EVALUATION OF THE PERFORMANCE OF CANDIDA ID2, A NEW CHROMOGENIC AGAR MEDIUM FOR DETECTION AND DIFFERENTIATION OF CLINICALLY IMPORTANT YEASTS

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ABSTRACT

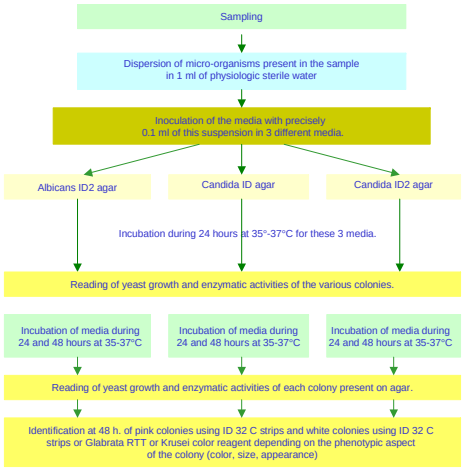
Objectives. Candida ID2 (CID2, bioMérieux, Marcy l'Etoile, France) is a new chromogenic medium, recently developed for the isolation of yeasts from clinical specimens. CID2 allows the direct identification of *C. albicans*, and presumptive identification of some other *Candida* species (*C. kefyr, C. lusitaniae, C. tropicalis*).
The purpose of this prospective study was to evaluate the performance of CID2 in comparison with the two other chromogenic media, Candida ID and Albicans ID2 (bioMérieux).
Methods. To assess selectivity, fertility and sensitivity of CID2, 294 biological specimens and 42 collection strains were isolated on the three media. After dilution in 1 mL of sterile water, 100 µL of the suspension were plated onto each medium. Media were incubated at 37°C, and red after 24 and 48 h. The inhibition of bacterial growth, the number and the size of yeast colonies, the coloration intensity of blue colonies (*C. albicans*) or pink colonies were appreciated.
A specimen was considered positive when a yeast grew on at least one of the 3 media. After 48 h, the pink and white colonies were identified by the standard methods.
Results. i) CID2 appeared the most selective medium at 24 and 48 h (1.4% of samples showed a bacterial growth) comparatively to Candida ID (5.1%) and Albicans ID2 (3.1%).
ii) 113 biological samples (38.4 %) were positive, and a total of 156 fungi were isolated on at least one of the media: no significant difference of fertility was seen between the three media.
iii) Regarding sensitivity, CID2 was globally superior for intensity of the blue colour at 48 h, but it appears to be lightly inferior for pink coloration, especially at 24 h. Moreover, the blue colour is more homogeneous on CID2 and Albicans ID2. Although evaluation of filamentous fungi detection was excluded to the study, they can be reliably detected on the tested media (7 samples positive with *G. candidum*, and 10 with moulds mainly *Aspergillus)*.
Conclusion. The new formulation of CID2 clearly improves the selectivity of fungal isolation compared to the previous chromogenic media. This medium gives a great ability to detect mixed cultures: indeed CID2 seems to be equivalent to other tested media for fertility and time of blue colour apparition, but homogeneity of the coloration facilitates greatly the reading of cultures. CID2 allows a direct and rapid identification of *C. albicans*, but other colonies must always be identified by the standard techniques.

OBJECTIVE

This study aimed at evaluating biological performance of the Candida ID2 medium used for the research or the presumptive identification of yeasts and fungi in biological sampling.
In this study, performance of Candida ID 2 agar are compared with Candida ID and Albicans ID 2.

About 294 samples, representative of the laboratory activity, were tested by the expert in order to obtain a minimum of 100 positive results. 42 collection strains were also tested. Different samples origin were tested: respiratory, digestive and urinary.

MATERIAL AND METHODS



Criteria studied :
1. Nutrient capacity : number of different fungi detected on each medium, size of yeasts colonies and numeration.
2. Sensitivity : intensity and time to obtain coloration.
Coloration of yeasts colonies according to the enzymatic activity.
3. Selectivity : growth of the bacterial contaminant on the studied medium.

