

Analytical evaluation of breath acetone tubes

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Abstract

Breath analysis provides opportunities for further development of precise and quick non-invasive diagnostic tools. The important example is the monitoring of metabolic flexibility through the acetone levels in an exhale. Metabolic changes may cause such pathological conditions as metabolic syndrome, type 2 diabetes mellitus and obesity. It is proven that breath acetone levels can indicate the states of ketosis or ketoacidosis. The development of sensitive, selective and easy-to-use tests for breath acetone is a step to personalized diagnostics, preliminary diagnosis and therapeutic control

The aim of the research was to evaluate analytical characteristics of acetone breath tubes intended for non-invasive monitoring of metabolic state.

The test is designed as an easy-to-blow glass tube, comprising a chemical reagent highly sensitive to acetone. The reagent changes its color from yellow to magenta depending on acetone concentrations. Sensitivity assessment was performed by lab simulation of an exhaled breath with various acetone concentrations. The acetone levels corresponded to a range associated with various metabolic conditions and were controlled by titrimetric method and a portable breath analyzer. Additionally, specificity to a target gas in the presence of water and ethanol vapors was assessed.

The results showed a correlation between the acetone concentration and the color gradients of the acetone sensitive reagent. The tubes show no reactions towards water and ethanol vapors.

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