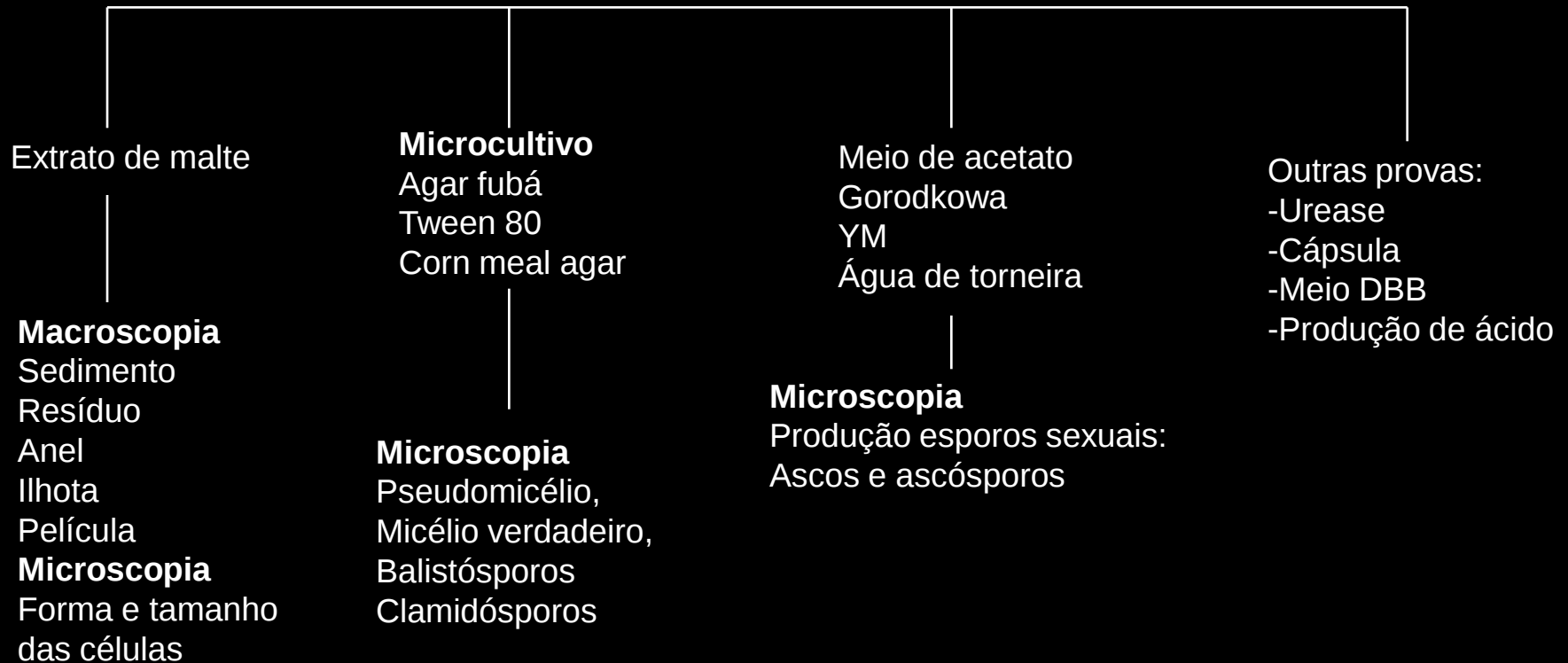


Identificação de *leveduras*

Taxonomia clássica

IDENTIFICAÇÃO GENÉRICA



C. krusei

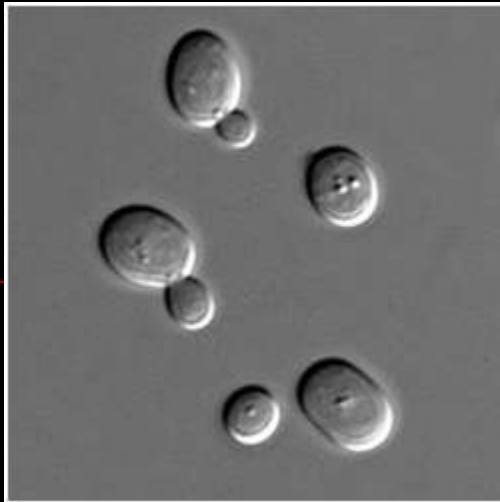
C. albicans



Formação de película com filme aderente em meio líquido

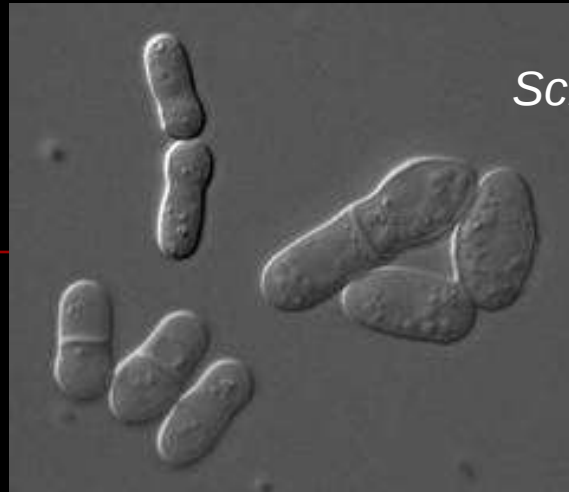
Em se tratando de um espécime clínico, pode ser indicativo da presença de
Candida krusei

Fleischmann, J.; Sripuntanagoon, E.M. Pellicle associated adherence film above incubation broth surface – an inexpensive adjunct to recognizing *Candida krusei* in the laboratory. BMC Res. Notes, v.4, p.74-80, 2011.



