

Detection of non-permitted technological processes

Main object:

- differentiate between different grades of pineapple juices
- detect methods to quantify marker compounds in pineapple peel

Research approach (using classical parameters)

- examination of fresh pineapples divided into peel, core and fruit flesh
- examination of authentic processed pineapple samples
- testing of methods
(procedure itself, interpretation of blind tests)

Examined pineapple material

12 fresh fruits (divided in peel, fruit flesh and core)

67 single strength juices

40 concentrates

30 samples of special steps or treatment

(mill juice, WESOS, mash, 2nd press,...)

Examined Parameters

density, degree brix

titrable acids

minerals

ash, ash alkalinity, alkalinity index

potassium, sodium, magnesium, calcium, iron

phosphate, total phosphorus, nitrate

carbohydrates

glucose, fructose, sucrose

glucose/fructose ratio

soluble polysaccharides

Peer Test

(Eurofins, SMA, chelab)

Iron

o.k.

Potassium

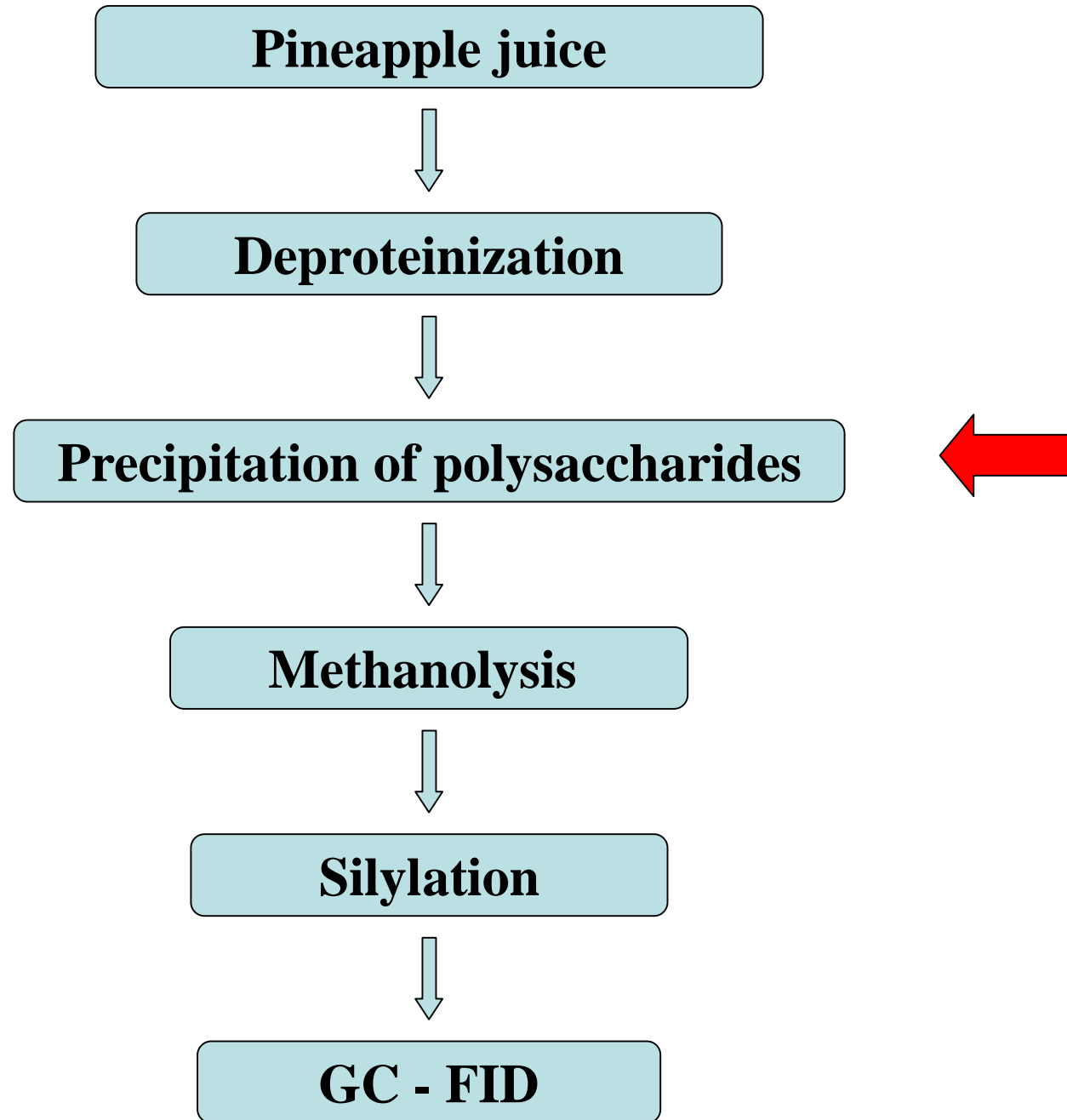
o.k.

Phosphate

o.k.

