Chapter 3

RESULTS

According to the morphological and physiological study, 319 tested strains were identified as Candida albicans 142 (44.24%), the highest incidence, C. tropicalis 51 (15.80%), C. parapsilosis 8 (2.49%), Torulopsis glabrata 18 (5.61%). The less frequent species of Candida included the following, C. pseudotropicalis, C. krusei, C. guilliermondii, C.lambica and C. catenulata (see Table 2). The member of organism in the genus Cryptococcus, only Cr. neoformans 51 (15.89%) was isolated from human and animals sources (see Table 2). For the genus Trichosporon, there were 27 (8.41%) isolates of Tr. cutaneum and one of Tr. pullulans. In the last genus of isolated yeasts, Rhodotorula, R. rubra (2), R. graminis (9), R. glutinis (1) were found in this research (see Table 2). And the last 2 isolated strains were undifferentiated to species even based on morphological and physiological characteristic but, by using morphological study on glutineous rice tween or agar, these two isolates were identified as Candida sp. Anyhow, Geotrichum was not isolated from various clinical specimens in this study. (see Table 2).

Classical and rapid carbohydrates assimilation.

For the comparative study of conventional and rapid assimilation of 15 kinds of carbohydrate it was found that Torulopsis and Candida krusei have correct result there were no false positive and

Table 2. Identification of Tested Strains

Species	no.	source
Candida albicans	142	urine (50), throat and mouth swab (30), sputum (24), bronchial washing (13), vaginal and cervical swab (7), pus (7), TSC (1), CSF (1), lung autopsy (1), kidney autopsy (1), stool (1), ascytic fluid (1), and no data ((5).
Candida tropicalis	51	urine (15), throat and mouth swab (7), sputum (5), pus (4), stool (3), vaginal and cervical swab (2), bronchal washing (2), pericardium (1), gastric content (2), ascytic fluid (1), dialpion fluid (1), nails (1), hemoculture (1)
Torulopsis glabata	18	urine (13), cervical and vaginal swab (3), mouth and throat swab (2)
Candida parapsilosis	8	urine (2), throat and mouth swab (2), hemoculture (1), pus (1), sputum (1)
Candida pseudotropicalis	3	hemoculture (2), 1*

Table 2. Identification of Tested Strains (cont.)

Species	no.	source
Candida krusei	2	urine
Candida guilliermondii	1	cerebrospinal fluid
Candida lambica	1	1*
Candida catenulata	2	urine
Candida species	2	
Cryptococus neoformans	51	cerebrospinal fluid (20) animal droplet (21)
Trichosporcn cutaneum	27	urine (20), sputum and lung (4), pus (92), tongue (1)
Trichosporon pullurans	1	pulral diffusion fluid
Rhodotorula rubra	2	urine
Rhcdotorula glutinis	1	throat + mouth swab
Rhodotorula graminis	9	nails (7), pus (2)

Total number = 321 isolates

* data not received.

flase negative as shown in table 4.1 and table 4.4. Table 4.2 was the result of C. albicans, the data showed that some kind of carbohydrates were not concomitant results. These carbohydrates were sorbose (4.14% different), cellobiose (100% different), soluble starch (1.38% different)and arabinose (93.10% different). By using chi-square test of these four different values at p=0.01 it was found that only rapid assimilation of cellobiose and arabinose were significantly different from conventional method. C. tropicalis, table 4.3, only cellobiose was 7.55% different by using chi-square test at p=0.01 it was found that rapid cellobiose assimilation was not significant different from conventional assimilation. From table 4.4, results of C. parapsilosis, it showed that rapid assimilation of trehalose, xylose, arabinose were significantly different from conventional assimilation at p=0.01. Compared results Cr. neoformans was shown in table 4.6. It was found that rapid assimilation of galactose, trehalose, melibiose, xylose and inositol were significantly different from conventional assimilation at p=0.01.