Saccharomyces

Brotamento multipolar

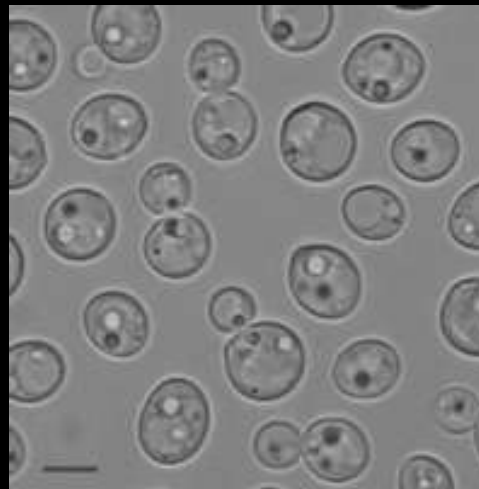


Schizosaccharomyces

Reprodução por
fissão



Trigonopsis



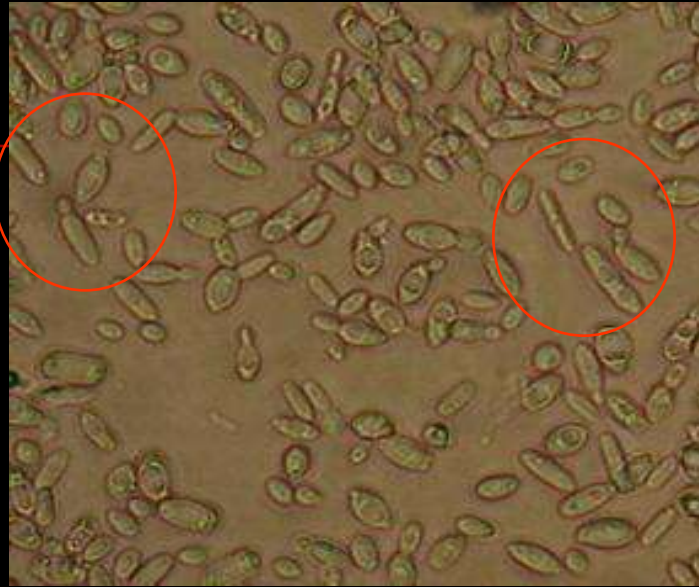
Lipomyces



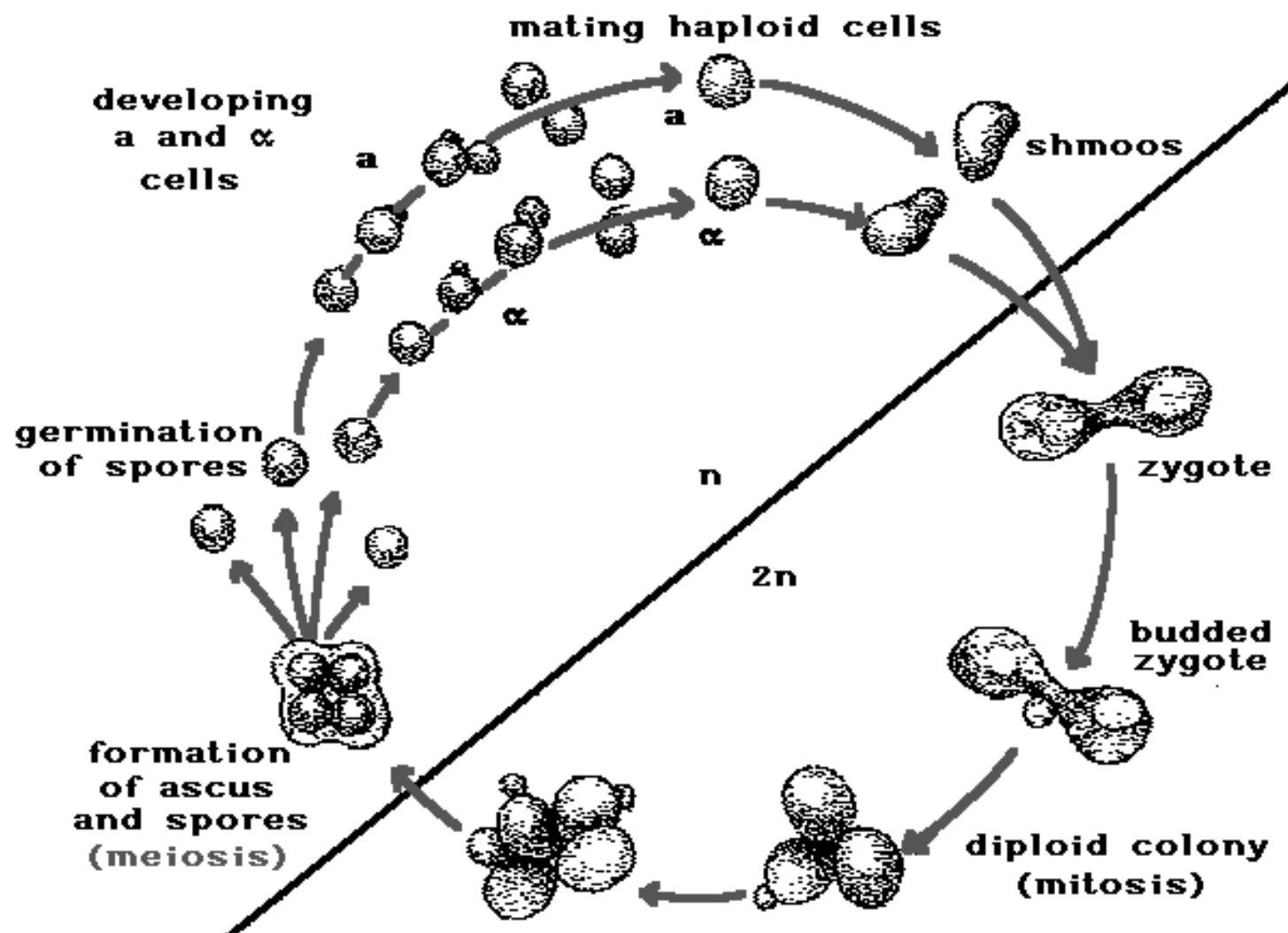
Hanseniaspora

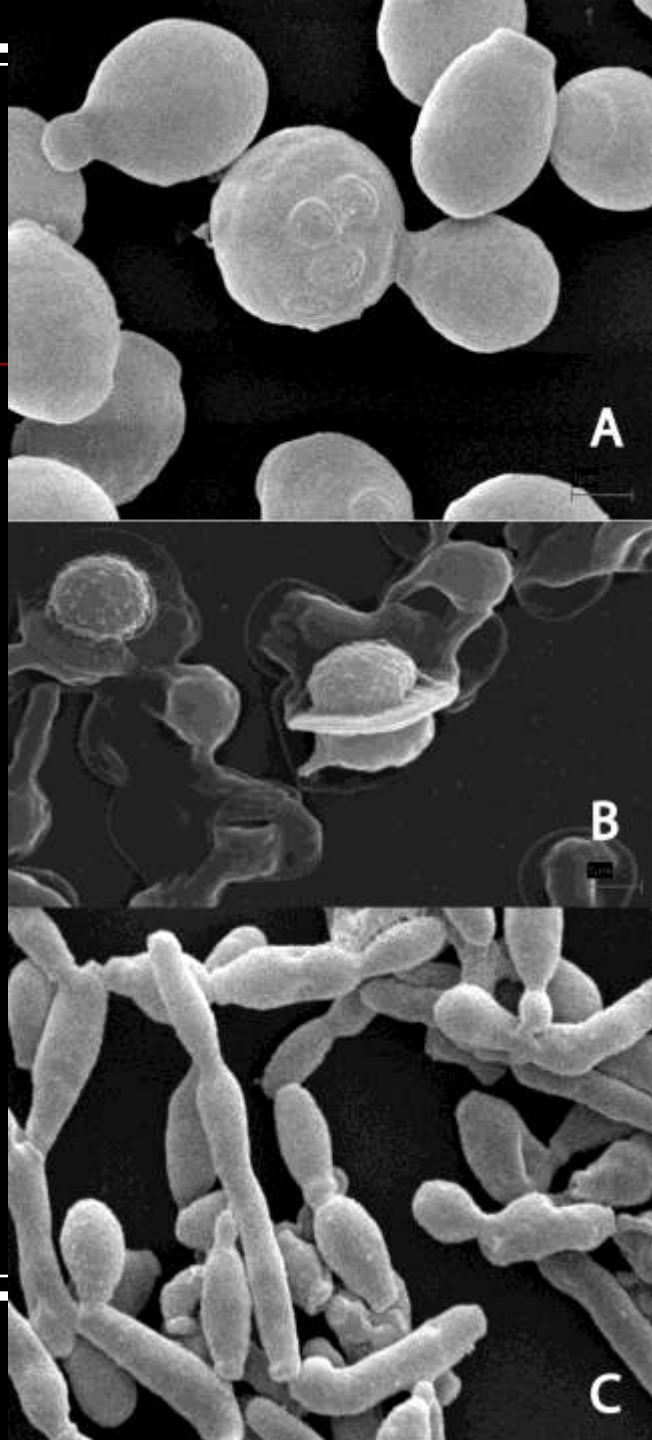
Brotamento bipolar

Para identificação de *Dekkera*

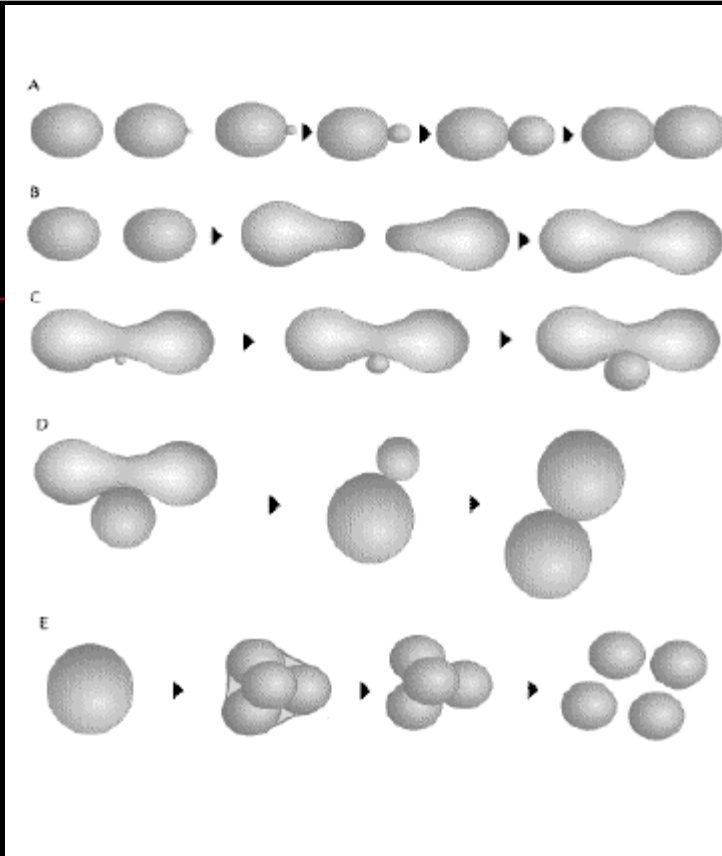


Teste de produção de ácido a partir da glicose em meio carbonato de cálcio, por 7-10 dias, a 30° C.