Polysaccharides

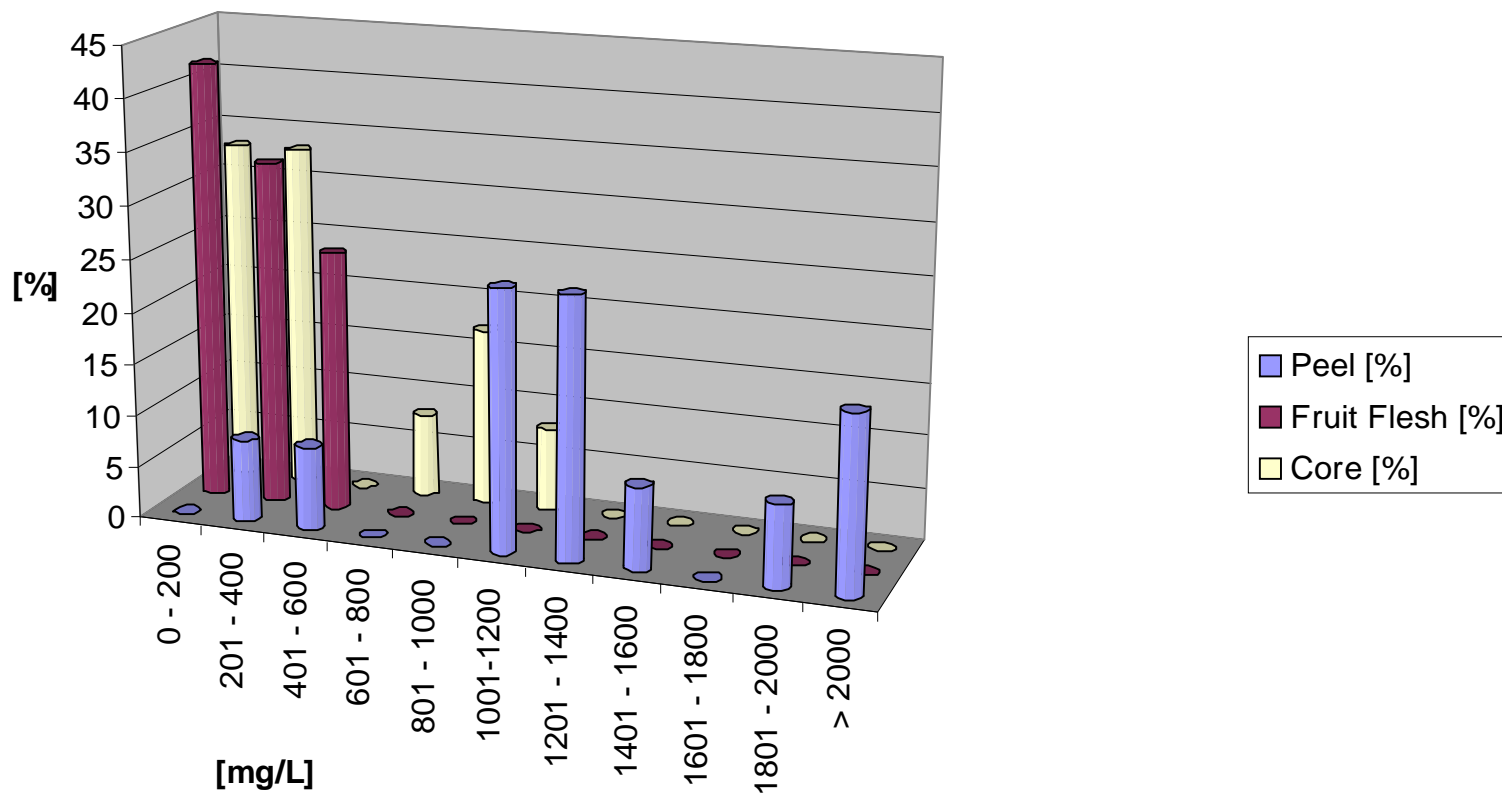
to be optimized



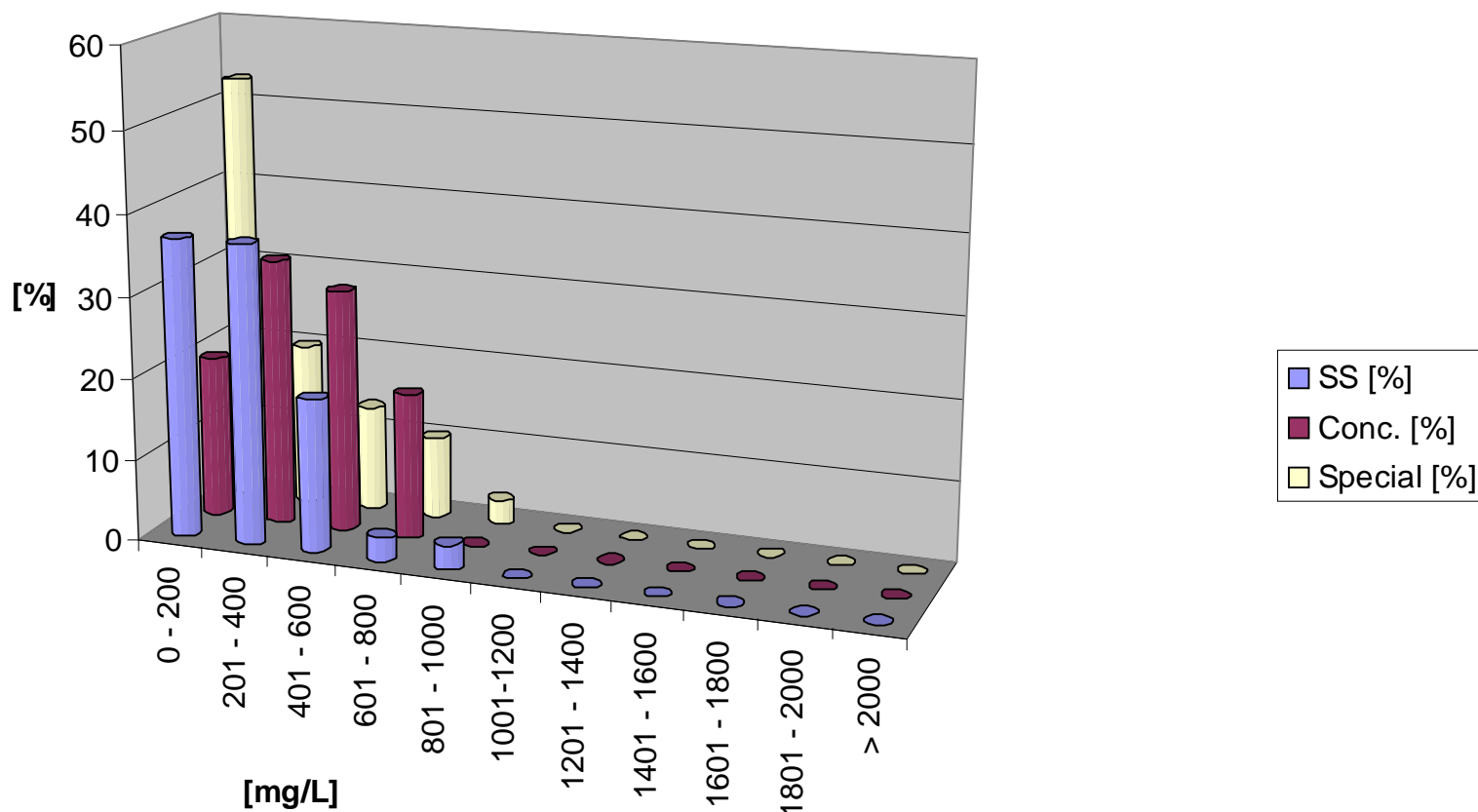
Repeatability of analysis of soluble polysaccharides

