

TITLE: IMPORTANCE OF IRON IN PIGMENTED SUPRAGINGIVAL BIOFILM IN BOVINES WITH PERIODONTITIS

AUTHORS: SARAIVA, J.R.; BORSANELLI, A.C.; BUSO-RAMOS, M.M.; RAMOS, T.N.M.; VACCARI, J.; SOUZA, N.C.; GAETTI-JARDIM JR., E.; SCHWEITZER, C.M.; CUSTÓDIO, A.A.; DUTRA, I.S.

INSTITUTION: FACULDADE DE CIÊNCIAS AGRÁRIAS E VETERINÁRIAS (FCAV) / UNIVERSIDADE ESTADUAL PAULISTA “JÚLIO MESQUITA FILHO” (UNESP) – VIA DE ACESSO PROF. PAULO DONATTO CASTELLANE S/N – JABOTICABAL/SP, CEP 14884-900

ABSTRACT:

Periodontitis is a polymicrobial disease that affects the supporting tissues of the teeth. Its occurrence severely compromises animal health, production and welfare. In bovines, it results from the accumulation and dysbiosis of dental biofilm, leading to increased prevalence and populations of Gram-negative anaerobes of *Porphyromonas*, *Prevotella* and *Fusobacterium* genera, which also have great metabolic interdependence and virulence, partly controlled by the availability of iron in the environment. The present study aimed to evaluate the chemical composition of the black pigmented supragingival biofilm of bovines and its correlation with periodontitis. For this purpose, eleven first molars were collected from 11 bovines in a slaughterhouse, 5 without visible pigmentation and 6 with pigmented supragingival biofilm. Periodontal probing of all dental arches was performed and animals with periodontitis were considered to be those with a pocket depth greater than 5mm and clinical evidence of inflammation, found in 4 arches of the total animals evaluated. The samples were submitted to the energy dispersion spectroscopy technique and the semi-quantitative values of the identified elements were associated with pigmentation and periodontitis using the Student's t-test and the Mann-Whitney test, with a 5% significance level. The results of the t-test revealed a correlation between iron and periodontitis ($p < 0.014$), and the Mann-Whitney test demonstrated a correlation between iron and black pigmentation ($p < 0.015$). These findings show that animals with periodontitis have biofilm with a higher content of iron in their composition compared to periodontally healthy animals. Iron stood out among the elements detected in both correlations, evidencing the probable participation of this element in microbial metabolism, as observed in other studies involving *Porphyromonas* and *Prevotella* genera, which accumulate iron in the form of dark pigmentation compounds on their cell surface. The present study demonstrated that the dental surface has favorable conditions for the expression of the main virulence factors of the biofilm anaerobic microbiota, not only because it presents aminoacids that can be used in cellular catabolism, but mainly due to the wide availability of iron capable of exacerbating the expression of microbial virulence.

Keywords: biofilm, bovine, energy dispersion spectroscopy, iron, periodontitis

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Author: Júlia Rebecca Saraiva

E-mail: julia_beca@hotmail.com