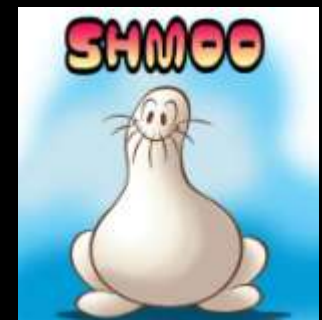




The xylose-fermenting yeast, *Pichia stipitis* (A) during vegetative growth, (B) forming spores, and (C) under carbon limitation. (FPL photo-Tom Kuster)

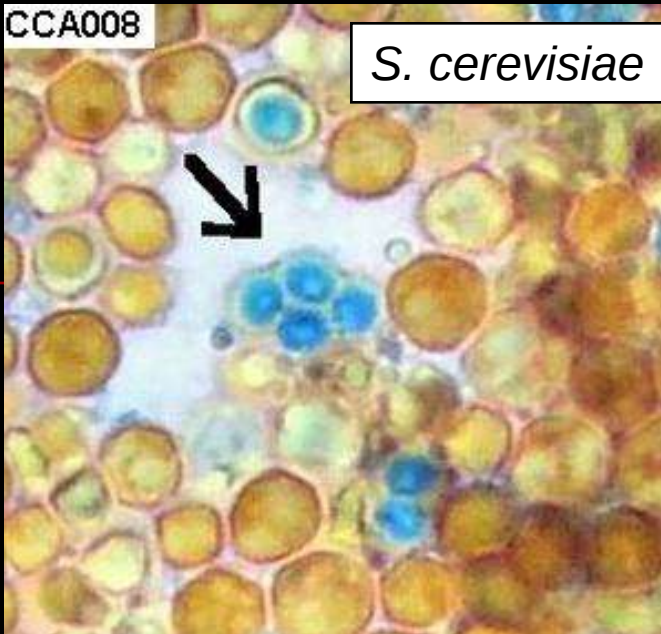


- A. Haploid yeast cells budding
- B. Haploid cells forming shmooos and zygotes
- C. Zygote budding off diploid
- D. Diploid budding
- E. Diploid forming asci with ascospores; freed haploid spores