		sum		glucose	galactose	mannose	glucuronic acid	galacturonic acid	arabinose	xylose	ramnose
Pineapple Juice I		284	[mg/L]	22	92	116	0	0	37	17	0
Pineapple Juice II		237	[mg/L]	18	77	98	0	0	29	15	0
Pineapple Juice III		206	[mg/L]	16	63	91	0	0	23	13	0
Pineapple Juice IV		192	[mg/L]	16	59	83	0	0	21	13	0
Pineapple Juice V		241	[mg/L]	18	79	92	0	0	37	15	0
Pineapple Juice VI		208	[mg/L]	16	70	79	0	0	28	15	0
mean value		228		17	73	93			29	14	
rel. standard deviation		14,6		13,8	16,4	14,1			23,3	10,8	

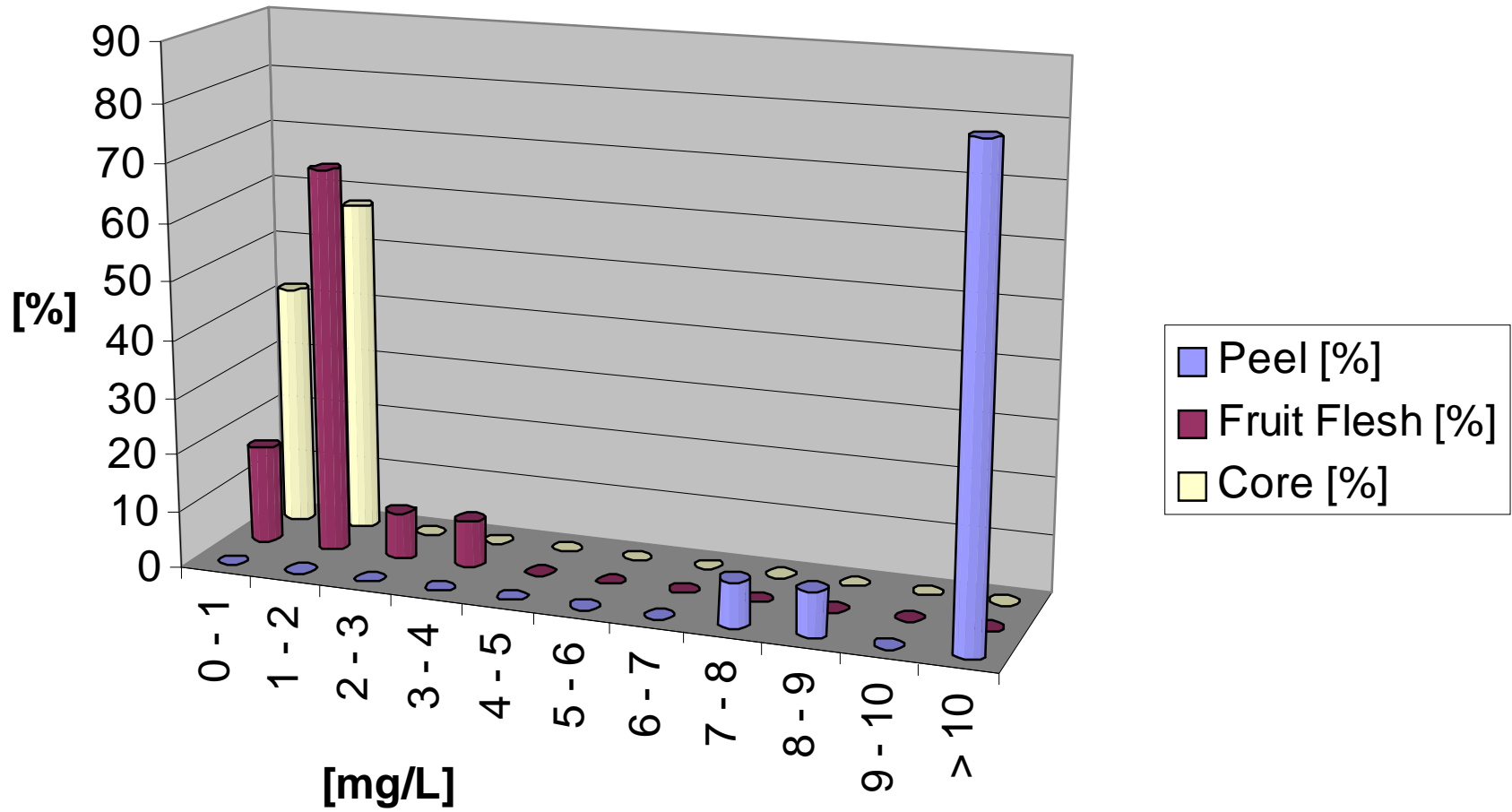
Sum of Monosaccharides from polysaccharides (fresh fruits)



