv Microbiol; 2014;4: 1237-1241.*

Open Access Journal
International Journal of Medical Research and Pharmaceutical Sciences
Volume 4 (Issue 3): March 2017 ISSN: 2394-9414
DOI- 10.5281/zenodo.345445 Impact Factor- 3.109

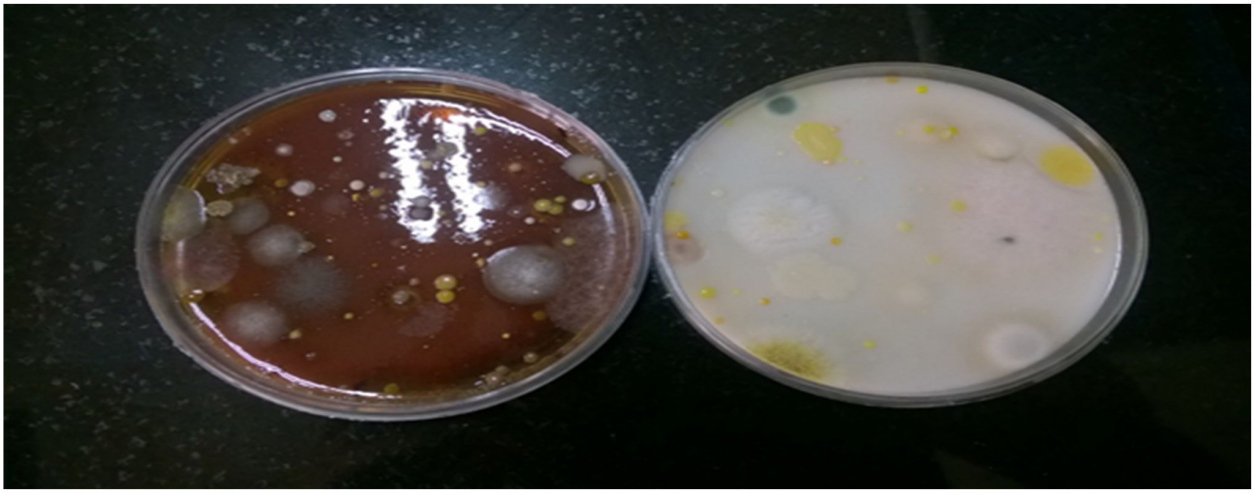

Fig. 1: Bacterial and Fungal colonies recovered from air by settle plate method using chocolate agar (left) and milk agar (right)

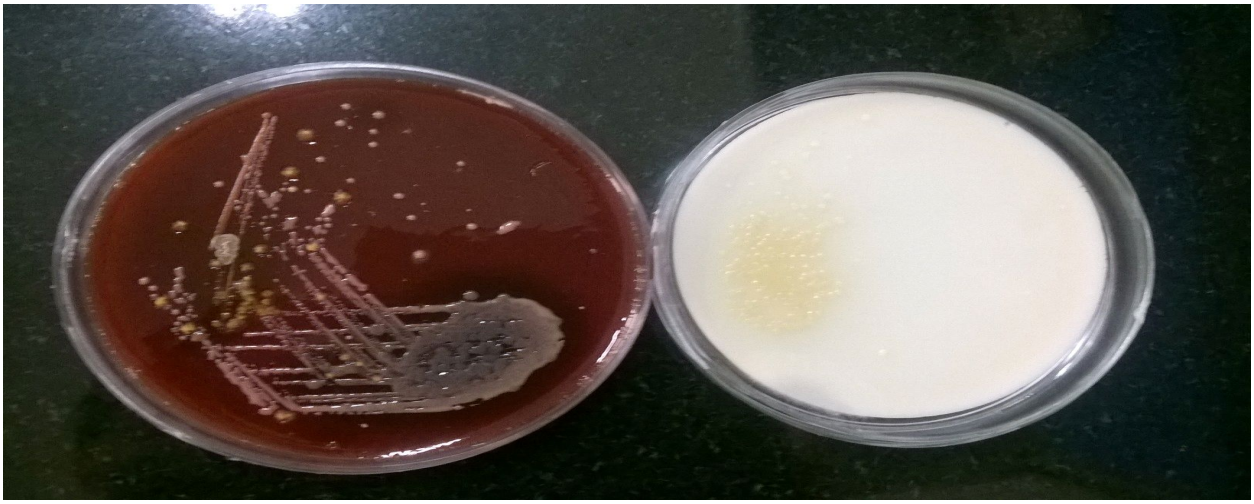

Fig. 2: Colonies from door swab using both media.