

EQA round: AKS3/24 - Basic Clinical Chemistry - Serum

Setup: groups - M (measurement principle); Slovakia; minimal size of the groups n = 5

RoM = robust average	AV = assigned value	D_{max} = acceptable difference
SD = standard deviation	CRV = certified reference value	LL = lower limit
CV = coefficient of variation	CVP = consensus of all participants	UL = upper limit
N_{tot} = total number of the results	CVPG = consensus of the participants' groups	N_{eva} = number of the results assessed
N_{out} = number of the results removed before calculation	U_{AV} = expanded uncertainty of the assigned value ($k = 2$)	N_{suc} = number of successful results
		S_{rel} = relative success

Test Sample Group	[unit]	RoM	SD	CV [%]	N_{tot}	N_{out}	Comparability					N_{eva}	N_{suc}	S_{rel} [%]	Traceability					N_{eva}	N_{suc}	S_{rel} [%]		
							AV	U_{AV}	D_{max}	LL	UL				AV	U_{AV}	D_{max}	LL	UL					
(22) α-amylase	[μ kat/L]				42							0									42	41	98	
Sample A												0									42	41	98	
(0) Not specified		5,86	0,4	6,8	42	0								CRV	5,98	0,16	15%	5,08	6,88		42			
Sample B												0									42	41	98	
(0) Not specified		4,76	0,34	7,1	42	0								CRV	4,72	0,14	15%	4,01	5,43		42			
(35) α-amylase pancreatic	[μ kat/L]				22							22	21	95										
Sample A												22	21	95										
(0) Not specified		4,97	0,16	3,2	22	0	CVP	5,01	0,074	18%	4,1	5,92												
Sample B												22	21	95										
(0) Not specified		4,11	0,14	3,4	22	0	CVP	4,13	0,053	18%	3,38	4,88												
(32) γ-globulin (elfo)	[-]				7							7	7	100										
Sample A												7	7	100										
(0) Not specified		0,129	0,019	15	7	0	CVP	0,127	0,006	30%	0,088	0,166												
Sample B												7	7	100										
(0) Not specified		0,13	0,023	18	7	0	CVP	0,123	0,005	30%	0,086	0,16												
(10) Albumin	[g/L]				38							38	37	97										
Sample A												38	37	97										
(1) BCG		44,4	1,6	3,7	38	0	CVP	44,4	0,28	10%	39,9	48,9												
Sample B												38	37	97										
(1) BCG		32,3	1,6	5	38	0	CVP	32,2	0,31	10%	28,9	35,5												
(31) Albumin (elpho)	[-]				7							7	7	100										
Sample A												7	7	100										
(0) Not specified		0,633	0,053	8,4	7	0	CVP	0,631	0,019	15%	0,536	0,726												
Sample B												7	7	100										
(0) Not specified		0,636	0,047	7,5	7	0	CVP	0,644	0,012	15%	0,547	0,741												
(21) ALP	[μ kat/L]				41							38	36	95								41	34	83
Sample A												38	36	95								41	40	98
(3) IFCC method		0,778	0,069	8,9	41	0									CRV	0,828	0,035	18%	0,678	0,978		41		
(3) IFCC method; (1) Abbott		0,83	0,13	16	8	0	CVPG	0,831	0,021	14%	0,714	0,948												
(3) IFCC method; (58) Beckman Coulter (AU)		0,715	0,037	5,2	7	0	CVPG	0,734	0,024	14%	0,631	0,837												
(3) IFCC method; (60) Roche		0,799	0,054	6,8	21	0	CVPG	0,776	0,015	14%	0,667	0,885												
Other					5	0																		
							1x 3/12, 2x 3/46, 1x 3/85, 1x 3/177																	
Sample B		0,745	0,055	7,3	41							38	36	95								41	34	83
(3) IFCC method		0,745	0,055	7,3	41	0									CRV	0,691	0,019	18%	0,566	0,816		41		
(3) IFCC method; (1) Abbott		0,79	0,1	13	8	0	CVPG	0,794	0,019	14%	0,682	0,906												
(3) IFCC method; (58) Beckman Coulter (AU)		0,73	0,03	4,1	7	0	CVPG	0,759	0,025	14%	0,652	0,866												
(3) IFCC method; (60) Roche		0,751	0,059	7,8	21	0	CVPG	0,726	0,016	14%	0,624	0,828												
Other					5	0																		
							1x 3/12, 2x 3/46, 1x 3/85, 1x 3/177																	

