

## SALIVARY YEAST FLORA IN HEALTHY ADULTS AND ITS RELATION TO pH

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### Abstract

The present study was undertaken on 40 healthy adults. Yeasts of the genus *Candida* were recovered in saliva of 35 percent cases. No significant difference between males and females with regard to these organisms was found. Among the yeast cultures isolated, 25 percent were *Candida albicans*. These organisms were recovered from saliva at all pH levels, except at pH 8 and they were found with a greater frequency in the acidic salivas.

### Introduction

Yeasts of the genus *Candida* are often encountered in the saliva of healthy adults (Richardson and Jones, 1958). They increase in number and cause certain pathological conditions like oral thrush in patients receiving broad spectrum antibiotics (Huppert et al., 1953) or in diabetes, probably due to the tendency towards high content of glucose in saliva of these patients which favours their growth (Knight and Fletcher, 1971). Possible correlation between yeasts and acid production has been suggested by Young et al. (1951). He stated that there is in fact a direct relationship between the acidity of saliva and the percentage of yeast positive cultures. Glass (1951) observed significant correlation between yeasts and the incidence of dental caries. However according to Marples (1960), conditions in mouth which favour the development of caries are also suitable for the growth of yeasts but they are not directly related to the incidence of caries.

The present investigation was undertaken to find out the incidence of yeast-like organisms in the oral cavity of healthy adults and to determine their number and kind with relation to pH of saliva.

### Material and Methods

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Subjects selected for the study were 40 healthy adults between 20 to 50 years of age. They included 19 males and 21 females. None of the subjects were taking any antibiotic therapy for the two weeks prior to the collection of specimens.

### Collection of Specimens

Saliva samples from each subject were taken in the morning. About 3 ml unstimulated saliva was collected from each subject before breakfast or brushing the teeth in a sterile screw capped receptacle, and promptly brought to the laboratory for examination.

### Determination of pH

The pH of the saliva samples was measured with pH paper with 0.5 pH difference. pH was also determined with pH meter by contact method using microelectrodes.

### Inoculation of Media

Ten fold serial dilutions were prepared in 9 ml sterile saline upto a dilution of  $10^{-7}$  with the help of sterile pipettes. From undiluted and diluted samples 0.1 ml was transferred in duplicate on the surface of Sabouraud's dextrose agar plates to which chloramphenicol was added to suppress bacterial growth. Plates were incubated at 28°C for three to four days. Yeast like colonies were counted on each plate for each dilution and mean count per ml of saliva was calculated. Pure cultures were obtained in each case.

### Identification Procedures

Identification was based on colony characteristic, microscopic morphology and staining properties. Yeasts appearing as white or cream coloured colonies on Sabouraud's dextrose agar were identified as *Candida* species if they reproduced by budding and showed the presence of pseudomycelium under the microscope. Further identification of the isolated species was based on chlamydospore formation on corn meal agar.

### Results

Fourteen out of forty saliva samples (35 percent) were found positive for yeast. The following table shows the distribution of yeast in saliva samples. The total mean count in positive cases was log 4.4 and the range was 3.0 to 5.7. The low standard deviation (0.6) indicates little variability of samples for these organisms.

Fig. 1 illustrates the yeast positive cultures in males and females. The incidence was slightly higher among males.

Table: Distribution of Yeast Cultures in 40 Saliva Samples

	Yeast viable count per ml								Mean Viable Counts log 10	S.D. log 10	Range $\pm 1.96$ log	S.D. 10
	0	1	2	3	4	5	6	7				
Saliva samples (40)	26	1	0	5	5	2	1	0	4.4	0.6	3.0-5.7	

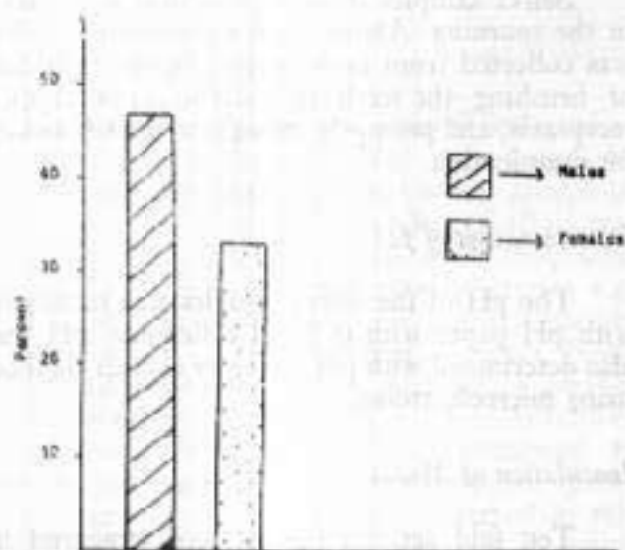


Fig. 1: Distribution of yeast according to sex.