For Tr. cutaneum, the result was shown in table 4.7, that only rapid assimilation of sorbose had significant difference from conventional assimilation. Other carbohydrates also had different results on these two methods but no significance by using p=0.01. From table 4.8, result of R. graminis, the data had shown that rapid assimilation of sorbose and xylose had significant differences from conventional assimilation.

The table 4.1 showed results of uncommon isolated species and rapid assimilation was different from conventional assimilation in some kind of carbohydrates, one of interesting carbohydrate was dulcitol which has been assimilated by C. guilliermondii by conventional assimilation but could not assimilated by rapid assimilation. The other uncommon isolated species C. catenulata; its data was not shown, also had different result between rapid and classical methods on some kindsof carbohydrate such as xylose lactose, raffinose and insitol for Tr. pullulans; galactose for R. glutinis, cellobiose, trehalose, raffinose and xylose for C. utilis; trehalose and raffinose for C. lusitanae; maltose for Cr. albidus; sucrose, maltose cellobiose trehalose, lactose, melibiose, raffinose, and soluble starch for Geotrichum candidum; trehalose, soluble starch and arabinose for R. minuta.

Carbohydrates fermentation

The 6 genera, Candida, Cryptococcus, Trichosporon, Rhodotorula, Torulopsis in medically important yeasts Candida and Torulopsis could ferment carbohydrates. All of the isolated yeasts in the genus Candida were able to ferment glucose, C. albicans 40 (28.17%) isolates could ferment galactose, 50 (39.43%) isolates could ferment trehalose, all isolates could ferment maltose, but could not ferment sucrose and lactose. All of C. tropicalis (51 isolates) were able to ferment sucrose, 2 of 51 isolates could not ferment galactose and maltose and 3 of 51 isolates could not ferment trehalose. The same as C. albicans, all isolates of C. tropicalis could not ferment

Table 3. : Characteristic of standard strain

	Species		INK	GT	MS	TEM	URE	K	Ch	PI	A	Film
1	Candida albicans	ATCC 10231	-	+	+	42	-	-	+	-	+	-
2	C. albicans	CDC 85-00000xyz	-	+	-	42	-	-	+	-	+	-
3	C. tropicalis	CDC 85-035258	-	-	-	42	-	-	-	-	-	+
4	C. parapsilosis	CDC 85-031853	-	-	-	37	-	-	-	-	-	+
5	C. guilliermondii	CDC 85-031998	-	-	+	37	-	-	-	-	-	-
6	C. krusei	CDC 85-031997	-	-	+	37	-	-	-	-	-	+
7	C. stellatoides	CDC MP-84-018	-	-	-	42	-	-	-	-	-	-
8	Geotrichum candidum	CDC 85-035426	-	-	-	25	-	-	-	-	-	+
9	Candida albicans	ATCC 36802	-	+	+	42	-	-	+	-	+	-
10	C.tropicalis	NIH B4295	-	-	-	42	-	-	-	-	-	+
11	C. pseudotropicalis	NIH B4296	-	-	+	37	-	-	-	-	-	-
12	C. parapsilosis	NIH B4299	-	-	-	37	-	-	-	-	-	+
13	T. glabrata	NIH G-4	-	-	-	42	-	-	-	-	-	-
14	Trichosporon beijellii	TIST 5133	-	-	-	37	+	-	-	-	-	+
15	C. lusitaniae	TIST 5156	-	-	-	37	-	-	-	-	-	-
16	C. utilis	TIST 5146	-	-	-	37	-	-	-	-	-	+
17	Pichia guilliermondii	TIST 5142	-	-	+	37	-	-	-	-	-	-
18	T. glabrata	TIST 5141	-	-	-	25	-	-	-	-	-	-
19	Rhodotorula rubra	TIST 5124	-	-	-	25	+		-	-	-	+
20	Cryptococcus neoformans	DUKE U.	+	-	-	37	+		-	+	-	+
21	Cr. albidus	DUKE U.	+	-	-	25	+	+	-	-	-	+
22	Cr. laurentii	DUKE U.	+	-	-	25	+	-	-	-	-	+
23	Rh. minuta	DUKE U.	-	-	-	37	+	-	-	-	-	+
24	Trichosporon beijellii	DUKE U.	-	-	-	37	+	-	-	-	-	+

