

## Clinical Relevance of Oral Cleanliness Measurements

- **Ammonia in saliva is produced because of urea and amino acid metabolism by oral bacteria.<sup>i</sup> Therefore, ammonia concentration as an index of oral cleanliness is likely to reflect the total number of bacteria in saliva.<sup>ii</sup>**
- Significant correlation between ammonia levels and levels of methyl mercaptan produced by bacteria in dental plaque and tongue-coating samples has been shown in a study conducted by Amano et al.<sup>ii</sup> In addition, ammonia levels were significantly decreased upon removing tongue coating or dental plaque in the subjects studied.
- In another study, the concentration of ammonia in the oral rinse showed a relatively strong correlation with the total bacterial count.<sup>iii</sup> In the survey conducted by Ishikawa, et al., the ammonia concentration, turbidity and total bacterial count showed a tendency to increase with age.
- **Several studies demonstrate the generation of ammonia increases the pH of dental plaque by hydrolysis of urea or the metabolism of arginine. This creates a more alkali environment that favors the balance of remineralization.<sup>iv</sup>**
- **Ammonia production by the arginine deiminase system will cause a rise in pH and will benefit commensal bacteria by maintaining a neutral pH to prevent cariogenic bacteria from becoming pathogenic. <sup>iv</sup>**

- **Studies have shown that caries-free subjects have more elevated levels of urease and arginine deiminase activity.<sup>v</sup>**
- **Paired with clinical assessments, measuring ammonia levels in oral rinse is a simple and useful tool for dentists to assess oral cleanliness and healthy levels of commensal bacteria.**
- Specifically, ammonia production via ADS inhibits tooth demineralization by neutralizing glycolytic acids and favoring the growth of a desirable microflora that is compatible with dental health.<sup>vi</sup>

## References

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- <sup>i</sup> Shu M et al. The relationship between dental caries status and dental plaque urease activity. *Oral Microbiol Immunol* 2007; 22:61-66.
- <sup>ii</sup> Akiko Amano et al. Monitoring ammonia to assess halitosis. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2002; 94:692-696.
- <sup>iii</sup> Ishikawa et al. An oral Cleanliness test based on Ammonia concentration and/or Turbidity of Mouth Rinse Solution. *J Dent Hlth* 2009; 59:93-100.
- <sup>iv</sup> Ya-ling Liu et al. Progress toward understanding the contribution of alkali generation in dental biofilms to inhibition of dental caries. *International Journal of Oral Science* 2012; 4: 135-140.
- <sup>v</sup> Evelyn Reyes et al. Caries-free subjects have high levels of urease and arginine deiminase activity. *Journal of Applied Oral Science*; 2014: 235-240.
- <sup>vi</sup> Nascimento et al. Arginine Metabolism in Supragingival Oral Biofilms as a Potential Predictor of Caries Risk. *JDR Clinical and Translational Research*; 2019 July: 261-270.