- CHROMagar™ MRSA -
Evaluation of a New Chromogenic Medium for Isolation of MRSA

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Summary

Methicillin-resistant *Staphylococcus aureus* (MRSA) are responsible for an increasing number of serious nosocomial and community-acquired infections, and accurate methods to detect such strains are needed.

Using MRSA (57 isolates) and MSSA (43 isolates) we tested the performance of 3 kinds of MRSA isolation media, MRSA Screen Agar Mannitol Salt Agar with Oxacillin **MSA**, Oxacillin Resistant Screening Agar **ORSA**, and a new chromogenic medium called **CHROMagar MRSA**.

CHROMagar MRSA achieved 100% specificity and sensitivity against MRSA while with **MSA** and **ORSA**, both media mis-identified 4 isolates of MRSA as MSSA with a specificity of 100% but a sensitivity of 91,5 %. Corresponding isolates had the *mecA* gene but MIC against Oxacillin was below 2 mg/L. These results would suggest that the new **CHROMagar MRSA** is the best culture medium for MRSA.

Introduction

MRSA has increased as an infection problem in local hospitals due to its strong ability to survive. It is recognised as a risk to be controlled in the clinics. Therefore it is important to identify MRSA at early stages. At the moment the gold standard in the identification of MRSA is PCR, by identifying the presence of the *mecA* gene. However this technology is not available in many laboratories in Japan. The USA NCCLS recommends different methods, including the method with **MSA** medium as an alternative to PCR. It is common to see **MSA** medium with Oxacillin, but recently CHROMagar company introduced a new medium **CHROMagar MRSA**. This is a report of its specificity and sensitivity for MRSA.

Ingredients and Methods

1. Bacterium tested. A revised version of the Toyama method was used for this experiment.

2. **MSA**, **ORSA** and **CHROMagar MRSA** were used as the media to isolate MRSA. The interpretation was done following the manufacturers instructions. Media were prepared following manufacturers instruction. **MSA** was incubated at 35°C for 24 hours. **ORSA** and **CHROMagar** were incubated at 37°C for 24 hours.

3. Results were confirmed with MRSA-LA, E-test Oxacillin and Ceftizoxime discs and compared to results obtained with the PCR method.

Results

57 MRSA isolates hold the DNA of *mecA* gene and 43 isolates were found to be MSSA. The experiments using three types of media are shown in Table 1. **CHROMagar MRSA** was successful in detecting all 57 isolates as MRSA. On the contrary, with **MSA** and **ORSA**, 4 isolates from different patients were not detected on both **MSA** and **ORSA** media.

The specificity and sensitivity of three media for detection of MRSA are shown in Table 2. **CHROMagar MRSA** achieved 100% in both specificity and sensitivity. **MSA** and **ORSA** both achieved 100% and 91,5% respectively.

Table 3 shows the presence of MRSA by the methods MRSA-LA, E-test Oxacillin and Ceftizoxime disc. In the case of MRSA-LA all the MRSA were judged as MRSA and MSSA as MSSA. The presence of MRSA by using a Ceftizoxime disc showed 55 isolates of MRSA out of 57 isolates of MRSA. With this method 2 bacterial isolates were judged as MSSA with the presence of *mecA*. E-test Oxacillin assessed all bacteria for MIC against Oxacillin. 53 MRSA isolates resisted to 2 mg/L antibiotic.

Table 1 Performance of MRSA isolation media

mecA PCR result	N° of strains	MRSA Isolation Media		
		CHROMagar MRSA	MSA	ORSA
+	57	57	53	53
-	43	43	47	47

Table 2 Specificity and sensitivity of MRSA isolation media

MRSA Isolation Media	Specificity in %	Sensitivity in %
CHROMagar MRSA	100.0	100.0
MSA	100.0	91,5
ORSA	100.0	91,5

Table 3 Comparison of susceptible testing for MRSA

mecA PCR result	N° of strains	MRSA-LA (PBP2')	Disc Diffusion test (ceftizoxime) > 20 mm (n = 100)	E-test (oxacillin) > 2 mg/L
+	57	57	55	53
-	43	43	45	47

Evaluation

We studied the specificity and sensitivity for detection of MRSA of a chromogenic culture medium recently promoted by CHROMagar. **CHROMagar MRSA** allowed detection of MRSA for all 57 MRSA (*mecA* positive) isolates.

This medium includes special components allowing the detection of MRSA as purple colonies on the medium. Therefore it is easy to detect MRSA. It was tested to see if it has a very good specificity and sensitivity.

MSA and **ORSA** are media using usual Oxacillin to select MRSA. A comparison study was done with CHROMagar Staph aureus supplemented with Oxacillin or Methicillin to detect MRSA. Sensitivity of plating in absence of antibiotics was 98 % but the sensitivity lowered to 58.6 % when Oxacillin was added. The sensitivity went up to 70 % when ciprofloxacin was added onto CHROMagar Staph aureus. Therefore the rate of the detection is not satisfactory just by addition of these classical supplements and low level Oxacillin resistant carrying *mecA* gene could be taken as MSSA.

Conclusion

In this study **CHROMagar MRSA** achieved 100% in both specificity and sensitivity which suggests that **CHROMagar MRSA** is a useful medium to detected MRSA.