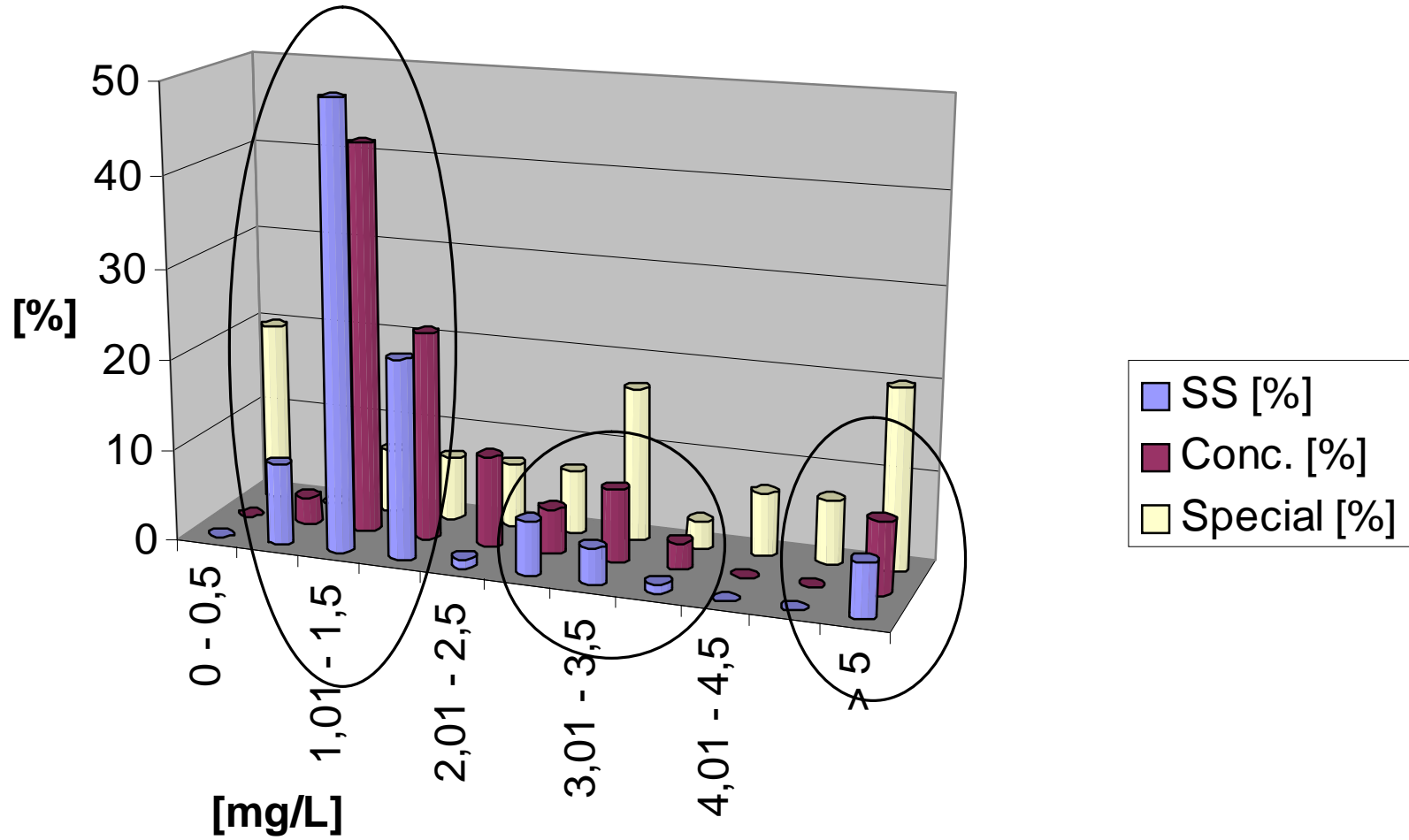
Sum of monosaccharides from polysaccharides [mg/L]



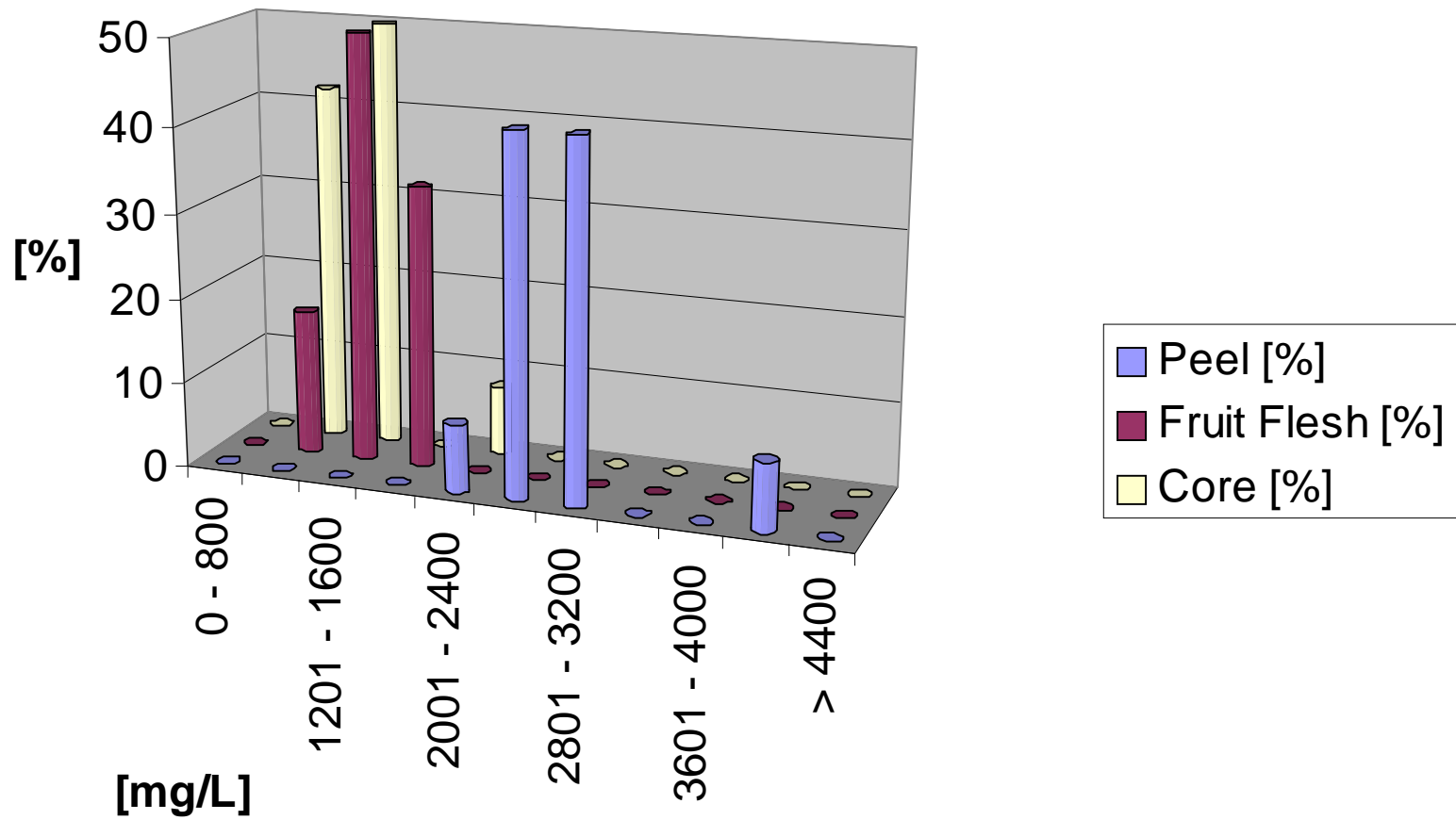
Iron [mg/L] (fresh fruits)