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Test Sample Group	[unit]	RoM	SD	CV [%]	N _{tot}	N _{out}	Comparability					N _{eva}	N _{suc}	S _{rel} [%]	Traceability					N _{eva}	N _{suc}	S _{rel} [%]	
							AV	U _{AV}	D _{max}	LL	UL				AV	U _{AV}	D _{max}	LL	UL				
(24) ALT	[µkat/L]				43							0									43	42	98
Sample A												0									43	42	98
(0) Not specified		1,69	0,078	4,6	43	0								CRV	1,702	0,045	15%	1,44	1,96		43		
Sample B												0									43	42	98
(0) Not specified		1,19	0,053	4,5	43	0								CRV	1,164	0,031	15%	0,989	1,34		43		
(23) AST	[µkat/L]				43							0									43	40	93
Sample A												0									43	40	93
(0) Not specified		1,47	0,086	5,8	43	0								CRV	1,473	0,044	15%	1,25	1,7		43		
Sample B												0									43	42	98
(0) Not specified		2,01	0,11	5,6	43	0								CRV	2,017	0,044	15%	1,71	2,32		43		
(13) Bilirubin total	[µmol/L]				43							0									43	43	100
Sample A		21,6	2,6	12	43							0		CRV	21,42	0,57	26%	15,8	27		43	43	100
(2) DCA, DPD		21,5	2,5	12	42	0															42		
Other					1	0															1		
														1x 1									
Sample B		50,8	4,7	9,3	43							0		CRV	50,2	1,2	26%	37,1	63,3		43	43	100
(2) DCA, DPD		50,6	4,6	9	42	0															42		
Other					1	0															1		
														1x 1									
(14) Bilirubin direct	[µmol/L]				30							27	24	89							0		
Sample A		5,88	1,4	24	30							27	24	89							0		
(1) Jendrassik-Gróf; (60) Roche		6,58	0,19	2,9	5	0	CVPG	6,82	0,17	20%	5,45	8,19								5			
(2) DCA, DPD; (58) Beckman Coulter (AU)		4	0,59	15	7	0	CVPG	3,93	0,22	20%	3,14	4,72								7			
(2) DCA, DPD; (60) Roche		6,64	0,37	5,6	10	0	CVPG	6,82	0,17	20%	5,45	8,19								10			
Other					8	0															5		
														1x 0/60, 2x 1/1, 2x 2/1, 1x 2/12, 1x 2/46, 1x 2/177									
Sample B		10,7	3,3	31	30							27	25	93							0		
(1) Jendrassik-Gróf; (60) Roche		12,7	0,59	4,7	5	0	CVPG	13,8	0,5	20%	11	16,6								5			
(2) DCA, DPD; (58) Beckman Coulter (AU)		8,61	1	12	7	0	CVPG	8,07	0,52	20%	6,45	9,69								7			
(2) DCA, DPD; (60) Roche		13,2	0,67	5	10	0	CVPG	13,8	0,5	20%	11	16,6								10			
Other					8	0														5			
														1x 0/60, 2x 1/1, 2x 2/1, 1x 2/12, 1x 2/46, 1x 2/177									
(9) Total protein	[g/L]				41							0									41	40	98
Sample A												0									41	40	98
(0) Not specified		69,6	1,7	2,4	41	0								CRV	69,9	1,5	9%	63,6	76,2		41		
Sample B												0									41	40	98
(0) Not specified		49,2	1,1	2,2	41	0								CRV	51,1	1,1	9%	46,5	55,7		41		
(26) CK	[µkat/L]				41							0									41	35	85
Sample A												0									41	37	90
(0) Not specified		5,31	0,35	6,7	41	0								CRV	6	0,17	20%	4,8	7,2		41		
Sample B												0									41	36	88
(0) Not specified		1,88	0,15	7,9	41	0								CRV	2,129	0,053	20%	1,7	2,56		41		
(2) Potassium	[mmol/L]				44							44	43	98							0		
Sample A		5,67	0,11	2	44		CRV	5,621	0,084	7%	5,22	6,02								44	43	98	
(2) Indirect ISE		5,67	0,11	2	43	0						43											

