

# Effects. erythritol, xylitol. Biofilm structure S.Mutans

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**Abstract:** AIM: study. effects. erythritol, xylitol. Biofilm structure S.Mutans. Methods: erythritol and xylitol at 20g/L, 40g/L, 60g/L and 80g/L were specially prepared and used in the culture of S.Mutans. The biofilm structure of S.Mutans was preserved by CLSM. Results: Under the influence, the thickness of biofilm was thinner, the density of S.Mutans created, the cohesiveness of S.Mutans created, the percentage of vital bacteria created in a dose dependent manner. Conclusion: E-erythritol and xylitol both have dose-dependent effects of S.Mutans.

**KeyWords:** Erythritol; xylitol; Streptomyces mutants; adherence; biofilm [Chinese]

Is a multi-factor Chronic Bacterial infectious disease. For different cocci of energy source sucrose of S in of process is very important. Study sugar of substitute dry of bacteria of energy s disease prevention has important meaning. At present, domestic and foreign in xylitol for sugar substitute has carried out the more of study its anti-role also get. A large number of research show that xylitol can reduce dental plaque biofilm and saliva in of cocci quantity influence of cocci in teeth of Adsorption; Promoting Saliva secretion and promoting glaze again; Shadow The of cocci in mother of on reduce children disease [1-5] Disease rate; Inhibition of cocci and Acid Red sugar alcohol also known as D sugar alcohol Chemical name 1234-Erythritol and xylitol have similar of physical and chemical characteristics and function has in sucrose and Sugar of characteristics: Very low of energy, High tolerance, high [6] Safety, don't cause blood glucose wave, non-of, antioxidant. Domestic and foreign in red sugar alcohol in food work domain of with study in-depth but its anti-mechanism of study little. This the laser copolymerization description micro-(CLSM) Of dead and live light staining technology observation than in vitro conditions under 24 h Different degree of red sugar alcohol and xylitol of cocci strain Biofilm Structure of influence so as to explore red sugar alcohol inhibition, anti-of role.

## 1. Material and Methods

### 1.1 Main material and

Quasi-Strain ATCC 25175 (Sichuan University West oral medical college Disease Research); TPY Liquid Medium (200 ml Liquid in 3.0g Trypsin 0.8g Yeast Extract, 2.0g Sucrose, 1.2g Phosphoric acid two, 0.4g  $K_2HPO_4$  In 3  $H_2O$ , 0.4g  $Na_2CO_3$ , 0.4g NaCl, 200  $h_2O$ ), TPY Solid Medium (200 TPY Add in Liquid Medium 2..5G Fat), PBS Liquid, Red, sugar and xylitol (Mountain, Bao, treasure creature) L-7012-Live/dead bacterial viability Kit Light staining (Molecular probes USA). Super workbench (Zhou Hua); Ldxx-50kbs Vertical Force steam (Shanghai Shen 'an Medical College); Yqx-Oxygen incubator (Shanghai New Miao medical, instruments); KQ-400db Ultrasonic Cleaning (Kunshan ultrasonic), Germany); Micro plus, laser confocal scanning, micro (TCS SP5) (Lei-Ca), Germany).

### 1.2 Method

Divide red, sugar alcohol and xylitol into distilled water with Gradient 20, 40, 60, 80g/l Red, sugar and xylitol Solutions 121 High temperature, steam disinfection 20 min Use.

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Inoculate dried ISO, cocci and quasistrains TPY Solid culture Ki Inner, 37 Oxygen Cultivation (800/L N<sub>2</sub>, 100/L CO<sub>2</sub>, 100/L H<sub>2</sub>) 24 h; After culturing, the bacteria were inoculated with sterile inoculation, and TPY In liquid medium, 37 Oxygen Cultivation 18 h; Smear cultures and then disperse the bacteria PBS In liquid, shock, even after above, bacteria liquid, Degree OD (0.630) 1.0 Role of bacteria.

In 6. Placed in a petri dish of Bacteria 14mm x 14mm Coverslips, every hole 1. Tablets, will be made of Bacteria 3 mL Inoculated in Hole, cell culture dish, same, add equal body different degrees (20, 40, 60, 80g/L) The solution of red, sugar and xylitol

PBS Chong ye 3 mL With bacteria Liquid 3 mL Mixed for negative, shine, PBS Chong ye 6 mL Make a blank, shine, every, solution quasi 5A parallel This. Will 6 Hole cell petri dish placed oxygen incubator in 37, Oxygen Training (800 ml/L N<sub>2</sub>, 100 ml/L CO<sub>2</sub>, 100 ml/L H<sub>2</sub>) 24 h. 8.5~9.0) 50 μM With 100 μM Of glycerol/PBS At liquid mounting (Glycerol and PBS At liquid 1) Seal coverslip, 4 Storage and immediately. More than operation were in dark environment under complete.