RESULTS

1. Nutrient capacity :
Distribution of the 24-hour positive collection :

24-hour positive collection	Using 1 medium, at least	Candida ID 2		Candida ID		Albicans ID 2	
Biological samples	85	75	(88.24%)	74	(87.06%)	77	(90.59%)
Strains	42	42	(100 %)	42	(100 %)	42	(100%)
Total	127	117	(92.13%)	116	(91.34%)	119	(93.70%)

Distribution of the 48-hour positive collection :

48-hour positive collection	Using 1 medium, at least	Candida ID 2		Candida ID		Albicans ID 2	
Biological samples	156	138	(88.46%)	137	(87.82%)	133	(85.26%)
Strains	42	42	(100 %)	42	(100 %)	42	(100%)
Total	198	180	(90.91%)	179	(90.40%)	175	(88.38%)

Size of colonies: Colonies diameter has been measured in millimeters after an incubation period of 24 hours and then 48 hours at 35-37°C. Size of colonies obtained with the 3 media are nearly identical.
Counting: The counting obtained with the tested media is identical whatever the media.

2. Sensitivity :
The sensitivity study relates to the positive biological samples plus tested strains. The Candida ID2 chromogenic media (as well as Candida ID) allows the identification of *Candida albicans* (blue colonies) and the preliminary identification of a 3-specy group (pink colonies). Albicans ID2 chromogenic medium enables the exclusive identification of *C. albicans* (blue colonies).
The table below shows the distribution of a 24-hour colouration obtained with the tested media:

Number of collections that gave a colouration (within 24 hrs)	Sample	Using 1 medium, at least	Candida ID 2		Candida ID		Albicans ID 2	
Blue	Biological and collection	68	60	(88.24%)	59	(86.76%)	62	(91.18%)
Pink	Biological and collection	16	10	(62.50%)	14	(87.50%)	NA	

The table below shows the distribution of 48-hour coloration obtained with the tested media:

Number of collections that gave a colouration (within 48 hrs) Collection Using 1 medium, at least	Samples	Using 1 medium, at least	Candida ID 2			Candida ID			Albicans ID 2	
			N	(1)	(2)	N	(1)	(2)	N	(1)
Blue	Biological and collection	80	72	(90 %)	NA	68	(85 %)	NA	70	(87.50%)
Pink	Biological and collection	26	22	(84.62%)	(59.46%)	24	(92.31%)	(64.86%)	NA	

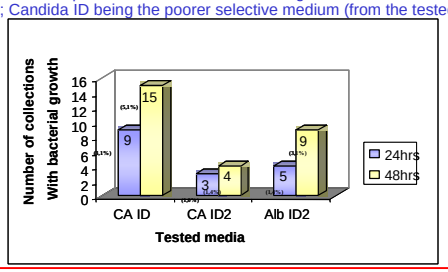
(1) / total coloration number
(2) / expected theoretical number

The total number of collections that gave blue or pink colonies is very close according to compared media. Candida ID 2 medium gives globally a better performance as regards the 48-hour blue stain. However, it gives a poorer pink color of colonies, in particular after 24 hours of incubation.

Coloration intensity
A part from intensity, colouration of *C. albicans* colonies with Candida ID2 and Albicans ID2 is more uniform and more homogeneous than for the blue colonies obtained on Candida ID.

Time required for coloration appearance
Coloring appears with the same intensity, depending on duration, on the 3 media for *C. albicans*, with a small advantage for Candida ID2 and Albicans ID2 compared to Candida ID.

3. Selectivity :
From a quantitative point of view, the bacterial growth is more inhibited with Candida ID2; Candida ID being the poorer selective medium (from the tested media).



CONCLUSION

The higher performance of Candida ID2 is due to its high selectivity as regards inhibition of associated microorganisms, intensity of blue coloration after 24 hours, compared to Candida ID (+ 33%) and after 48 hours (+ 9%). Compared to Albicans ID2, the intensity is slightly poorer after 24 hours and equivalent after 48 hours. Moreover, consistency of the blue coloration on Candida ID2 provides the medium with a real reading comfort.

This underlines the interest of this chromogenic medium regarding the visualization of the specy combinations within a biological collection.

Lastly, it should be noted that, in accordance with the rule followed-up in the field of mycology, this chromogenic medium, as for all those existing, only allows the direct identification on *C. albicans* species.

The identification of any other colony whatever its color (pink, white) can be acquired only by the implementation of traditional processes (physiological and/or biochemical criteria, monoclonal antibodies, etc...).