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							AV	U _{AV}	D _{max}	LL	UL	N _{eva}	N _{suc}	S _{rel} [%]	AV	U _{AV}	D _{max}	LL	UL	N _{eva}	N _{suc}	S _{rel} [%]					
Other					1	0							1														
							1x 99																				
Sample B		3,63	0,072	2	44		CVP	3,64	0,015	6%	3,42	3,86	44	43	98											0	
(2) Indirect ISE		3,63	0,069	1,9	43	0							43														
Other					1	0							1														
							1x 99																				
(5) Inorganic phosphate	[mmol/L]				40								40	38	95											0	
Sample A		1,22	0,027	2,2	40		CVP	1,22	0,008	10%	1,09	1,35	40	39	98											0	
(1) UV-molybdate method		1,22	0,027	2,2	39	0							39														
Other					1	0							1														
							1x 2																				
Sample B		0,791	0,023	2,9	40		CVP	0,787	0,006	10%	0,708	0,866	40	38	95											0	
(1) UV-molybdate method		0,79	0,022	2,8	39	0							39														
Other					1	0							1														
							1x 2																				
(27) gamma-GT	[µkat/L]				41								0												41	41	100
Sample A													0												41	41	100
(0) Not specified		0,982	0,027	2,8	41	0									CRV	1,053	0,027	21%	0,831	1,28					41		
Sample B													0												41	41	100
(0) Not specified		0,983	0,028	2,9	41	0									CRV	1,017	0,025	21%	0,803	1,24					41		
(16) Glucose	[mmol/L]				43								0												43	40	93
Sample A		4,5	0,11	2,5	43								0		CRV	4,656	0,047	8%	4,28	5,03					43	41	95
(3) Method with hexokinase		4,49	0,1	2,2	40	0																				40	
Other					3	0																				3	
															3x 1												
Sample B		6,86	0,16	2,3	43								0		CRV	6,915	0,069	8%	6,36	7,47					43	41	95
(3) Method with hexokinase		6,85	0,14	2,1	40	0																				40	
Other					3	0																				3	
															3x 1												
(7) Magnesium	[mmol/L]				41								41	37	90											0	
Sample A		1,5	0,04	2,6	41		CRV	1,499	0,029	15%	1,27	1,73	41	38	93											0	
(2) Photometry		1,5	0,035	2,3	33	0							33														
(4) UV enzyme method		1,58	0,12	7,5	8	0							8														
Sample B		0,806	0,032	4	41		CVP	0,806	0,006	11%	0,717	0,895	41	38	93											0	
(2) Photometry		0,803	0,025	3,2	33	0							33														
(4) UV enzyme method		0,825	0,067	8,1	8	0							8														
(3) Chloride	[mmol/L]				44								44	43	98											0	
Sample A		115	3,4	3	44		CVP	115	0,66	7%	106	124	44	43	98											0	
(3) Indirect ISE		115	3,3	2,9	43	0							43														
Other					1	0							1														
							1x 2																				
Sample B		96,9	3,4	3,5	44		CVP	97,5	0,67	7%	90,6	105	44	43	98											0	
(3) Indirect ISE		96,8	3,3	3,4	43	0							43														
Other					1	0							1														
							1x 2																				