Will the this place CLSM Under observation dead showed color live Color. Each biofilm this by the end (Biofilm and coverslip phase of Surface) To table (Biofilm Free Surface) -By-along Twig u & Z Description (Twig U & Z Step 1 μM) Take broken description like. Each this random observation 3A wild. Observation Conditions: Lase isonococcus biofilm thickness

The average biofilm thickness of cocci was the largest.

20.1 μM Different degrees of red, sugar alcohol, and xylitol, thickness (Both < 10 μM) Are less than negative, according (P < 0.05). The biofilm thickness analysis ratio of alcohol, sugar alcohol, and xylitol at the same degree 40g/L, Erythritol less than Xylitol (P < 0.05); Du 80g/L, Erythritol

More than Xylitol (P < 0.05); In 20g/L And 60g/L Degree Level brown sugar alcohol and xylitol of biofilm thickness no of difference (P > 0.05). With the increase of red sugar alcohol and xylitol biofilm thickness showed a decreasing which

80g/L Xylitol thickness minimum (7.3 μM) (Table 1).

### 2.3 Different bacteria biofilm Density

In red sugar alcohol anti-Role of study home and abroad to carry out Less. Runnel And study showed daily consumption with red sugar alcohol of candy than with xylitol or Yamanashi sugar alcohol of candy caused by of dental plaque of weight. reduce. Red sugar alcohol don't influence spot of weight and acid of and reduce the saliva and plaque in [8] Of cocci. Park And study showed red sugar alcohol has influence of cocci adhesion and reduce Portuguese advanced glycation shift (GTF) And fructose-based shift (FTF) And natural expression of Use. Another study shows that erythritol can inhibit the number of isococci, cocci, acids, and adhesion, and reduce the number of isococci in saliva and dental plaque biofilms, cocci and Lactobacillus acidophilus in Formula G/ I Effect of biofilm density reduction on Xylitol 40, 60, 80g/ I Effect of xylitol biofilm density reduction on erythritol; Table, two, in 20g/L There was no difference in the effect of biofilm density reduction. 40, 60, 80g/ I Xylitol biofilm Density

The degree of reduction is applied to the alcohol. Percentage of viable biofilm: At the bottom, 40g/L There is no difference in Function 20g/L Inhibitory Effect of living bacteria on Xylitol

60, 80g/ I Du Inhibitory Effect of live xylitol on erythritol; In, in 20, 40g/L Inhibitory Effect of living bacteria on Xylitol 60, 80g/ I Inhibitory Effects of live xylitol on erythritol; Table

Above, the results suggest that the effects of red, sugar and xylitol, ISO, and cocci biofilm are similar. Red, sugar and xylitol

Ketong, reduce the diversity of cocci 24 h Biofilm thickness, reduce biofilm bacteria density, reduce biofilm of viable rate and inhibition of cocci of activity influence of bacteria biofilm of structure. Analysis fruit low degree of red sugar alcohol of bacteria biofilm suppression role slightly in with once of xylitol; But in height xylitol of bacteria biofilm suppression role in red sugar alcohol.

Red sugar alcohol has and xylitol similar of chemical structure its different bacteria biofilm suppression role may

is the dispute of inhibition of cocci of phosphoric acid alcohol-c acid by of Phosphorylation, department of and suppression its sugar of absorption,. Secondly red sugar alcohol can't be different cocci use as its s substrate red sugar alcohol into bacteria internal after s in of suppression sugar s required of activity, main is phosphoric acid alcohol C acid heterogeneous and phosphoric acid Fructose-inducedMakes6-Phosphoric acid glucose and6-Phosphoric acid fructose can't16-Two phosphoric acid fructose and the latter sugar s of C acid was Lactic Acid off role generated lactic acid the necessary of activation factor to make different cocci of acid force decreased and, bacteria biofilm inhibit the role. In red sugar alcohol and xylitol of bacteria biofilm suppression role of difference may is due to its both chemical structure of difference, with the concurrence of the once under both of cocci sugar S and acid suppression role, weak don't consistent to students of bacteria biofilm[13]

Suppression role of difference.

This with red sugar alcohol and xylitol than study of style red sugar alcohol anti-role do step of fruit showed red sugar alcohol of bacteria biofilm of influence like Xylitol, but red sugar alcohol of bacteria biofilm structure students influence of specific mechanism and application ydlp need in after the study in do step of exploration.

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