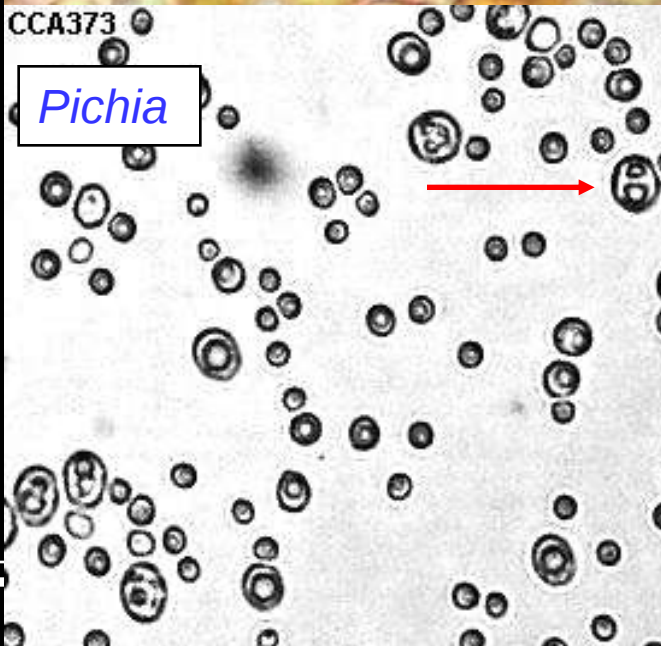
CCA008

S. cerevisiae



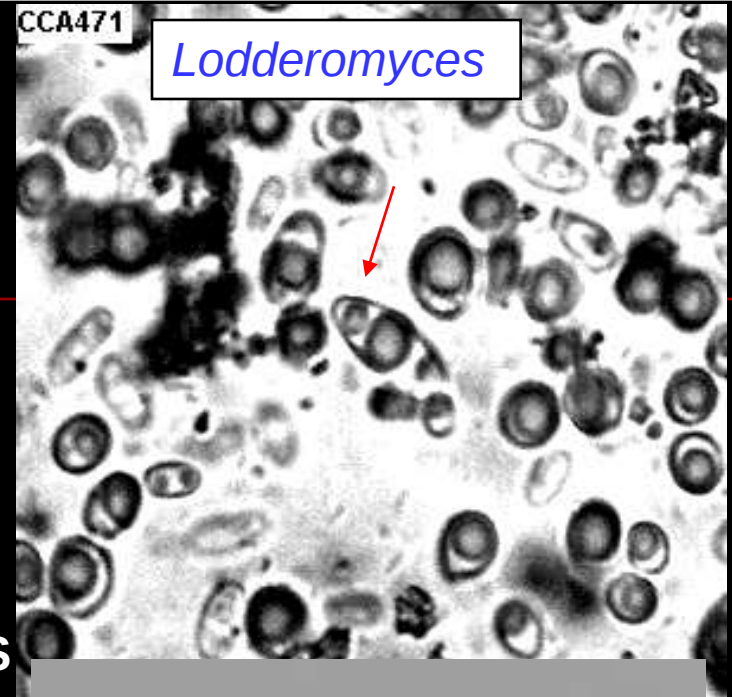
CCA373

Pichia

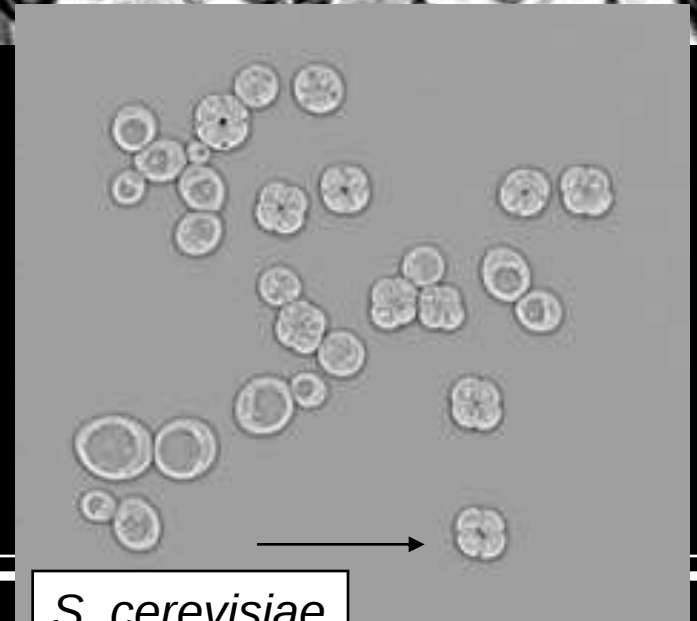


CCA471

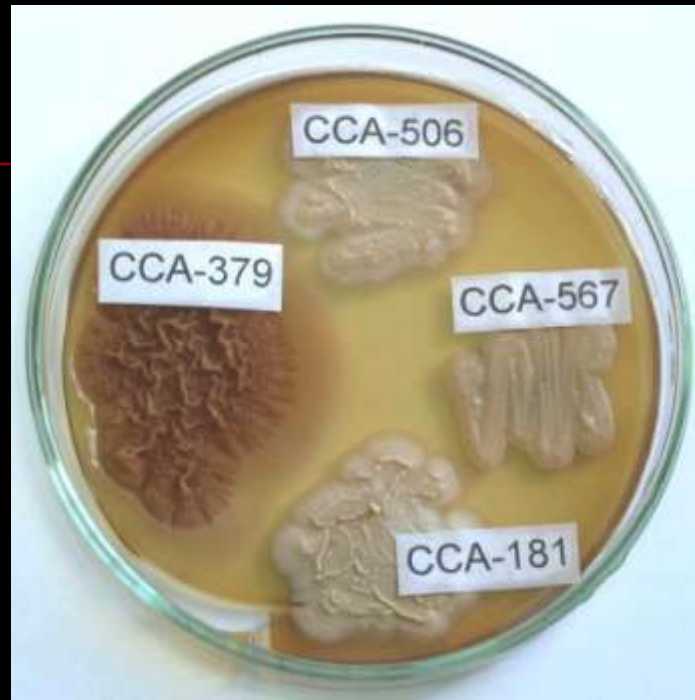
Lodderomyces



ESPOROS
SEXUAIS



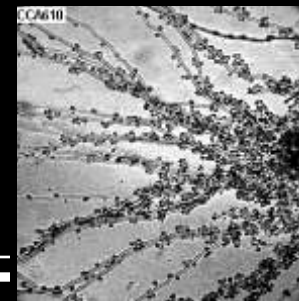
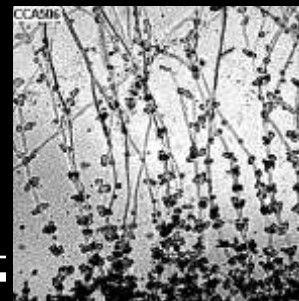
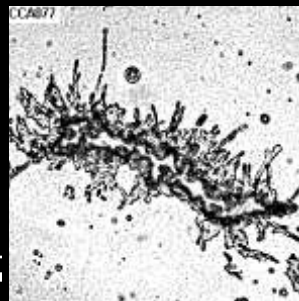
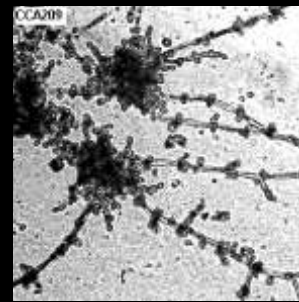
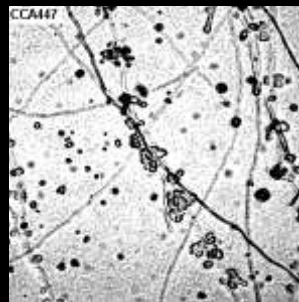
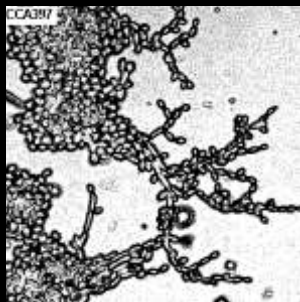
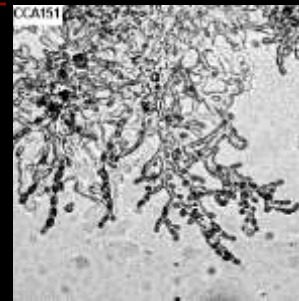
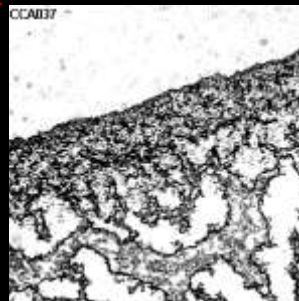
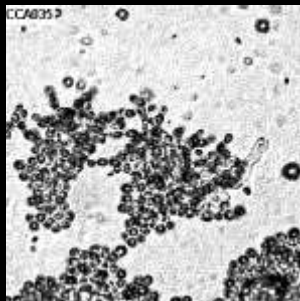
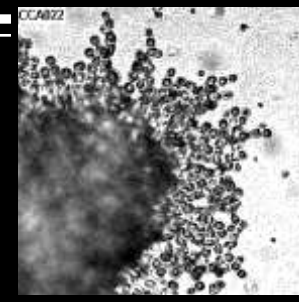
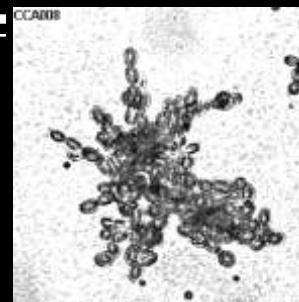
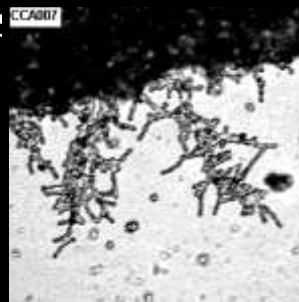
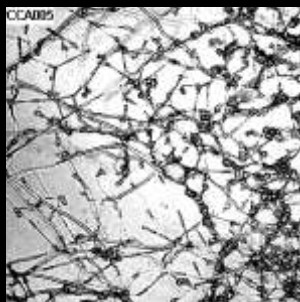
S. cerevisiae