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Test Sample Group	[unit]	RoM	SD	CV [%]	N _{tot}	N _{out}	Comparability					N _{eva}	N _{suc}	S _{rel} [%]	Traceability					N _{eva}	N _{suc}	S _{rel} [%]	
							AV	U _{AV}	D _{max}	LL	UL				AV	U _{AV}	D _{max}	LL	UL				
(15) Cholesterol	[mmol/L]				41							0									41	39	95
Sample A												0									41	39	95
(0) Not specified		4,43	0,13	3	41	0								CRV	4,483	0,045	9%	4,07	4,89		41		
Sample B												0									41	39	95
(0) Not specified		3,16	0,12	3,7	41	0								CRV	3,225	0,077	9%	2,93	3,52		41		
(30) Cholinesterase	[μkat/L]				14							14	13	93							0		
Sample A												14	13	93							0		
(0) Not specified		134	4,8	3,6	14	0	CVP	134	2,3	12%	117	151									14		
Sample B												14	13	93							0		
(0) Not specified		98,2	3,6	3,6	14	0	CVP	98,5	1,6	12%	86,6	111									14		
(19) Creatinine	[μmol/L]				44							0									44	37	84
Sample A												0		CRV	58,14	0,58	13%	50,5	65,7		44	37	84
(1) Jaffe		62,1	6,9	11	16	0															16		
(3) Enzyme		56,9	2,6	4,5	28	0															28		
Sample B												0		CRV	184,5	1,8	13%	160	209		44	41	93
(1) Jaffe		185	6,2	3,4	44																16		
(3) Enzyme		184	10	5,6	16	0															28		
(0) Not specified		185	5,2	2,8	28	0															28		
(17) Uric acid	[μmol/L]				41							0									41	39	95
Sample A												0									41	39	95
(0) Not specified		394	11	2,8	41	0								CRV	391,8	3,9	12%	344	439		41		
Sample B												0									41	40	98
(0) Not specified		291	11	3,8	41	0								CRV	288,5	2,9	12%	253	324		41		
(12) Lactate	[mmol/L]				18							18	18	100							0		
Sample A												18	18	100							0		
(3) Photometric enzyme method		3,97	0,074	1,9	18	0	CVP	3,98	0,024	15%	3,38	4,58									13		
Other		3,98	0,067	1,7	13	0															5		
					5	0																	
							4x 1, 1x 2																
Sample B												18	18	100							0		
(3) Photometric enzyme method		0,977	0,047	4,9	18	0	CVP	0,981	0,015	15%	0,833	1,13									13		
Other		0,98	0,031	3,1	13	0															5		
					5	0																	
							4x 1, 1x 2																
(28) LD	[μkat/L]				35							0									35	34	97
Sample A												0									35	34	97
(0) Not specified		3,38	0,13	3,8	35	0								CRV	3,368	0,086	18%	2,76	3,98		35		
Sample B												0									35	35	100
(0) Not specified		1,91	0,092	4,8	35	0								CRV	1,976	0,046	18%	1,62	2,34		35		
(29) Lipase	[μkat/L]				28							25	24	96							0		
Sample A												25	25	100							0		
(0) Not specified; (58) Beckman Coulter (AU)		0,99	0,045	4,5	6	0	CVPG	0,994	0,026	24%	0,755	1,24									6		
(0) Not specified; (60) Roche		0,981	0,055	5,6	16	0	CVPG	0,979	0,018	24%	0,744	1,22									16		
Other					6	0															3		
							3x 0/1, 1x 0/12, 1x 0/177, 1x 0/179																
Sample B												25	24	96							0		
(0) Not specified; (58) Beckman Coulter (AU)		0,495	0,026	5,2	28	0	CVPG	0,465	0,023	24%	0,353	0,577									6		
(0) Not specified; (60) Roche		0,475	0,007	1,6	6	0	CVPG	0,505	0,009	24%	0,383	0,627									16		