INK = INDIA INK PREPARATION
GT = GERM TUBE TEST
MS = CYCLOHEXIMIDE RESISTANCE
CH = CHLAMYDOSPORE PRODUCTION
PI = L-DOPA-PAPER STRIP TEST
TEM = TEMPERATURE
URE = UREAS TEST
K = POTASSIUM NITRATE ASSIMILATION
A = GROWTH IN ACID BROTH
FILM = FILM SURFACE FORMATION

ATCC = American Type Culture Collection
CDC = Division of Mycotic Disease,
Center for Disease Control, Atlanta
NIH = National Institute of health, Bethesda, Maryland
TIST = Thailand Institute of Scientific
and Technology Research
DUKE U. = Duke University

Table 3.1 : Characteristic of standard strain (sugar fermentation)

		FD	FG	FS	FM	FT	FL
1 Candida albicans	ATCC 10231	+	+	-	+	+	-
2 C. albicans	CDC 85-00000xyz	+	+	-	+	+	-
3 C. tropicalis	CDC 85-035258	+	+	+	+	+	-
4 C. parapsilosis	CDC 85-031853	+	+	-	-	-	-
5 C. guilliermondii	CDC 85-031998	+	+	+	-	+	-
6 C. krusei	CDC 85-031997	+	-	+	-	-	-
7 C. stellatoides	CDC MP-84-018	+	-	-	-	+	-
8 Geotrichum candidum	CDC 85-035426	-	-	-	-	-	-
9 Candida albicans	ATCC 36802	+	+	-	+	+	-
10 C.tropicalis	NIH B4295	+	+	+	+	+	-
11 C. pseudotropicalis	NIH B4296	+	+	+	-	+	-
12 C. parapsilosis	NIH B4299	+	+	-	-	-	-
13 T. glabrata	NIH G-4	+	-	-	-	+	-
14 Trichosporon beijellii	TIST 5133	-	-	-	-	-	-
15 C. lusitaniae	TIST 5156	+	-	+	-	+	-
16 C. utilis	TIST 5146	+	+	-	-	-	-
17 Pichia guilliermondii	TIST 5142	+	+	+	-	+	-
18 T. glabrata	TIST 5141	+	-	-	-	+	-
19 Rhodotorula rubra	TIST 5124	-	-	-	-	-	-
20 Cryptococcus neoformans	DUKE U.	-	-	-	-	-	-
21 Cr. albidus	DUKE U.	-	-	-	-	-	-
22 Cr. laurentii	DUKE U.	-	-	-	-	-	-
23 Rh. minuta	DUKE U.	-	-	-	-	-	-
24 Trichosporon beijellii	DUKE U.	-	-	-	-	-	-

FD = GLUCOSE FERMENTATION
FG = GALACTOSE FERMENTATION
FS = SUCROSE FERMENTATION
FM = MALTOSE FERMENTATION
FT = TREHALOSE FERMENTATION
FL = LACTOSE FERMENTATION

Table 3.2 : Characteristic of standard strain (Sugar assimilation)

