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Title: Decreasing intensities of certain VOCs as potential biomarkers for bacteria

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Body: Introduction Volatile organic compounds (VOCs) are potential biomarkers for various applications, such as detection of diseases or detection of bacterial growth. On bacterial cultures is examined whether change of intensities of ambient VOCs also could be potential biomarkers. Methods Headspace of bacteria cultures, e.g. mycobacterium avium, staph. aureus or e. coli were measured with a GC-ion-mobility-spectrometry (STEP) and a GC-differential-ion-mobility-spectrometry (SIONEX). Breeding grounds with no growth were used as comparison. Air was collected with a disposable PTFE tube and spectra were analyzed by a statistical program based on cluster analysis. Results Different VOCs only appeared at growth of a specific bacterial culture. The intensities of some VOCs actually correlated with the amount of growth. Interestingly, the intensity of many VOCs, which appeared in headspace of breeding grounds per se, was significantly decreased when overgrown with bacteria (example shown in Fig. 1).

Discussion The decreasing intensity of VOCs from breeding grounds when overgrown with bacteria could be used to detect growth, because this was detected before growth of bacteria could be identified with conventional methods. Furthermore, if the pattern of decreasing VOCs is specific, these VOCs could even be potential biomarkers for certain bacterial cultures. It shows that ambient peaks should always taken in account when searching for biomarkers.