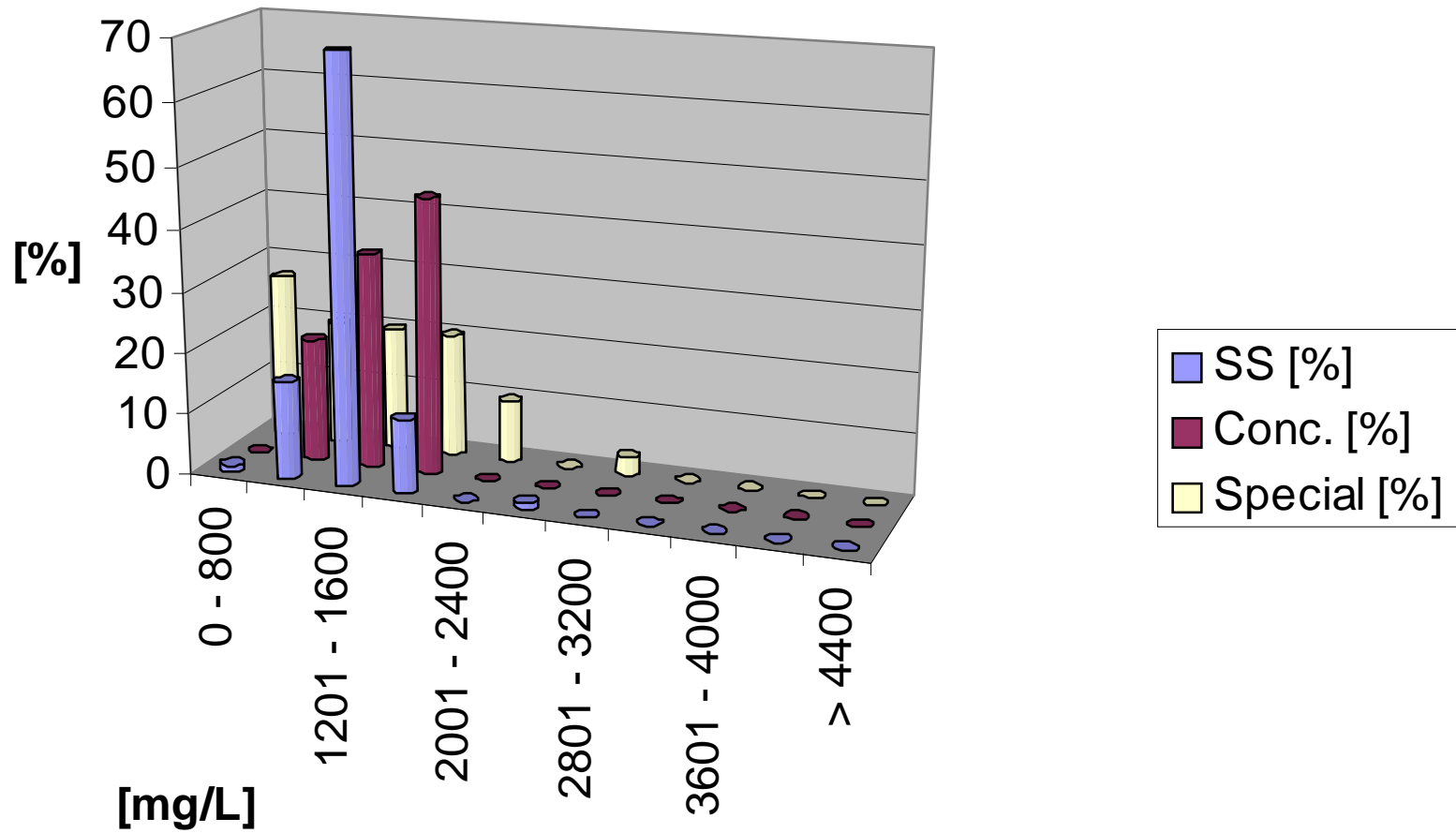
Iron [mg/L]