Species		GLU	GAL	SOR	SUC	MAL	CEL	TRE	LAC	MEL	RAF	ST	XYL	ARA	INO	DUL
1 Candida albicans	ATCC 10231	+	+	-	+	+	-	+	-	-	-	+	+	+	-	-
2 C. albicans	CDC 85-00000xyz	+	+	-	+	+	-	+	-	-	-	+	+	+	-	-
3 C. tropicalis	CDC 85-035258	+	+	-	+	+	+	+	-	-	-	+	+	+	-	-
4 C. parapsilosis	CDC 85-031853	+	+	-	+	+	-	+	-	-	-	-	+	+	-	-
5 C. quilliermondii	CDC 85-031998	+	+	-	+	+	+	+	-	+	+	-	+	+	-	+
6 C. krusei	CDC 85-031997	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 C. stellatoides	CDC MP-84-018	+	+	-	-	+	-	+	-	-	-	+	+	+	-	-
8 Geotrichum candidum	CDC 85-035426	+	+	+	-	-	-	-	-	-	-	-	+	-	-	-
9 Candida albicans	ATCC 36802	+	+	-	+	+	-	+	-	-	-	+	+	+	-	-
10 C.tropicalis	NIH B4295	+	+	-	+	+	+	+	-	-	-	+	+	+	-	-
11 C. pseudotropicalis	NIH B4296	+	+	-	+	+	+	+	+	-	+	-	+	+	-	-
12 C. parapsilosis	NIH B4299	+	+	+	+	+	-	+	-	-	-	-	+	+	-	-
13 T. glabrata	NIH G-4	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-
14 Trichosporon beijellii	TIST 5133	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+
15 C. lusitaniae	TIST 5156	+	+	-	+	+	-	-	-	-	+	+	-	-	-	-
16 C. utilis	TIST 5146	+	-	-	+	+	+	+	-	-	+	-	+	-	-	-
17 Pichia quilliermondii	TIST 5142	+	+	-	+	+	+	+	-	+	+	-	+	+	-	+
18 T. glabrata	TIST 5141	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-
19 Rhodotorula rubra	TIST 5124	+	+	+	+	+	-	+	-	-	+	-	+	+	-	-
20 Cryptococcus neoformans	DUKE U.	+	+	-	+	+	-	+	-	-	+	+	+	-	+	+
21 Cr. albidus	DUKE U.	+	-	-	+	+	+	+	-	-	+	+	+	+	-	-
22 Cr. laurentii	DUKE U.	+	+	-	+	+	+	+	+	+	+	+	+	+	+	-
23 Rh. minuta	DUKE U.	+	-	-	+	-	+	+	-	-	+	-	+	+	-	-
24 Trichosporon beijellii	DUKE U.	+	+	-	+	+	+	+	+	+	+	+	+	+	-	-

GLU = GLUCOSE CEL = CELLOBIOSE ST = SOLUBLE STARCH

GAL = GALACTOSE TRE = TREHALOSE XYL = XYLOSE

SOR = SORBOSE LAC = LACTOSE ARA = ARABINOSE

SUC = SUCROSE MEL = MELIBIOSE INO = ONOSITOL

MAL = MALTOSE FAF = RAFFINOSE DUL = DULCITOL

Table 4. Results of classical and rapid carbohydrate assimilation

Species		GLU	CAL	SCR	SUC	MAL	CEL	TRE	LAC	MEL	RAF	ST	XYL	ARA	INO	DUL
C. pseudotropicalis	C	4	4	3	4	4	3	3	3	4	4	3	4	2	4	4
(4)	R	4	4	3	4	4	4	4	4	3	4	1	4	4	4	4
C. krusei	C	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
(3)	R	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
C. guilliermondii	C	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
(3)	R	3	3	2	3	3	3	0	2	3	2	3	3	3	3	0
R. rubra	C	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
(3)	R	3	2	3	3	3	3	2	3	3	3	3	1	1	2	2

GLU = GLUCOSE GAL = GALACTOSE SOR = SORBOSE

SUC = SUCROSE MAL = MALTOSE CEL = CELLOBIOSE

TRE = TREHALOSE LAC = LACTOSE MEL = MELIBIOSE

RAF = RAFFINOSE ST = SOLUBLE STARCH XYL = XYLOSE

ARA = ARABINOSE INO = INOSITOL DUL = DULCITOL

C = VONVENTIONAL METHOD R = RAPID METHOD

Table 4.1 : Result of classical and rapid carbohydrateassimilation test for C. albicans Total = 145 strain (three standard strain included)

	conventional	rapid	% DIFF.	chi-square
glucose	145	145	0.00	ND
galactose	145	145	0.00	ND
sorbose	139	145	4.14	4.25
sucrose	145	145	0.00	ND
maltose	145	145	0.00	ND
cellobiose	145	0	100.00	286.01
trehalose	145	145	0.00	ND
lactose	145	145	0.00	ND
melibiose	145	145	0.00	ND
raffinose	145	145	0.00	ND
starch	143	145	1.38	0.50
xylose	145	145	0.00	ND
arabinose	135	0	93.10	248.85
inositol	145	145	0.00	ND
dulcitol	145	145	0.00	ND

