



RESEARCH ARTICLE

The use of garlic powder culture media to enhance the growth of fungi like *Candida albicans* and some *Aspergillus* species

Dr :Wifaq Mahmood Ali AL-Wattar MBChB, MSc, FICMS¹, Mr: Abass Jumaa Sultan B. Sc. Microbiology²

1 Assistant professor /college of medicine /unit of infectious clinical diseases /Baghdad university/

2 Ministry of health /laboratory of public health /Maisan /Iraq

Manuscript Info

Manuscript History:

Received: 15 June 2014
Final Accepted: 22 July 2014
Published Online: August 2014

Key words:

:garlic media ,aspergillus ,candida.

*Corresponding Author

Dr :Wifaq Mahmood Ali
AL-Wattar MBChB, MSc,
FICMS¹

Abstract

Aim of study:To determine the beneficial use of garlic in media used for fungal growth ,regarding time and coast.

Material and methods :Garlic was used to prepare a new media for fungal spieces growth like yeast and molds namely *Aspergillus niger* and *Aspergillus fumigatus*,using powder extract .

Result:Garlic containing media was found to encourage the fungal growth when media autoclaved rather than inhibiting it ,as antimicrobial agent.

conclusion:the use of this media is cheaper ,faster and reliable in enhancing molds and yeast growth.

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Introduction

Scientific name of garlic, *Allium sativum* L.(1,2), is a member of the onion family (Alliaceae). It is a bulb comprised of cloves (thickened storage leaves) individually wrapped in dried leaf sheaths or skins attached to a compressed stem plate. it contain volatile oils, sugars, albumin ,starch and acillin component used as analgesic, mainly, source of vitamineA,B1,B2,and it reduces serum cholesterol ,induces immunity and as anti-cancer (3,4,5). Therefore, it was suggested that garlic extract may open the new era in the medicinal use of garlic to prevent diabetic and cardiovascular complications.(6)

The use of garlic in medicine because it contains allicine and alline with well known antibacterial action specially on *salmonella*, *proteus vulgaris*,*staphylococcus* and *Escherichia coli* (7) , and antifungal(8,9) specially against *candida albicans*,and its role in reducing blood sugar and cholesterol is very well established ,so it is use to protect from cardiovascular disease (10)and its antifungal activity was noticed when used in 100% concentration without autoclaving(7) .But in this study the garlic was used to encourage the fungal growth by special alteration in the methods of preparation and the temperature of incubation.

Material and methods

The use of garlic media to grow the yeast as *candida albicans* in a time less than 18 hours and for the molds like *Aspergillus fumigatus* and *Aspergillus niger* in 48 hours which is a shorter period of time than those seen when those fungi grown on sabuorud dextrose agar ,as the optimal temperature of growth was at 37 C incubation as shown in following figures1&2

The concentration used was 10g/liter ,15g,20g and 25g/L of dried powder of garlic applied and it was found that the best concentration was 10g/L. The compson of the media is tested in three different combination of garlic mixed with other ingredients and agar agar, named as(X1, and X2 and X3) is made at pH of{ 5, 5, 2. 5,6} dissolved in

distilled water boiled up to 100C centigrade to be autoclaved and powered in petri dishes to be used .The antifungal effect of garlic was overcome by autoclaving at 121C and 15Lb for 15 minutes, cultured at 37C° the best growth was seen in X2 combination ,here the garlic powder acts as good growing media for yeast and molds rather than its antifungal effect when applied without autoclaving ,it is very cheap and convenient media with very few chance of bacterial growth and contamination.The same media showed no growth when sterilized at 100C°only without autoclaving as the garlic acted as absolute antifungal agent only as other researcher found(11).

Results:

It is the first time in Iraq to make such media ,it was tested and got the approval of the local authorities and lichened under the number of 3678 in 8th of October 2013, we started to use them in the laboratories of some Baghdad hospitals to gain fast access to molds mainly to diagnose the fungal diseases in patients faster and more specific, media named X1,X2,X3 tested with three (PH=5.2 ,5.5 and 6)and different incubation time and temperature,the best results obtained at 37C° at 5.5 pH for X2 combination media when fungus like *Aspergillus fumigatus* grown on both sabourauds agar and X2 garlic media the color of the colonies was different due to some chemical changes as seen in

Figure1:Showed the growth of Aspergillus species on sab .agar and three different combinations of garlic media,asX1,X2,andX3 in the first picture no growth seen on sab. agar after 18hours,while the 1st growth noticed after 47hoursas shown in the lower picture

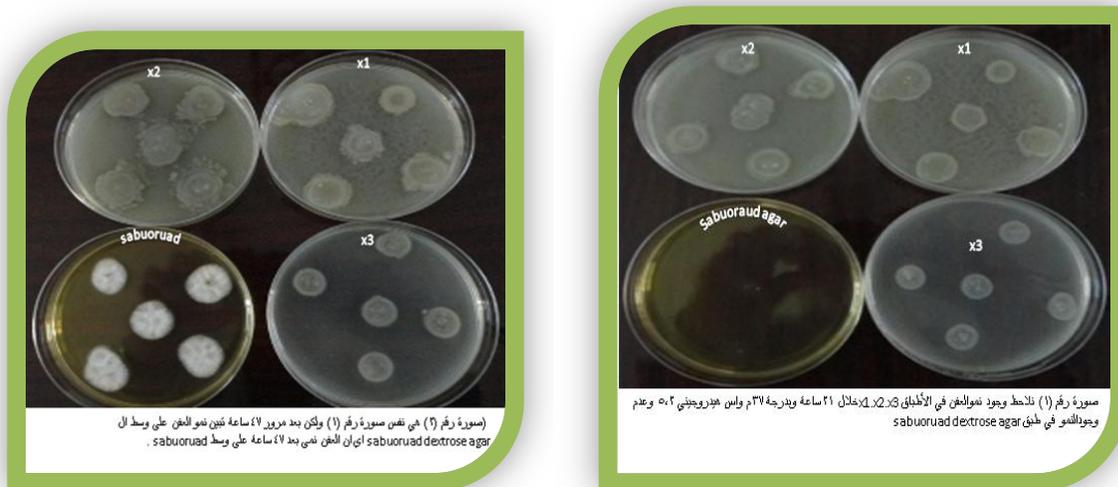




Figure2 :Comparison between the three medias and sabourauds in rate the growth of *candida albicans* by streaking method ,seen after 18 hours streaking of pure culture at 37C and 5.2 pH left and the one to the right same media but pH=6with same time and temprture .



Figure 3 :The comparison between the three medias as X1,X2,X3 and sabroudauds media for growing *Aspergillus niger* after 45 hours incubation in the upper one and 68hour in the lower picture ,notice the color of colonies is different.

Discussion:

Many media used to cultivate different species of fungi, as Sabouraud dextrose agar, brain-heart infusion agar, cornmeal agar and others (5,7), the expected time of colonial observation is 24 hours for *Candida* and 48 hours for *Aspergillus* spp. so the use of garlic media as a nutrient media for fungi is of prime importance, in medical practice when urgent diagnosis is lifesaving to patients, so if the *Candida* grown in 18 hours and *Aspergillus* in less than 40 hours, once the media autoclaved the allicin and alliin chemicals are disintegrated and their antifungal activity is lost leaving (15,12), but a very good enriched media for molds and yeast cultivation, this disagreed with AL-Taai and Layla found that the garlic extract had antifungal action against *Astermaria*, *Aspergillus terreus* and *Fusarium oxysporum* fungi (15,16,17) according to our knowledge no similar trails done in Iraq and middle east area.

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