



Assessment Of Antifungal and Cytotoxicity On Aqueous Solution Of Acai Berry With Probiotics Against *Candida albicans*

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ABSTRACT

Aim: To assess antifungal and cytotoxic effects of acai berry with probiotics.

Materials and methods: Six millilitres of rose-bengal broth were produced, sterilised, and added to three test tubes. In the range of “5*10 billion cfu/ml”, *Candida* suspension was applied to each of the three test tubes. the incubation period of 1, 2, 3, or 4 hours. To determine the lowest inhibitory activity, the percentage of dead cells is then computed at a “wavelength of 600 nm”. “200 ml of distilled water” were used to dissolve “2g of iodine-free salt” to test for cytotoxicity. We filled “6 well Elisa plates” with “10–12 cc of saline water”. The combined acai berry and probiotics were then added in accordance with the concentration levels after 10 nauplii were gradually added to each well (“20 l, 40 l, 60 l, 80 l, and 100 l, plus control”). 24 hours were spent incubating the plates.

Results: The results are calculated by day 1 and day 2. On day 1, at concentration of 5µl, 10µl, 20µl, 40µl, 80µl and the control group the number of nauplii alive was 10. On day 2, at concentration of 5µl 8 nauplii alive, at 10µl 8 nauplii was alive, 20µl 7 nauplii was alive, 40µl 7 nauplii was alive, 80µl 6 nauplii was alive.

Conclusion: Result shows the acai berry and probiotics formations shows antifungal property and good cytotoxic effect, in future can be used in management of oral candidiasis associated lesion.

Keywords: *acai berry, probiotics, antioxidant, antifungal, oral candidiasis, candida associated with leukoplakia, oral sub mucous fibrosis*

INTRODUCTION

As the most prevalent oral mucosal infectious disease, “oral candidiasis (OC)” is a fungal infection that is primarily caused on by *Candida albicans*. In the general population, 20–75% of

people have *C. albicans*. There are three types of oral candidiasis: pseudomembranous, erythematous, and hyperplastic. Due to underlying illnesses and multifactorial aetiologies,

the remaining clinical manifestations, such as “*Candida*-associated denture stomatitis, angular cheilitis, and linear gingival erythema, may not react to antifungals”. [1-3] To get a deeper grasp of antifungal pharmacotherapy, both topical and systemic antifungals are addressed. The dosing procedures for topical antifungals will be reviewed, and then their mechanisms of action, pharmacokinetics, interactions with other medications, and side effects will be covered in more detail. Oral administration of systemic antifungals is explored, as well as alternate delivery systems like intravenous (IV) administration.[4]

Rather from being used in routine dental care, several of the modalities outlined are only used for life-threatening fungal infections that are treated in acute hospital care settings. In 19th century, various scientists such as Metchnikoff, Tissier, Grigorova, and Shirota defined probiotics as “live microorganisms that, when administered in adequate amount, confer health benefit to the host”. Probiotics are available in different strains, most commonly used is *Lactobacillus* spp. and *Bifidobacterium* spp. and, to a lesser extent, to *Saccharomyces* spp., *Bacillus* spp., and *Escherichia* species”. Probiotics have been into invitro studies against fungal growth. [5-6] To a greater level probiotic have exhibited anti-fungal properties against *Candida albicans*. Probiotics are rich in antibacterial activity, they fight against the pathogenic microorganism through competitive inhibition, and also producing bacteriocins. They also alter other pathogenic bacterial progression reduce the dysbiosis. Studies have shown that probiotics can be used as adjuvant therapy in management of oral candidiasis.

Acai berry is as super fruits which is staple food of Brazilians. which was early used as medicinal fruit for chronic and acute inflammatory disease of that region [7]. Last 10 years, acai berries export has increase rapidly, due to their rich medicinal values. Acai berry are now commercially available as cosmetic products like skin cream and hair oil. Acai berry is rich in antioxidant and anti-inflammatory property, due presence of anthocyanin. [8-9] Acai berry has not yet been used in oral potentially malignant disorders. Presence of oleic acid and linoleic acid helps in reducing the cholesterol levels. Acai berry have proven to reduce free radicals and thereby decreasing oxidative stress. [10-12]

This novel formulation can be used in leukoplasia, oral submucous fibrosis and *Candida* associated leucoplakia’s studies have noted dysbiosis is evident in premalignant disorder, as acai berry works as effective antioxidant and probiotics works against dysbiosis that present in premalignant disorders, this combination will help in preventing the disease from turning into a malignant condition.

MATERIALS AND METHOD

Acai berry and probiotic extracts are combined and tested for cytotoxicity using the Brine shrimp lethality assay. Weighed and dissolved in 200 ml of distilled water was 2 g of iodine-free salt. Ten to twelve millilitres of saline water were added to six-well ELISA plates. Each well received a gentle addition of 10 nauplii (2”0 L, 40 L, 60 L, 80 L, 100 L, and control”) [figure 1]. Probiotics were then added in accordance with the concentration level, followed by the aqueous acai berry extract. 24 hours were spent incubating the plates. The outcome by which the toxicity (or the capacity to kill) of the formulation is assessed is the count of live shrimps. After 24 hours, the ELISA plates were examined, and the number of live nauplii present was recorded and estimated using the formula below,

“Number of dead nauplii / Number of dead nauplii + Number of live nauplii ×100”

RESULT

The results are calculated by day 1 and day 2. On day 1, at concentration of 5µl, 10µl, 20µl, 40µl, 80µl and the control group the number of nauplii alive was 10. On day 2, at concentration of 5µl 8 nauplii alive, at 10µl 8 nauplii was alive, 20µl 7 nauplii was alive, 40µl 7 nauplii was alive, 80µl 6 nauplii was alive. These result shows the acai berry and probiotics formations shows good cytotoxic effect.

