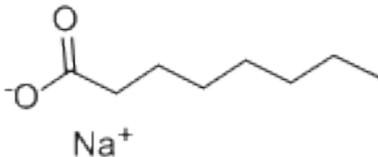
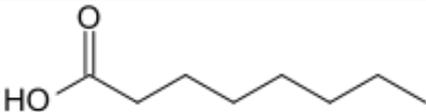


¹³C-Sodium-Octanoate and ¹³C-Octanoic Acid Breath Test

¹³ C-Sodium-Octanoate	
	Molecular weight: 167.2 g/mol Enrichment: 99 % Labeled C-atoms: 1 Dosage: 100 mg
¹³ C-Octanoic Acid	
	Molecular weight: 145,21 g/mol Enrichment: 99 % Labeled C-atoms: 1 Dosage: 91 mg (100 µl)

Metabolism

¹³C-Sodium-octanoate or ¹³C-Octanoic acid is administered together with solid test meals, to assess the gastric emptying. Labeled octanoic acid is most commonly administered in egg yolk, into which it can be injected before baking ^{1,2}. After passing the stomach, it is absorbed in the small intestine and catabolized in the liver ³. Whilst some of the labeled carbon is incorporated into different metabolic pathways, about 50 % enters the body's bicarbonate pool and is exhaled ⁴. As the rate-limiting step in this process is the stomach-emptying rate, this test is a reliable application to assess solid gastric emptying ⁵⁻⁷. Whether ¹³C-sodium-octanoate or ¹³C-octanoic acid is used is a matter of feasibility.

Applications of ¹³C-Sodium-Octanoate Breath Test

The ¹³C-Sodium-Octanoate Breath Test is very useful for the investigation of functional dyspepsia and autonomic diabetic neuropathy ⁸. Gastroparesis has also been shown to be related to irritable bowel syndrome (IBS) ^{9,10} and inflammation of the distal gastrointestinal tract ¹¹.

The patient should have fasted for 10 hours prior to the test. The patient should not drink carbonated water or soft drinks prior to the test since that might interfere with the results. In addition, oxygen supplementation should be avoided because increased oxygen content in exhaled breath can influence ¹³CO₂ measurement by NDIRS ¹².

Test Performance Procedure (see IRIS® Operating Manual for additional information)

1. Mix an egg with 100 mg of ¹³C-sodium-octanoate or inject 91 mg of ¹³C-octanoic acid into an egg yolk, mix it with egg white and bake. Serve it with 60 g of white bread, 5 g of margarine and 150ml of water (14 g of protein, 26 g of carbohydrate and 9 g of fat, 250 kcal) ¹³.
2. Collect zero (basal) breath sample as described in manual.
3. Enter patient height and weight into the IRIS®-3 or IRIS®-Doc Software.
4. Allow patient to eat the prepared egg meal.
5. Collect breath samples as shown below (Table 1).
6. Analyze all 13 breath samples with IRIS®-3 or IRIS®-Doc.

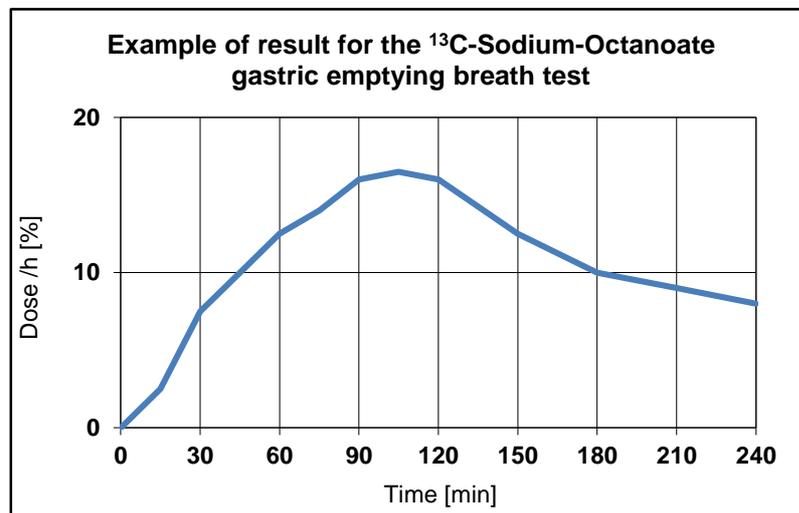
#1 Bag	#2 Bag	#3 Bag	#4 Bag	#5 Bag	#6 Bag	#7 Bag	#8 Bag	#9 Bag	#10 Bag	#11 Bag	#12 Bag	#13 Bag
0 min	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	150 min	180 min	210 min	240 min

Table 1: ¹³C-Sodium-Octanoate Test Sample Collection

Results and interpretation

Gastric emptying parameters are assessed by calculation of the half-emptying time ($T_{1/2B}$), the lag phase (T_{lagB}) and the gastric emptying coefficient (GEC), which have been introduced and validated against scintigraphy by Ghooos *et al*¹³. This method is still the most frequently applied method, although different analytical methods are currently under validation. These parameters are estimated by non-linear regression analysis directly with the IRIS[®]-3 or IRIS[®]-Doc Software (please refer to the manual).

Fig. 1: Example of ¹³C-Sodium-Octanoate gastric emptying breath test, Dose/h curve



As the results are dependent on the test set-up – especially the calories of the provided meal – and the population, it is strongly recommended that each laboratory establishes its own reference values. For solid test meals, Delbende *et al.* found a cut-off value for $T_{1/2B}$ of 124 minutes compared to scintigraphy for diagnosis of delayed gastric emptying⁶. Normal values calculated and corrected with scintigraphy by Ghooos *et al.* are for $T_{1/2B} = 72 \pm 22$ minutes and $T_{lagB} = 32 \pm 20$

minutes for a test meal of 250 kcal.¹³ Delbende and Ghooos adjusted to the scintigraphy by subtraction of 67 minutes and 66 minutes, respectively. Recommended cut-off values for the breath test result are 130 minutes for T_{lagB} and 200 minutes for $T_{1/2B}$ ¹⁴.

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