Fig. 2 shows the percentage of cases positive for yeast at different pH values. More frequently acidic salivas had yeasts than the alkaline salivas.

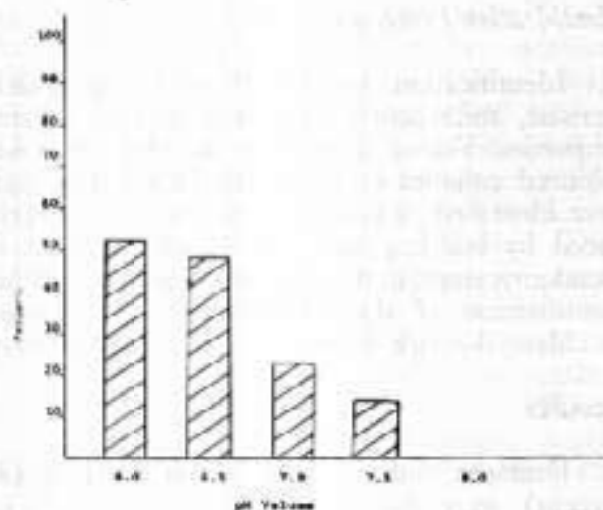


Fig. 2: Relationship of yeasts with salivas of different acidity.

In order to be sure that the salivary pH did not change during the time it was collected by the subjects and brought to the laboratory for examination, saliva samples of three different

subjects were tested for a period of five hours. Results of the test indicated that pH of saliva did not change until after an hour in the acidic saliva while the alkaline saliva did not show any change in the five hour experimental period (Fig. 3).

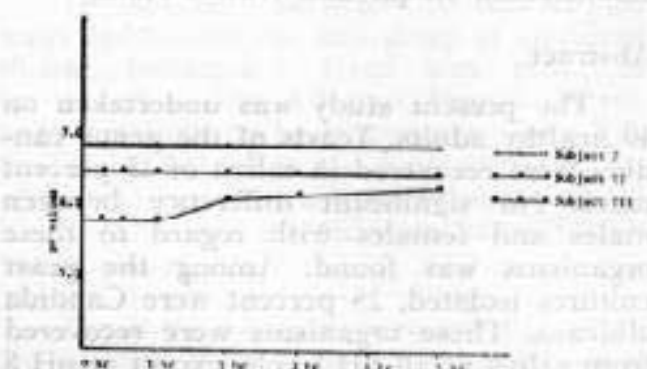


Fig. 3: Variation in salivary pH at room temperature.

## Discussion

The finding of oral yeast in 35 percent of the healthy adults gives an indication that they could be regarded as members of the normal flora of mouth. All yeast isolated from the present study were of *Candida* group, of which 25 percent were *Candida albicans*. This is in agreement with the study of Lilienthal (1950). He isolated in 47.7 percent of saliva yeast samples. Similar findings were reported by Marples (1960) who isolated yeasts from mouth washings of 40 per cent of adults. Glass (1951) reported yeast in 44 percent of saliva specimens of children with *C. albicans* as predominating species.

Total counts of *Candida* in cultures was found to be directly proportional to the acidity of saliva. They were also found in greater numbers in the more acidic salivas by Young et al. (1951). As *Candida* is an acid producer from carbohydrates it is possible that their presence lowers the salivary pH. The relationship between *C. albicans* and other acidogenic organisms such as *L. acidophilus* and their associated growth has indicated that *Candida* flourishes more in acidic environment (Koser et al., 1960).

No significant change in salivary pH was noted when saliva samples were left at room

temperature for a period of five hours. Similar findings were reported by Fearn and Zuberi (1977). They observed a shift of only 0.14 units towards alkaline side if the specimens were left at room temperature for one hour.

No correlation could however be studied regarding dental condition of the mouth and yeast flora in the present study.

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