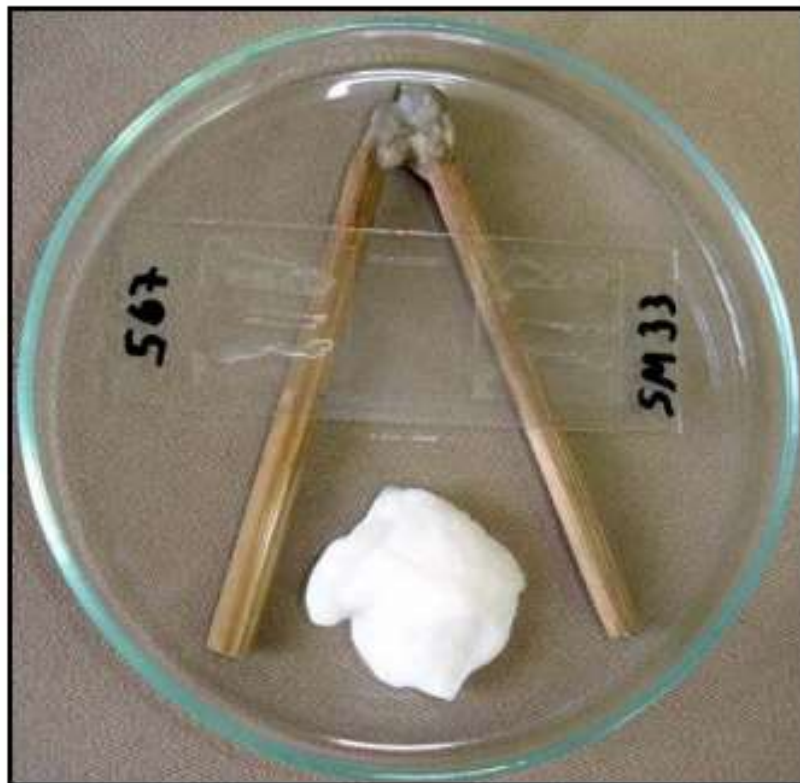


Teste do DBB. As linhagens CCA 181, 506 e 567 são DBB negativas, enquanto a CCA379 é DBB positiva (utilizada como controle positivo)

Leveduras basidiomicéticas exibem uma cor intensa na reação com Diazonium Blue B (DBB), enquanto as ascomicéticas não exibem. A reação é baseada na diferença de ultraestrutura da parede celular das leveduras.

Produção de pseudomicélio





- Microcultivo em lâmina com meio CMA para formação de pseudomicélio das leveduras