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								AV	U _{AV}	D _{max}	LL	UL				AV	U _{AV}	D _{max}	LL	UL							
Other						6	0	3x 0/1, 1x 0/12, 1x 0/177, 1x 0/179					3														
(8) Lithium		[mmol/L]				8							8	7	88								0				
Sample A													8	7	88								0				
(4) Photometry			0,839	0,054	6,5	8	0	CRV	0,857	0,013	12%	0,754	0,96														
Sample B													8	7	88								0				
(4) Photometry			0,644	0,05	7,7	8	0	CVP	0,65	0,021	12%	0,572	0,728														
(18) Urea		[mmol/L]				43							0									43	41	95			
Sample A													0									43	42	98			
(1) UV enzymatic m.(GMD)			12,7	0,4	3,2	43	0									CRV	12,97	0,13	15%	11	15	43					
Sample B													0									43	41	95			
(1) UV enzymatic m.(GMD)			4,99	0,21	4,2	43	0									CRV	5,035	0,05	15%	4,27	5,8	43					
(11) Osmolality		[mmol/kg]				12							12	11	92								0				
Sample A													12	11	92								0				
(0) Not specified			303	5,8	1,9	12	0	CVP	304	2	5%	288	320														
Sample B													12	12	100								0				
(0) Not specified			239	3	1,2	12	0	CVP	239	1,3	5%	227	251														
(1) Sodium		[mmol/L]				44							44	43	98								0				
Sample A													44	43	98								0				
(2) Indirect ISE			137	1,9	1,4	44		CRV	138,3	2,1	5%	131	146														
Other			137	1,8	1,3	43	0						43														
						1	0						1														
Sample B													44	43	98								0				
(2) Indirect ISE			112	1,7	1,5	44		CVP	113	0,46	4%	108	118														
Other			112	1,6	1,4	43	0						43														
						1	0						1														
								1x 99																			
(20) Triacylglycerols		[mmol/L]				41							0									41	40	98			
Sample A													0									41	40	98			
(1) Photometric enzyme (GPO-PAP)			2,09	0,068	3,3	41	0									CRV	2,104	0,021	18%	1,72	2,49	41					
Sample B													0									41	40	98			
(1) Photometric enzyme (GPO-PAP)			1,06	0,073	6,9	41	0									CRV	1,023	0,013	18%	0,838	1,21	41					
(4) Calcium		[mmol/L]				41							41	40	98								0				
Sample A													41	40	98								0				
(3) Photom. with arsenazo III			2,09	0,054	2,6	41		CRV	2,076	0,031	8%	1,9	2,25														
(4) Photomet. with NM-BAPTA			2,07	0,056	2,7	17	0						17														
Other			2,1	0,067	3,2	20	0						20														
						4	0						4														
								4x 2																			
Sample B													41	40	98								0				
(3) Photom. with arsenazo III			1,93	0,044	2,3	41		CVP	1,95	0,01	7%	1,81	2,09														
(4) Photomet. with NM-BAPTA			1,92	0,026	1,3	17	0						17														
Other			1,95	0,059	3	20	0						20														
						4	0						4														
								4x 2																			
(36) Calcium ionised		[mmol/L]				6							6	6	100								0				
Sample A													6	6	100								0				
(2) Direct ISE			1,35	0,037	2,8	6	0	CVP	1,35	0,017	10%	1,21	1,49														
													6														

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							AV	U _{AV}	D _{max}	LL	UL	N _{eva}	N _{suc}	S _{rel} [%]	AV	U _{AV}	D _{max}	LL	UL	N _{eva}	N _{suc}
Sample B (2) Direct ISE		1,39	0,045	3,2	6	0	CVP	1,39	0,019	10%	1,25	1,53	6	6	100	6	6	100	0	0	0
(6) Iron	[$\mu\text{mol/L}$]				38								38	35	92						0
Sample A (2) Method with ferrozine/ferene		24	0,85	3,5	38		CVP	23,8	0,18	15%	20,2	27,4	38	36	95	38	36	95	0	0	0
(4) Method with TPTZ		23,2	0,49	2,1	8	0							8			8					0
Sample B (2) Method with ferrozine/ferene		19,2	0,77	4	38		CVP	19	0,14	15%	16,1	21,9	38	36	95	38	36	95	0	0	0
(4) Method with TPTZ		18,4	0,3	1,6	8	0							8			8					0