Haematocrit

Reagent for quantitative In-vitro-determination of haematocrit in blood

HCT 142

Order No. **HCT 142**
Content: 40 tests

Method
Photometric turbidity measurement

Sample material
Capillary blood or EDTA blood
Use capillary blood immediately. Venous blood can be kept for up to 24 hours at +15°C to +25°C.

Reagent
Contents / concentrations:
Gowers's solution (pre-portioned in round cuvettes)
Sodium sulphate 194 mmol/L
Acetic acid 2.8 mol/L
pH = 2.5

Safety information
The reagent contains 16% acetic acid and is categorised as a dangerous preparation according to the EC Directives.
H319: Causes serious eye irritation
H315: Causes skin irritation
Observe the safety advice on the packaging.
A safety data sheet is available on request.[1)]

Storage and shelf life
The reagent can be kept in a dark place at a temperature between +15°C and +25°C until the expiry date indicated on the packaging.

Measurement conditions

Measurement devices:	Diaglobal Photometer Dr. Lange Photometer
Meas. wavelengths:	365nm, 520nm, 546nm, 560nm
Temperature:	Room temperature

Measurement range
for 520nm, 546nm, 560nm:
10 - 90% (0.10 - 0.90 L/L)

for 365nm:
10 - 70% (0.10 - 0.70 L/L)

Working instructions

Pipette into round cuvette:	
	Analysis
Blood	10 µL
Wash out the capillary with reagent solution. Mix thoroughly. Measure at the earliest after 3 min. within 20 min.	

Diaglobal Photometer
- Select the <**HCT**> test
- Set the photometer's zero point using a non-processed round cuvette (blank value)
- Insert analysis cuvette
- Read the result

Dr. Lange Photometer
- Select the <**HCT**> test
- Insert analysis cuvette
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Quality assurance
For quality assurance we recommend our control **ERY QS,** blood control for accuracy and precision for determination of erythrocytes and haematocrit in normal range.

Reference values[2)]

	%	L/L
Women	41 (36 - 45)	0.41 (0.36 - 0.45)
Men	46 (42 - 50)	0.46 (0.42 - 0.50)

Tips
- Store safely away from children.
- When extracting capillary blood, avoid pressing the fingertip too hard because otherwise the blood to be extracted is thinned-out by tissue fluid.
- Avoid haemolysis when extracting blood.
- Fluff the measurement solution up at regular intervals (approx. every 5 minutes) in order to avoid deposit of the erythrocytes on the base of the cuvette.

Summary
The haematocrit specifies the percentage volume share of the erythrocytes in the blood.

Indications / diagnostic significance[2)]
- Diagnostics and follow-up assessment for anaemia, hyperglobulia, dehydration and hyperhydratation conditions.
- Assessment of acute blood loss and therapy thereof after transfusion and infusion.

In cases of blood loss, the haematocrit drops together with the haemoglobin count. By determining the haematocrit, the current ratio plasma / erythrocyte volume can be assessed.

Endurance sport[3)] leads to an increase of the blood volume and a consequent drop in the haematocrit count (resting level). By lowering the haematocrit, the blood's flow properties are improved, helping the capillary gas exchange and the provision of oxygen to the muscles.

If the body is subjected to heavy stress with insufficient liquid intake, this results in an increase of the haematocrit. Counts in excess of 55% are critical and lead to an increased threat of thrombosis.

The haematocrit count can be determined by centrifugation using haematocrit capillaries. Automated blood cell devices are used to calculate the HCT value from the erythrocyte figure and the MCV. Diaglobal's photometric method is based on a turbidity measurement and enables simple determination of haematocrit which can also be carried out on the spot.

Measurement principle
By mixing the sample with the haematocrit reagent, the erythrocytes are distributed evenly in the measurement solution. The extinction measured is dependent on the quantity and size of the erythrocytes and can be depicted as a function of the product of these two sizes. Because the product from the quantity of erythrocytes and MCV corresponds with the haematocrit, there is a direct interrelationship between the extinction measured and haematocrit. The calibration function is calculated using control blood samples and is stored in the measurement devices named overleaf.
The values are based on the impedance method.

Performance parameters

Specificity / interferences
The measuring result is not influenced by high or low MCV counts.
Likewise, interferences by lipaemia or high leukocyte counts only play a minor role and generally do not falsify the measuring result.

Inaccuracy
The reproducibility was checked using human and control samples.

In series [n = 20]	Average [%]	Standard deviation [%]	VK [%]
Probe 1	18.5	0.26	1.4
Probe 2	34.4	0.36	1.1
Probe 3	47.5	0.43	0.9
From day to day [n = 20]	**Average [%]**	**Standard deviation [%]**	**VK [%]**
Probe 1	18.7	0.30	1.6
Probe 2	34.5	0.45	1.3
Probe 3	46.9	0.56	1.2

Analytic sensitiveness
Lower detection limit: 10% (0.1 L/L)

Comparison of methods
Comparison of the Diaglobal test HCT 142 (y) with a commercially available test (x) resulted in the following correlation according to the Passing/Bablok[4)] process:

y = 1.015x - 0.25
r = 0.989

n = 40
Concentration range: 17 - 60%

Bibliography
1. http://www.diaglobal.de/de/service/downloads/index.html
2. Thomas L. Labor und Diagnose. 4th edition. Marburg: Die Medizinische Verlagsgesellschaft, 1995: 594
3. Neumann G, Pfützner A, Berbalk A. Optimiertes Ausdauer-training, 2nd edition. Aachen: Meyer und Meyer Verlag, 1999: 62
4. Passing H, Bablok W. A new biometric procedure for testing the equality of measurements from two different analytical methods. J Clin Chem Clin Biochem. 1983; 21:709-720