clamidósporos

Candida albicans - pseudomicélio

IDENTIFICAÇÃO ESPECÍFICA

Auxanograma

Assimilação
Fontes C e N

Zimograma

Fermentação
Alcoólica de
açúcares

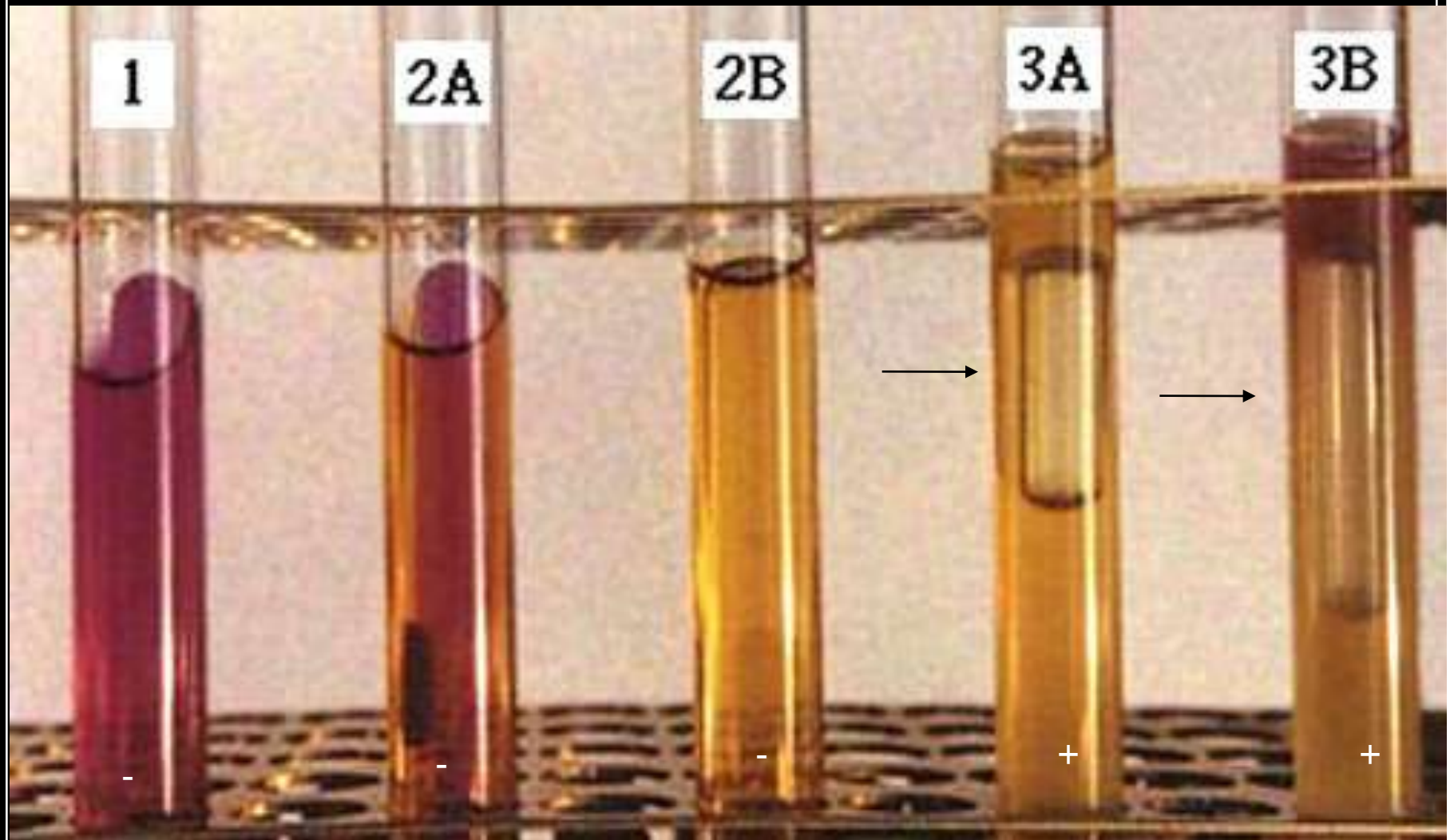
Meios diferenciais

- meio TTC
- ágar molibdênio
- ágar azul Tripan
- meio de Nickerson
- meio de CGB

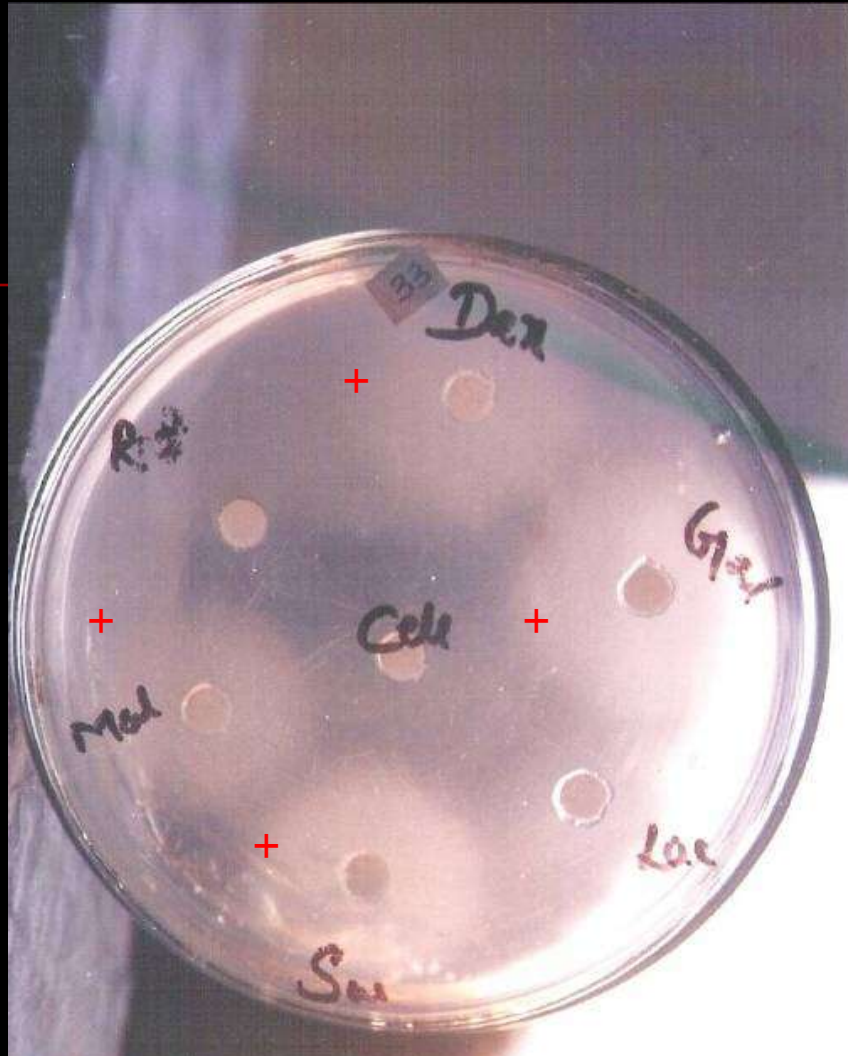
Outras provas:

- Crescimento 37°C
- Produção de compostos amilóides
- tubo germinativo
- resistência a Cicloheximida
- fenol oxidase

