

Comparison of pocket lactate meters 2007

According to the changes in the sportsmedical market, lactate meters for mobile use got very popular in the last years.

The first pocket device for lactate analysis was the Boehringer AccuSport, renamed in Roche AccuTrend Lactate and introduced in 1995. This device (and similar types for alternate parameters) operates with a paper test strip: Dosing a 20 µl sized sample of capillary blood onto (as recommended by capillary tubes), the results are given within 60 seconds by photometrical detection. Regardless its handy size, the specific difficulties of lactate analysis (e.g. sampling procedure and contamination risks) lead to misreadings very often. Additionally, the required sample size of 20 µl doesn't fit the demands of private customers (painless puncturing). The production of the device was discontinued in 2002.

Based on the technology of current glucose meters, in 1999 was introduced the Lactate Pro from Arkray (JAP), in 2003 the Lactate Scout from EKF/SensLab (GER) and in 2006 the Lactate Plus from Novabiomedical (USA). They are all operating by an enzymatical-amperometrical detection, using specially designed test strips for direct sample uptake. Lactate Pro and Lactate Scout are offered and sold continually in volumes around the world. The Lactate Plus isn't accredited yet for private use (no CE or FDA clearance) and currently available in the United States exclusively.



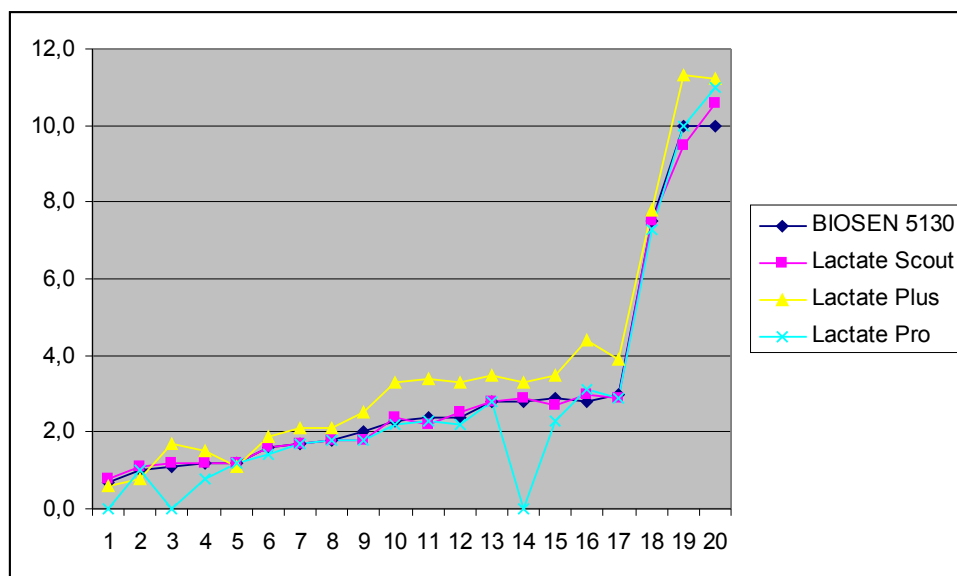
Featuring:

	Lactate Scout	Lactate Plus	Lactate Pro
Sample size (µl):	0,5	0,7	5
Measurement time (sec):	15	13	60
Measurement range (mmol/l):	0,5 – 25,0	0,3 – 25,0	0,8 – 23,0
Calibrated to:	Whole blood	Plasma	Whole blood
Hct compensation:	Yes	-	-
Function check:	Test solution	High and Low controls	Check strip
Display:	Result, time/date, options	Result, time/date, options	Result
Device control:	Scroll wheel-button	3 keys	Check strip
Battery:	2x AAA/LR03	Coin	Coin
Memory:	250	130	20
PC connection:	Serial 2.5" socket	Test strip socket	-
Supported hardware:	PC, Bluetooth, Cyclus-2	PC	-
Supported software:	Lactate Assistant (free), Lactware, Lactate Express, Winlactat, Para Analysis, Ergoline OptiCare	Chart	-

Comparison measurements:

The following measurements were made in immediate sequel, uptaking fresh human capillary blood directly and using an EKF BIOSEN 5130 lab analyzer as reference. Operating by re-usable chip sensors and an enzymatical-amperometrical detection as well, typical shifts in comparison readings are minimized herein. The first BIOSEN devices were also sold by Eppendorf and are generally well established in European and Asian labs and hospitals. The used 5130 lactate analyzer is the predecessor of the current, higher featured C_line and S_line models. Main differences to the pocket devices are caused by the required sample preparation (uptake of 20 µl sample by capillary tubes, to place into a reaction cup with hemolysis solution) and by the wet chemistry testing principle.

BIOSEN 5130	Lactate Scout	Lactate Plus	Lactate Pro
0,7	0,8	0,6	Low
1,0	1,1	0,8	1,0
1,1	1,2	1,7	Low
1,2	1,2	1,5	0,8
1,2	1,2	1,1	1,2
1,6	1,6	1,9	1,4
1,7	1,7	2,1	1,7
1,8	1,8	2,1	1,8
2,0	1,8	2,5	1,8
2,3	2,4	3,3	2,2
2,4	2,2	3,4	2,3
2,4	2,5	3,3	2,2
2,8	2,8	3,5	2,8
2,8	2,9	3,3	Failed
2,9	2,7	3,5	2,3
2,8	3,0	4,4	3,1
3,0	2,9	3,9	2,9
7,5	7,5	7,8	7,3
10,0	9,5	11,3	10,0
10,0	10,6	11,2	11,0



Note:
Lactate Plus test strips had to be replaced 7 times (= 27 readings total), caused by „Error 4“

The Lactate Pro has failed 2 times caused by too low readings and 1 time by missing reaction after uptake (= 23 readings total).

Differences to average results:

EKF BIOSEN 5130	-3%
Lactate Scout	-3%
Lactate Plus	16%
Lactate Pro	-7%

Differences to the reference system:

Lactate Scout	0%
Lactate Plus	20%
Lactate Pro	-4%

The Lactate Plus shows reasonable results below 3 mmol/l (aerobic training), but too high readings above. Repeated problems with the test strips („Er 4“) also increase the costs and the required time for testing.