% DIFF = % Difference

ND = Not done

Table 4.2 : Result of classical and rapid carbohydrat assimilation test for C. tropicalis Total = 53 strain (two standard strain included)

	conventional	rapid	% DIFF.	chi-square
glucose	53	53	0.00	ND
galactose	53	53	0.00	ND
sorbose	53	53	0.00	ND
sucrose	53	53	0.00	ND
maltose	53	53	0.00	ND
cellobiose	49	53	7.55	2.34
trehalose	53	53	0.00	ND
lactose	53	53	0.00	ND
melibiose	53	53	0.00	ND
raffinose	53	53	0.00	ND
starch	53	53	0.00	ND
xylose	53	53	0.00	ND
arabinose	53	53	0.00	ND
inositol	53	53	0.00	ND
dulcitol	53	53	0.00	ND

% DIFF = % Difference

ND = Not done

Table 4.3 : Results of classical and rapid carbohydrate assimilation tests for Torulposis glabrata Total = 20 strains (two standard strain included)

	conventional	rapid	% DIFF.	chi-square
glucose	20	20	0.00	ND
galactose	20	20	0.00	ND
sorbose	20	20	0.00	ND
sucrose	20	20	0.00	ND
maltose	20	20	0.00	ND
cellobiose	20	20	0.00	ND
trehalose	20	20	0.00	ND
lactose	20	20	0.00	ND
melibiose	20	20	0.00	ND
raffinose	20	20	0.00	ND
starch	20	20	0.00	ND
xylose	20	20	0.00	ND
arabinose	20	20	0.00	ND
inositol	20	20	0.00	ND
dulcitol	20	20	0.00	ND

% DIFF = % Difference

ND = Not done

Table 4.4 : Result of classical and rapid carbohydrate assimilation test for C. parapsilosis Total = 10 strain (two standard strain included)

	conventional	rapid	% DIFF.	chi-square
glucose	10	10	0.00	ND
galactose	10	6	40.00	2.81
sorbose	9	10	10.00	ND
sucrose	10	10	0.00	ND
maltose	10	10	0.00	ND
cellobiose	10	8	20.00	0.56
trehalose	10	0	100.00	16.20
lactose	10	9	10.00	ND
melibiose	10	9	10.00	ND
raffinose	10	10	0.00	ND
starch	7	6	10.00	ND
xylose	10	0	100.00	16.20
arabinose	9	2	70.00	7.27
inositol	10	10	0.00	ND
dulcitol	10	10	0.00	ND

DIFF = % Difference

ND = Not done

Table 4.5 : Result of classical and rapid carbohydrate assimilation test for Cr. neoformans Total = 52 strain (one standard strain included)

	conventional	rapid	% DIFF.	chi-square
glucose	52	52	0.00	ND
galactose	52	35	32.69	18.00
sorbose	52	52	0.00	ND
sucrose	52	52	0.00	ND
maltose	52	52	0.00	ND
cellobiose	32	42	19.23	3.79
trehalose	52	28	46.15	28.65
lactose	52	42	19.23	8.96
melibiose	52	4	92.31	85.47
raffinose	48	43	9.62	1.41
starch	52	52	0.00	ND
xylose	44	18	50.00	24.96
arabinose	36	24	23.08	4.77
inositol	52	13	75.00	59.24
dulcitol	52	52	0.00	ND