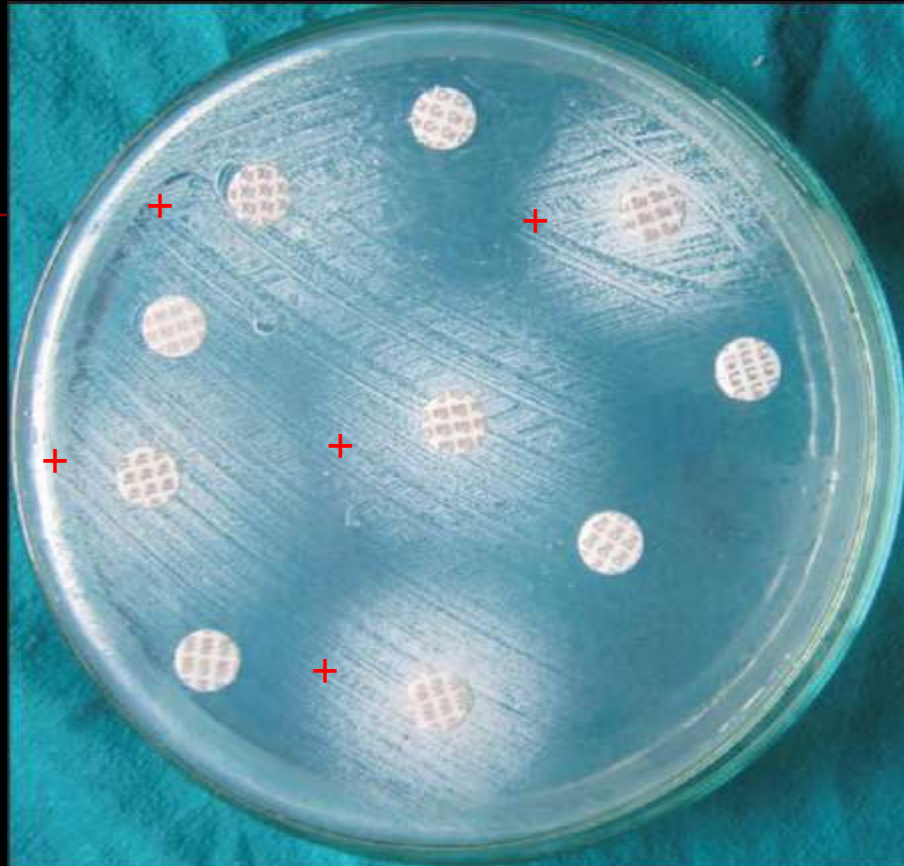
FERMENTAÇÃO DA GLICOSE



Teste de assimilação
açúcares em
meio sólido

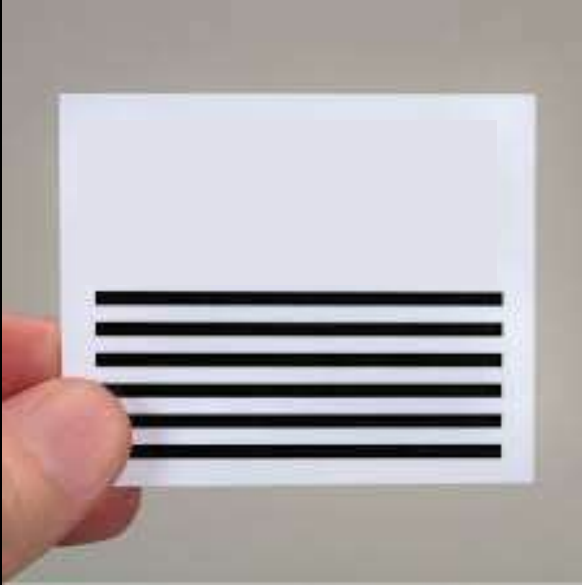


Jeddy et al. A study of antifungal drug sensitivity of *Candida* isolated from human immunodeficiency virus infected patients in Chennai, South India. J Oral Maxillofac Pathol 2011;15:182-6

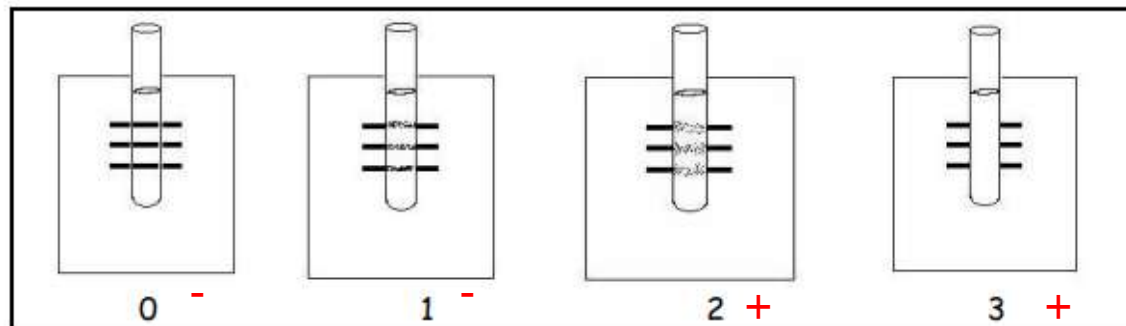


Shafi et al. Species distribution and antifungal susceptibility pattern of *Candida* causing oral candidiasis among hospitalized patients. Arch Med Health Sc 2015; 3(2):247-251.

Cartão de Wickerham



Para testes de assimilação
de fontes de carbono e
nitrogênio em meio
líquido



Linagem	Carbono																		Nitrogênio		
	Eritritol	Sacarose	Rafinose	Galactose	Xilose	Melezitose	Arabinose	Celobiose	Manitol	Melibiose	Glicose	Etanol	Maltose	Ac. Lactico	Ac. Citrico	Ramnose	Ac. Succinico	Inositol	Lisina	Etilamina	Nitrato
005	-	+	+	+	+	+	+	-	-	-	+	-	+	-	-	-	-	+	-	+	-
006	-	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	-	+	+	-
007	-	+	-	+	+	+	+	-	-	-	+	-	+	-	-	-	-	-	-	+	-
008	-	+	+	-	-	+	+	-	-	+	+	-	+	-	-	-	-	+	-	-	-
012	-	+	+	+	+	+	+	-	-	-	+	-	+	-	-	-	+	+	+	+	-
022	-	+	-	+	-	+	-	-	+	-	+	-	-	-	-	-	-	-	-	nd	-
023	-	+	+	+	+	+	+	-	-	+	+	-	+	-	-	-	-	+	-	-	-
027	-	+	-	+	-	+	+	-	-	-	+	-	+	-	-	-	-	-	-	nd	-
035	-	+	-	+	+	-	+	-	+	-	+	-	+	-	-	-	-	-	-	nd	-
037	-	+	+	-	+	+	-	-	-	+	+	-	+	-	-	-	-	+	-	-	-
053	-	+	+	+	+	+	+	+	-	-	+	-	+	-	-	+	+	+	+	+	+
059	-	+	-	-	+	+	+	+	-	-	+	-	+	-	-	-	+	+	+	+	+
077	-	+	+	+	-	+	-	+	+	-	+	+	+	-	-	-	+	+	+	+	+
083	-	+	+	+	+	+	+	-	-	-	+	-	+	-	-	-	-	+	-	-	-
115	-	+	-	+	+	+	+	-	+	-	+	+	+	-	+	-	-	+	+	+	-
151	-	+	-	-	-	-	+	-	-	-	+	-	-	-	-	-	-	-	+	-	-
155	-	+	-	+	+	+	+	+	-	-	+	+	+	-	-	+	+	+	+	+	+
181	-	+	-	+	+	+	+	+	+	-	+	+	+	-	+	-	+	+	+	+	-
209	-		+	+	+	+	+	-	-	-	+	+	-	-	-	-	-	+	-	-	-
373	-	+	-	+	+	+	+	-	+	-	+	+	+	-	-	-	+	+	-	+	-
385	-	-	-	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-
397	-	+	-	+	-	+	+	-	-	-	+	-	-	-	-	-	+	+	-	-	-
447	-	+	-	+	+	+	+	-	+	-	+	+	+	-	+	-	+	+	+	+	-
467	-	+	-	+	+	+	+	-	+	-	+	+	+	-	+	-	+	-	+	+	+
471	-	+	-	+	+	+	+	-	+	-	+	+	+	-	+	-	+	-	+	+	-
506	-	+	-	+	+	+	+	+	+	+	+	+	+	-	+	-	+	+	+	+	-
540	-	+	-	+	nd	+	+	-	+	-	+	+	+	-	+	-	+	+	+	+	-
567	-	+	-	+	+	+	+	-	+	-	+	+	+	-	+	-	+	+	+	+	-
593	-	+	+	+	+	+	+	-	+	-	+	+	+	-	+	-	+	+	+	+	-
610	-	+	-	-	+	+	+	+	+	-	+	+	+	-	+	-	-	+	+	+	-
612	-	+	-	+	+	+	+	+	+	-	+	+	+	-	+	-	+	+	+	+	-