DISCUSSION AND CONCLUSION

In this investigation, one of the most popular methods to ascertain cellular viability and cytotoxic effects was to evaluate the lethality of the brine shrimp nauplii. Probiotics are an alternate form of treatment for fungal infections, which have increased in frequency due to the rise in the number of immunocompromised people.

Rather from being used in routine dental care, several of the modalities outlined are only used for life-threatening fungal infections that are treated in acute hospital care settings.[13-14]] To clearly show the advantages and disadvantages of each, extensive definitive research on in vitro, in vivo, and clinical trials of both probiotic and biogenic (CFS) medication formulations is required. [14] The type of probiotic employed, the procedures used, and the experimental designs need to be given more attention.

Research has shown that probiotics, occasionally of a particular strain, may have antifungal action against one infection but not another. There is evidence from other recent research that *Lactobacillus* spp. can lessen the number of hyphae that *C. albicans* produces by discharging antimicrobial substances that produce a harmful microenvironment for a pathogen.[15] Although several compounds, such as hydrogen peroxide, lactic acid, acetic acid, and bacteriocins, have already been identified as biosurfactants, additional research is required to characterize new molecules and understand how they interact with *C. albicans*, notably in terms of the ability to create biofilms, filaments, and infection potential. [12,13]

There has been multiple research that examined the various ways that probiotics fight *Candida*. The majority of them demonstrated how closely related these mechanisms are to the *Lactobacillus* strain that was studied, emphasizing the fact that these properties are strain-dependent. The action mechanisms can interfere with the progression of candidiasis in vivo as well as *C. albicans* adhesion, biofilm formation, filamentation, and gene expression. Nonetheless, the molecular mechanisms are still unclear, necessitating further research into the creation of mutant probiotic strains with specific genome deletions. These strains may be a crucial tool in figuring out how probiotics interact with *C. albicans* and how to avoid candidiasis.

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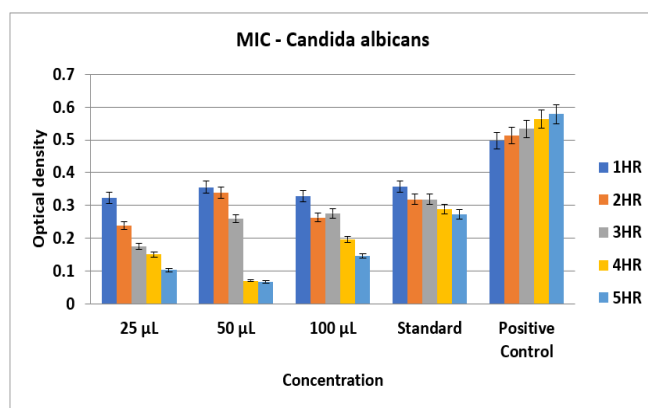


FIG 2

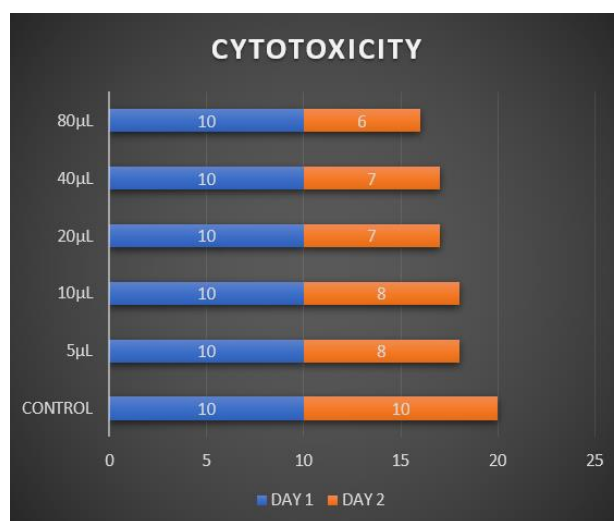


FIG 3

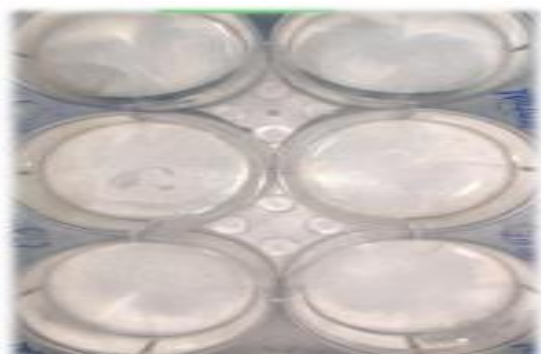


FIG 1