% DIFF = % Difference

ND = Not done

Table 4.6 : Result of classical and rapid carbohydrate assimilation test for Tr. cutaneum. Total = 29 strain (two standard strain included)

	conventional	rapid	% DIFF.	chi-square
glucose	29	29	0.00	ND
galactose	26	23	10.34	0.53
sorbose	29	11	62.07	23.28
sucrose	29	29	0.00	ND
maltose	29	29	0.00	ND
cellobiose	26	24	6.90	0.15
trehalose	26	22	13.79	1.09
lactose	25	23	6.90	0.12
melibiose	26	18	27.59	4.61
raffinose	26	17	31.03	5.76
starch	26	29	10.34	1.41
xylose	25	22	10.34	0.45
arabinose	25	23	6.90	0.12
inositol	27	28	3.45	0.00
dulcitol	29	29	0.00	ND

% DIFF = % Difference

ND = Not done

Table 4.7 : Result of classical and rapid carbohydrate assimilation test for Rh. graminis Total = 9 strain

	conventional	rapid	% DIFF.	chi-square
glucose	9	9	0.00	ND
galactose	9	3	66.67	6.25
sorbose	9	0	100.00	14.22
sucrose	9	9	0.00	ND
maltose	9	9	0.00	ND
cellobiose	9	8	11.11	0.00
trehalose	9	9	0.00	ND
lactose	9	9	0.00	ND
melibiose	9	9	0.00	ND
raffinose	9	9	0.00	ND
starch	9	9	0.00	ND
xylose	9	2	77.78	8.42
arabinose	9	3	66.67	6.25
inositol	9	9	0.00	ND
dulcitol	9	9	0.00	ND

% DIFF = % Difference

ND = Not done

lactose. For T. glabrata (20 isolates), all could ferment glucose and trehalose but could not ferment galactose, sucrose, maltose and lactose. For C. parapsilosis, 5 of 8 isolates could not ferment galactose and all of C. parapsiolsis could not ferment sucrose, maltose, trehalose and lactose. For C. pseudotropicalis, all isolates could ferment galactose and maltose but could not ferment maltose, trehalose and lactose. Other isolates in the genus Candida had fit fermentation reaction as in the standard key (Table 3.1).

Urease test

All of 321 isolated yeasts had been tested for comparative study of conventional and rapid urease test. All of isolated yeasts in the genus Trichosporon, Rhodotorula, Cryptococcus neoformans and the standard strains of these 3 genera were positive for urease by using conventional and rapid urease test. There were no false positive and false negative in the rapid urease swab test

Nitrate assimilation test

All of 321 isolated yeasts had been tested for comparative study of conventional and rapid nitrate assimilation . The positive nitrate utilization yeast in the isolated yeast were Tr. pullulans and R. glutinis and also with standard strain of Cr. albidus. The result of rapid nitrate swab test and the conventional method were concomitant. In the rapid test, we could not see false positive or false negative result.

Growth in Sabouraud broth for film surface production

All isolates of Trichosporon had width film surface production while isolates of Rhodotorula and Cryptococcus had thin film surface production. One standard strain of Geotrichum had width film surface production. In the genus Candida, C. krusei (all strains gave the same result as Trichosporon. Fourty-nine (96.08%) of 51 isolates of C. tropicalis had thin film surface production. For 18 of 142 C. albicans (12.68%) produced film surface. Other isolates in the genus Candida had the same result as C. albicans.

Temperature tolerance

The three different temperatures 25°C, 37°C and 42°C were selected to use in this investigation. All isolates of C. albicans and T. glabrata could grow at 42°C. For C. tropicalis, 49 of 51 isolates had growth at 42°C. Other isolates in Candida had no growth at 42°C but grew at 37 C. For Cr. neoformans and Tr. cutaneum all isolates could not grow at 42°C. but grow at 37°C. One isolate of Tr. pullulans could grow at 25°C, at 37 C but at 42°C it could not grow. For Rhodotorula, All isolates could grow at 37°C but at 42°C it could not grow.