¹ - (+) = positivo; (-) = negativo e (nd) = não determinado;

Linhagem	Produção de esporos	Produção de pseudomicélio	Cresc. em actidione 0,01%	Cresc. em Actidione 0,1 %	Cresc. 37°C	DBB	Fermentação da Glicose	Prod. de ácido ²
005	+	•	•	•	+	•	+	2
006	+	+	+	+	+	•	+	2
007	+	+	•	•	+	•	+	0
008	+	+	•	•	+	•	+	2
012	+	+	+	•	+	•	+	2
022	•	+	•	•	+	•	+	1
023	+	+	•	•	+	•	+	2
027	•	+	•	•	+	•	+	1
035	+	•	•	•	+	•	+	2
037	•	•	•	•	+	•	+	0
053	+	+	+	•	+	nd	+	3
059	+	+	+	+	+	•	+	3
077	+	+	+	+	+	•	+	3
083	•	+	•	•	+	•	+	1
115	+	+	+	+	+	•	+	2
151	+	+	•	•	+	•	+	1
155	+	•	+	+	•	•	+	3
181	•	+	+	+	+	•	+	1
209	+	nd	•	•	+	•	+	2
373	+	+	•	•	+	•	+	1
385	+	+	•	•	+	•	+	1
397	+	+	•	•	+	•	+	0
447	+	+	+	+	+	•	+	2
467	+	•	+	+	+	•	+	2
471	+	+	+	+	+	•	+	0
506	+	nd	+	+	+	•	+	1
540	+	+	+	•	+	•	+	1
567	+	nd	+	•	+	•	•	1
593	+	+	+	+	+	•	+	1
610	•	+	+	+	+	•	+	1
612	•	+	+	+	+	•	+	0

¹ - (+) = positivo; (-) = negativo e (nd) = não determinado;

Classificação das leveduras

- Reino Fungi

- Divisão Eumycota

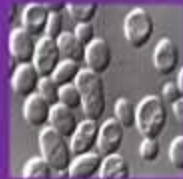
- Subdivisão Ascomycotina
 - Subdivisão Basidiomycotina
 - Subdivisão Deuteromycotina

Chaves de identificação

- Kreger-van Rij, N.J.W. The yeasts. A taxonomic study. Elsevier, 1984.
- Barnett, J.A., Payne, R.W., Yarrow, D. Yeasts: characteristics and identification. Cambridge Univ. Press, 1990.

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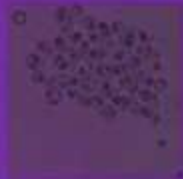
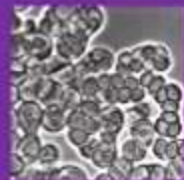
J.A. BARNETT, R.W. PAYNE & D. YARROW



YEASTS:

Characteristics and
identification

THIRD
EDITION



Photomicrographs by Linda Barnett

Keys

1. Key to the genera	967
2. Keys to species and genera not requiring characteristics of sexual reproduction	974
3. Key to species forming ballistospores	989
4. Key to species that produce true mycelium	990
5. Key to <i>Candida</i> species that do not produce pseudo- or true mycelium	994
6. Key to yeasts pathogenic for man and animal	998
A. Introduction	999
B. Identification of species	1000
C. Key	

1. Key to the genera

by N.J.W. Kreger-van Rij

- 1a Vegetative reproduction exclusively by cross wall formation without constriction
 Schizosaccharomyces p. 414
- b Vegetative reproduction exclusively by cells formed on stalks
 Sterigmatomyces p. 921
- c Vegetative reproduction by the formation of terminal buds on a conidiophore; the conidiophore elongates to develop a succession of conidia
 Symphodomyces p. 930
- d Other forms of vegetative reproduction
- 2a Vegetative reproduction by unipolar budding on a broad base; true mycelium may occur
 Malassezia p. 882
- b Vegetative reproduction by bipolar budding on a broad base
- c Vegetative reproduction by multilateral budding; true mycelium, arthrospores and ballistospores may also occur

- 3a Ascospores formed
b Ascospores not formed 4
6
- 4a Ascospores cap-shaped
Wickerhamia p. 440
b Ascospores hat- or helmet-shaped
Hanseniaspora p. 154
c Ascospores spherical 5
- 5a Ascospores smooth, hyaline, conjugating in pairs in the ascus; a narrow ledge is not visible under the light microscope
Saccharomyces p. 396
b Ascospores warty and brown
Nadsonia p. 279
c Ascospores smooth or warty, with or without an indistinctly visible ledge, not brown, not conjugating in pairs in the ascus
Hanseniaspora p. 154
- 6a Glucose fermented
b Glucose not fermented 7
Schizoblastosporion p. 909
- 7a Strong acetic acid formation from glucose; on malt agar growth is slow and cells are short-lived
*Erniella**
b No strong acetic acid formation from glucose; growth not slow
Kloeckera p. 873
- 8a Ballistospores formed
b Ballistospores not formed 9
14
- 9a Teliospores formed
Sporidiobolus p. 532
b Teliospores not formed 10
- 10a Cultures pink, red or orange
Sporobolomyces p. 911
b Cultures cream colored to slightly yellow
Bullera
Fibulobasidium } see *Bullera* key p. 577
Sirobasidium }

- 11a Some vegetative cells triangular
Trigonopsis p. 963 12
b Vegetative cells not triangular
- 12a Strong acetic acid formation from glucose; on malt agar growth is slow and cells are short-lived 13
b Not this combination of characters 14
- 13a Ascospores formed
Dekkera p. 146
b Ascospores not formed
Brettanomyces p. 562
- 14a Ascospores formed 15
b Ascospores not formed 41
- 15a Nitrate assimilated 16
b Nitrate not assimilated 19
- 16a Abundant true mycelium and budding cells; the hyphal septa have a dolipore visible under the light microscope as a small dark dot in the middle of the septum
Ambrosiomyces p. 106
b True mycelium present, scarce or absent; without septal dolipores 17
- 17a Hat-shaped ascospores formed in globose compartment at distal end of tube-shaped ascus
Pachysolen p. 289 18
b Ascus not tube-shaped
- 18a Ascospores spherical with a warty wall
Citeromyces p. 117
b Ascospores hat-shaped, hemispherical or Saturn-shaped
Hansenula p. 165
c Ascospores oblong with obtuse ends
Wickerhamiella p. 443
- 19a Ascus is sac-like protrusion on a vegetative cell; spores light amber or brown
Lipomyces p. 252
b Not this combination of characters 20

* The genus *Erniella* was described by Smith et al. (1981) and is not yet presented in this monograph.