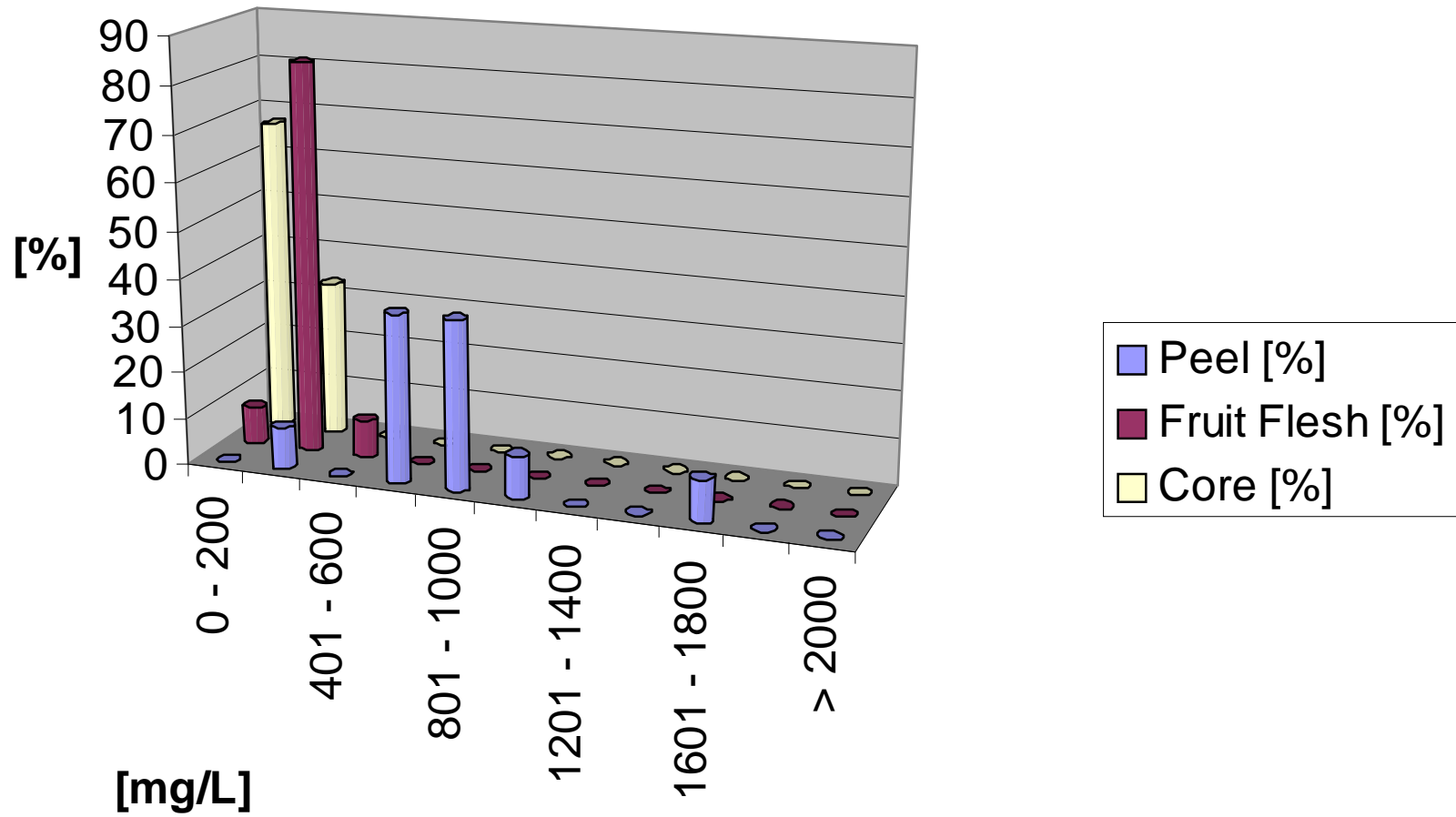
Potassium [mg/L] (fresh fruits)



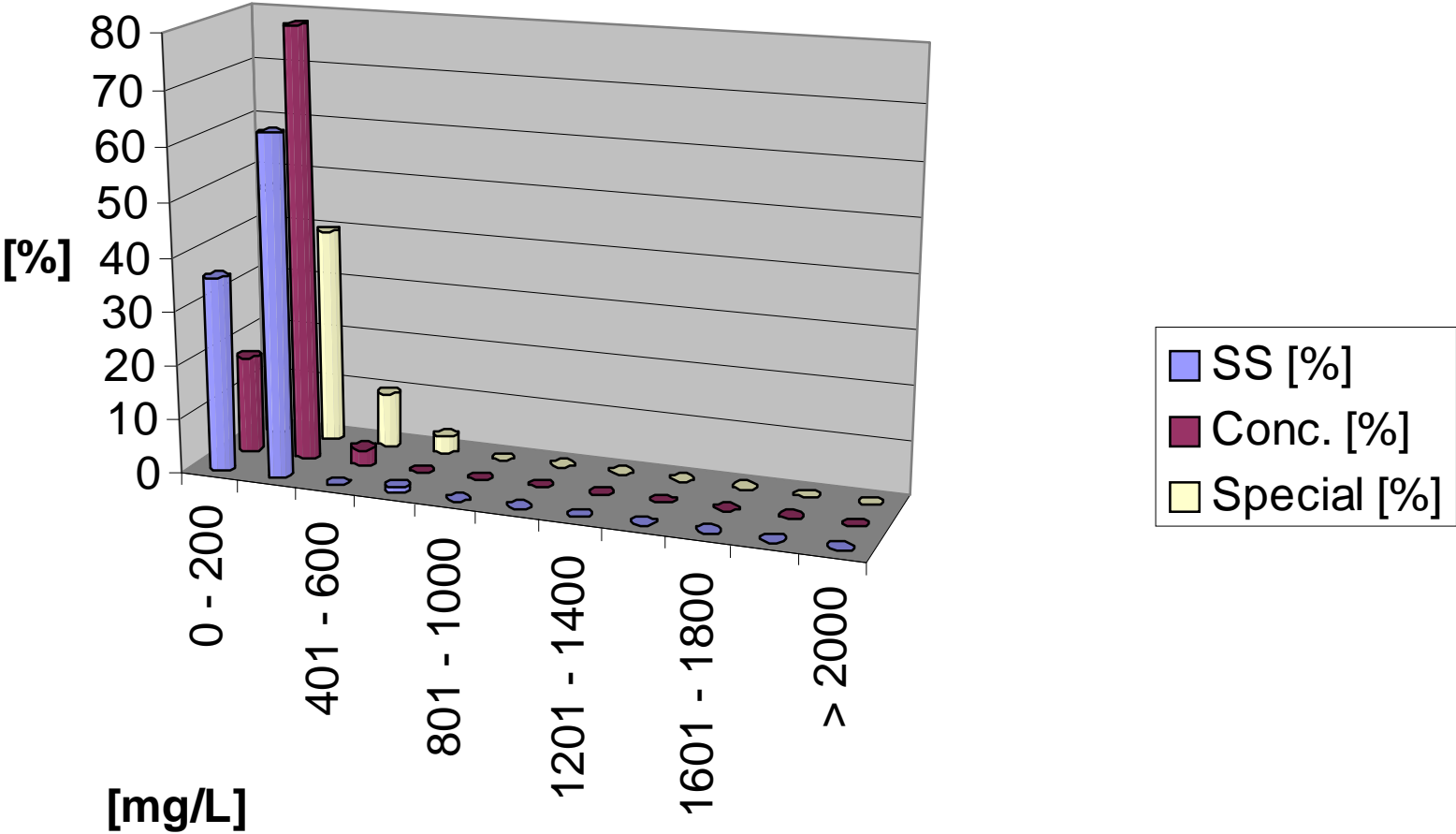
Potassium [mg/L]