Germ tube test

On the study of germ tube production for rapid presumptive identification of C. albicans in pooled human serum, it was found that

Table 5. Result of other rapid methods compared with classical method

Species	Method Used classical methods and morphological test no.	rapid method							
		INK	GT	CH	MS	URE	K	A	PIG
Candida albicans	145	0	140	131	142	0	0	129	0
Candida catenulata	2	0	0	0	1	0	0	0	0
Torulopsis glabata	20	0	0	0	0	0	0	4	0
Candida guilliermondid	3	0	0	0	3	0	0	0	0
Candida krusei	3	0	0	0	0	0	0	0	0
Candida lambica	1	0	0	0	0	0	0	0	0
Candida lusitaniae	1	0	0	0	0	0	0	0	0
Candida parapsilosis	10	0	0	0	0	0	0	1	0
Candida pseudotropicali	4	0	0	0	1	0	0	0	0
Candida sp.	2	0	0	0	0	0	0	0	0
Candida tropicalis	53	0	0	1	6	0	0	0	0
Candida utilis	1	0	0	0	0	0	0	0	0
Cryptococcus albidus	1	1	0	0	0	1	1	0	0
Cryptocccus laurentii	1	1	0	0	0	1	0	0	0
Cryptococcus neoformans	52	52	0	0	0	52	0	0	52
Geotrichum candidum	1	0	0	0	0	0	0	0	0
Rhodotorula glutinis	1	0	0	0	0	1	1	0	0
Rhodotorula graminis	9	0	0	0	0	9	0	0	0
Rhodotorula minuta	1	0	0	0	0	1	0	0	0
Rhodotorula rubra	3	0	0	0	0	3	0	0	0
Trichosporon cutaneum	29	0	0	0	0	29	0	0	0
Trichosporon pullulans	1	0	0	0	0	1	1	0	0

INK = INDIAN INK PREPARATION
GT = GERM TUBE
CH = CHLAMYDOCONIDIA PRODUCTION
MS = RESISTANCE TO CYCLOHEXIMIDE
URE = UREASE TEST
K = POTASSIUM NITRATE ASSIMILATION
A = GROWTH IN ACIDIC PH BROTH
PIG = L-DOPA-PAPER STRIP TEST

140 isolated yeasts were positive for germ tube production and all the 140 isolates were identified as C. albicans. Five isolates of C. albican (3.45%) were negative for germ tube production. Other isolated yeasts could not produce germ tube in this study.

Chlamydoconidia production

Chlamydoconidia production for rapid presumptive identification of C. albicans on glutinous rice agar in 24 hours. There were 132 from 321 isolated yeasts positive for chlamydoconidia and 131 (90.35%) isolates were C. albicans and one was C. tropicalis. No others genera and species of the isolated yeast were positive for chlamydoconidia in this study.

Cycloheximide resistance

The resistance to cycloheximide could be used for rapid differentiation of some clinical significant yeasts. On this study we had found that 142(97.93%) isolates of C. albicans were resistance to 0.1% cycloheximide and the 3 remainder were sensitive. One isolate of C. guilliermondii was resistant to 0.1% cycloheximide. All of other species and genera were sensitive to 0.1% cycloheximide.

Pigmentation from L-DOPA paper strip test

L-DOPA paper strip test for pigment formation was used in rapid identification of Cr. neoformans. All of isolated Cr.

neoformans and standard strain had produced dark pigment when streak these yeasts on the L-DOPA paper strip after 60 minutes. No other genera and species of isolated yeasts could produce dark pigment on the L-DOPA paper. For the two standard strains of Cr. albidus and Cr. laurentii also could not produce dark pigment on the L-DOPA paper.

India ink preparation

All the Cryptococcus standard strains were positive for encapsulated yeast, It was found that only Cr. neoformans could produce capsule which could be easily detected by this simple method. The other isolated yeast could not prcduce capsule especially for C. albicans, the most common isolated yeast in this study.

Growth in acidic pH Sabouraud broth

After all of 321 isolated yeasts were inoculated in Sabouraud broth pH 1.5 for 24 hrs. one hundred and twenty-nine from one hundred and fourty-five (88.97%) of C. albicans had growth. One C. parapsilosis isolate had the same growth equal to C. albicans No isolates of C. tropicalis had the same growth equal to C. albicans. The other isolated yeasts showed negative growth in Sabouraud broth pH 1.5.