Is breath acetone a reliable real-time marker of ketosis?

While breath acetone tracks ketosis well, single readings are only moderately reliable in real time

Is breath acetone a reliable real-time marker of ketosis? N = 15

Yes 100% · Possibly 0% · Mixed 0% · No 0%

FIGURE 1 Research consensus on breath acetone for ketosis

Breath acetone reflects fat burning and ketone production and is attractive because it is non-invasive and easy to repeat. Research across diets, diabetes, and ketoacidosis shows generally good correlation with blood ketones, but with important caveats for “real-time” use.

Correlation with Blood Ketones

- In adults on ketogenic meals, breath acetone predicted plasma acetoacetate very well ($R^2 \approx 0.70$) and β-hydroxybutyrate (BHB) moderately ($R^2 \approx 0.54$) (Suntrup et al., 2020).
- In a 14-day home study, point-by-point breath acetone and blood BHB were only **moderately** correlated ($R \approx 0.57$), but daily exposure (area under curve) was high ($R \approx 0.80$) (Musa-Veloso et al., 2002).
- Strong correlations are also reported in rats on ketogenic diet ($R^2 \approx 0.75$) (Qiao et al., 2014), healthy humans after MCT doses (Hancock et al., 2020), and people with diabetes (R=0.82–0.89 for BHB/AcAc) (Saasa et al., 2019; Jiang et al., 2023; Van Erp-Van Der Kooij et al., 2023).

Examples of performance thresholds

Context / device	What BrAce did well	Citations
Ketogenic diet, portable meter	Predicted BHB above clinical cutoffs (AUC 0.85–0.94)	(Musa-Veloso et al., 2002; Likhodii et al., 2002; Niramitmahapanya, 2022)
Type 1 diabetes & DKA risk	Separated normal/elevated/high ketone risk	(Güntner et al., 2018; Bovey et al., 2018; Anderson et al., 2021; Van Erp-Van Der Kooij et al., 2023)
Diabetic ketosis diagnosis	High sensitivity and specificity vs blood/urine	(Jiang et al., 2023; Anderson et al., 2021; Huang et al., 2023)

FIGURE 2 Clinical uses of breath acetone across settings

Real-Time and Dynamic Limitations

- Both blood BHB and breath acetone fluctuate ~40–50% over a day; single measurements often miss true daily exposure (Musa-Veloso et al., 2002).
- There is a **time lag**: BHB can rise before breath acetone, and breath acetone can stay elevated even as blood ketones fall (Musa-Veloso et al., 2002; Bovey et al., 2018; Nakamura et al., 2023; Kim et al., 2020).
- Exercise and meal composition (high vs low carbohydrate) change acetone and BHB differently, limiting simple "instant" interpretation (Kim et al., 2020; Wang et al., 2020).

Clinical and Practical Use

- For epilepsy and ketogenic diets, breath acetone reliably tracks onset and progression of ketosis and individual differences, in good agreement with capillary BHB (Suntrup et al., 2020; Likhodii et al., 2002; Hancock et al., 2020; Niramitmahapanya, 2022; Alkedeh & Priefer, 2021; Sakane, 2024).
- In diabetes and ketoacidosis, breath acetone distinguishes ketosis/DKA from non-ketotic states with good accuracy, but standards and cutoffs vary across devices and studies (Saasa et al., 2019; Güntner et al., 2018; Anderson et al., 2021; Marfatia et al., 2025)[13–15] (Huang et al., 2023).

Conclusion

Breath acetone is a good **non-invasive marker of overall ketosis** and tracks blood ketones reasonably well, especially over hours to days and for distinguishing low vs high ketone states. As a strictly "real-time" surrogate for a single blood BHB value, it is only moderately reliable due to biological lag and variability, so repeated measurements and context (diet, exercise, illness) are important for interpretation.

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