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Precision of Isotope-Selective Nondispersive Infrared Spectrometers (NDIRS) is not Satisfactory when Using Diabact UBT 50 mg ^{13}C Urea Breath Test with Cut-Off 1.5 and Urease Incubation 10 Minutes

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Introduction: Nondispersive infrared spectrometers (NDIRS) compete with IRMS in 13C-based breath testing. New models of NDIRS with autosampler for 12 mL exetainers make it possible to run "IRMS-kit" on this type of less costly and cumbersome instruments. It is unclear, however, if NDIRS precision is sufficiently high when using this new and lower sample volume.
Aim: To compare IRMS (Abca 20–20, Europa Scientific, Crewe, UK) and NDIRS (Iris-lab, Wagner Analyzen Technic, Bremen, Germany) by running Diabact UBT 50 mg kit (Orexo AB, Uppsala, Sweden) samples on both instruments.

Materials and Methods: Four hundred and ninety-seven consecutive samples from the same number of patients, 252 females, mean age 57 years, were analyzed from November 2008 to May 2009. IRMS results were considered gold standard and values < 1.5 delta over baseline (DOB) negative.
Results: Ninety-three of the 99 positive tests were positive on NDIRS, giving a sensitivity of 94%. Three hundred sixty-four of 398 were negative, with 91% specificity. In the majority of the false positive tests at least one tube was technically inferior with low CO_2 content
Conclusion: The high number of NDIRS false positive tests (34) when using 1.5 DOB cut-off is not acceptable. Reference tubes with software correction for drift would improve the IRIS results. Increase of the urease incubation time to 20 minutes would probably separate positives and negatives better, hopefully making an increase of Diabacts cut-off to 3.5 DOB possible. The lower sensitivity of the NDIRS makes the instrument vulnerable when working with 12 mL samples instead of the customary bags with volume 40–300 mL.

