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ORIGINAL ARTICLE

STUDY OF ASPARTAME ON BIOFILM PRODUCTION

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ABSTRACT: Aspartame is an odourless white crystalline powder 160-200 times sweeter than sucrose used in beverages. The present study has been planned to observe the biofilm production of Streptococcus mutans over a biosurface and to assess the influence of aspartame on biofilm production over that surface. The lyophilic standard Streptococcus mutans ATCC 25175 (Hi media lab) was reactivated in Trypiticase Soy Broth incubated at37^0 C with 10% CO_2 for 18 hrs. 2.5 ml of this liquid culture was added in two 5ml of Brain Heart Infusion Broths with sucrose, congo red and sterile human tooth one with 0.3% aspartame and other without aspartame and incubated at 37^0 C with 10% CO_2 for 18 hrs. Biofilm production was evidenced by blackening of tooth along with black deposits .Blackening appeared less in the broth containing aspartame which was further proved by subculturing from both over Brain Heart Infusion (BHI) agar with sucrose and Congo red.
KEYWORDS: Aspartame, biofilm, congo red.

INTRODUCTION: Aspartame is an odourless white crystalline powder 160-200 times sweeter than sucrose used in beverages. It was discovered accidentally in 1965 by James M Schalater. Aspartame is one of the five low calorie sweetener approved by Food and Drug Administration. The carioprotective property of aspartame is assessed by a standard biofilm producing bacteria like Streptococcus mutans ATCC 25175. Aspartame is a methylester of the aspartic acid and /phenylalaninedipeptide. It was first sold under the brand name Nutra Sweet. It was first synthesized in 1965, and the patent expired in 1992. The European Food Safety Authority concluded in its 2013 re-evaluation that aspartame and its breakdown products are safe for human consumption at current levels of exposure,[1] corroborating other medical reviews.[1]The taste of aspartame and other artificial sweeteners differs from that of table sugar in the times of onset and how long the sweetness lasts, though aspartame comes closest to sugar's taste profile among approved artificial sweeteners.[2]The sweetness of aspartame lasts longer than that of sucrose, so it is often blended with other artificial sweeteners such as acesulfame potassium to produce an overall taste more like sugar.[2 3] Aspartame can be synthesized from its constituent amino acids, L-phenylalanine and L-aspartate.

AIMS & OBJECTIVES: The present study has been planned to observe the biofilm production of Streptococcus mutans over a biosurface and to assess the influence of aspartame on biofilm production over that surface.

MATERIALS & METHODS: Thelyophilic standard Streptococcus mutans ATCC 25175 (Hi media lab) was reactivated in Trypiticase Soy Broth incubated at37^0 C with 10% CO_2 for 18 hrs. 2.5 ml of this liquid culture was added in two 5ml of Brain Heart Infusion Broths with sucrose, congo red and sterile human tooth one with 0.3% aspartame and other without aspartame and incubated at 37 ^{0} C with 10% CO_2 for 18 hrs.

OBSERVATION: Biofilm production was evidenced by blackening of tooth along with black deposits Blackening appearedless in the broth containing aspartame which was further proved by subculturing from both over Brain Heart Infusion (BHI) agar with sucrose and Congo red. Black colonies were observed in subcultures from broth without aspartame and pink colonies in subcultures from broth with aspartame.

DISCUSSION: The cariogenic potential of sucrose (as sweetener) and Streptococcus mutansas colonizer is well established. Aspartame has been reported to have an inhibitory effect on Streptococcus mutans. In the present study Streptococcus mutans treated with aspartame showed less biofilm formation (Das S. et. al.) [4].There is also a significant decrease in the formation of biofilm by Streptococcus mutans over the human tooth in aspartame containing media as observed similarly by Olsen et. al 1977[5 6] which may be due to damage of cell structure by aspartame making the cell less virulent.

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