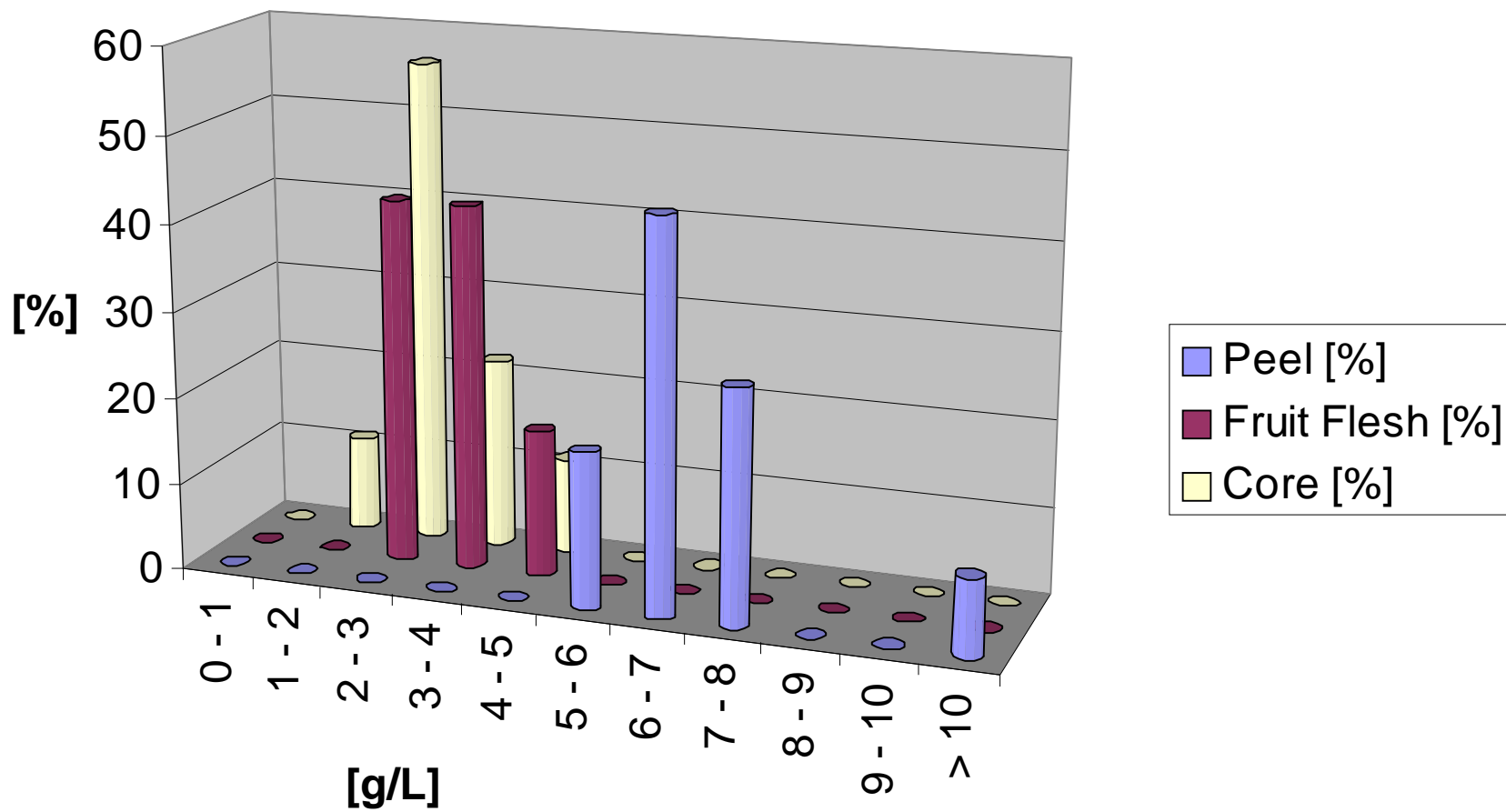
Phosphate [mg/L] (fresh fruits)



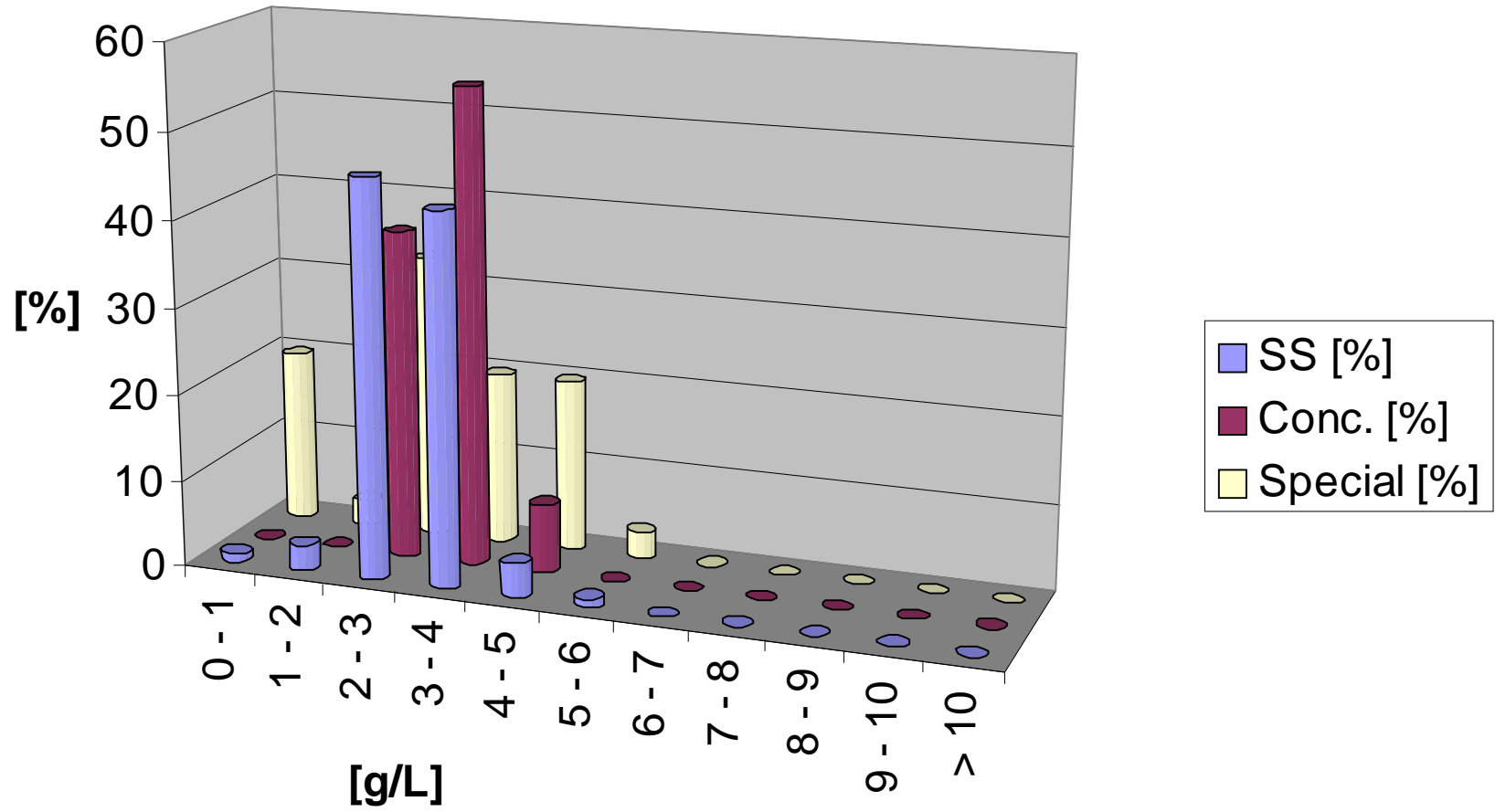
Phosphate [mg/L]



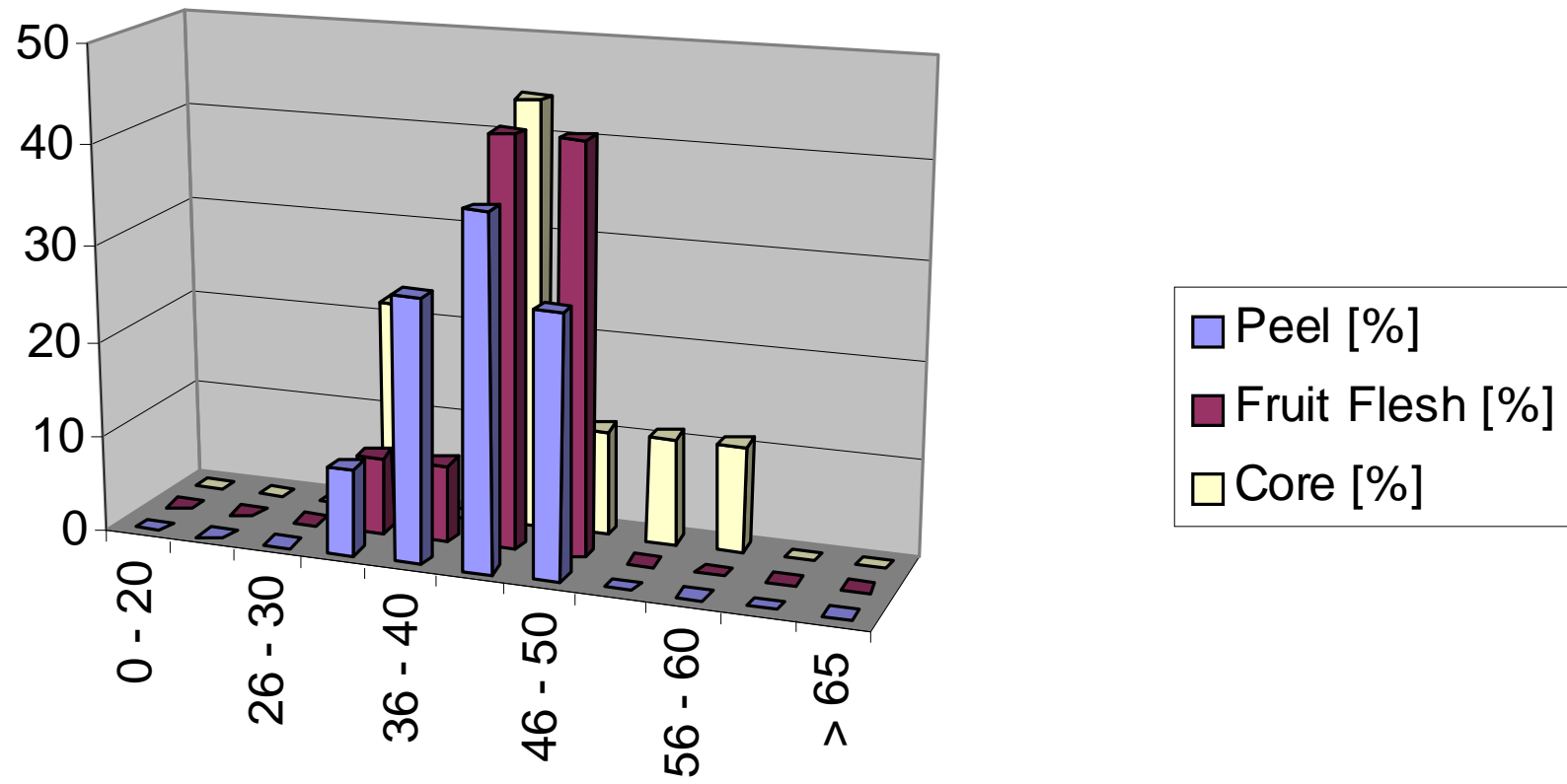
Ash [g/L] (fresh fruits)



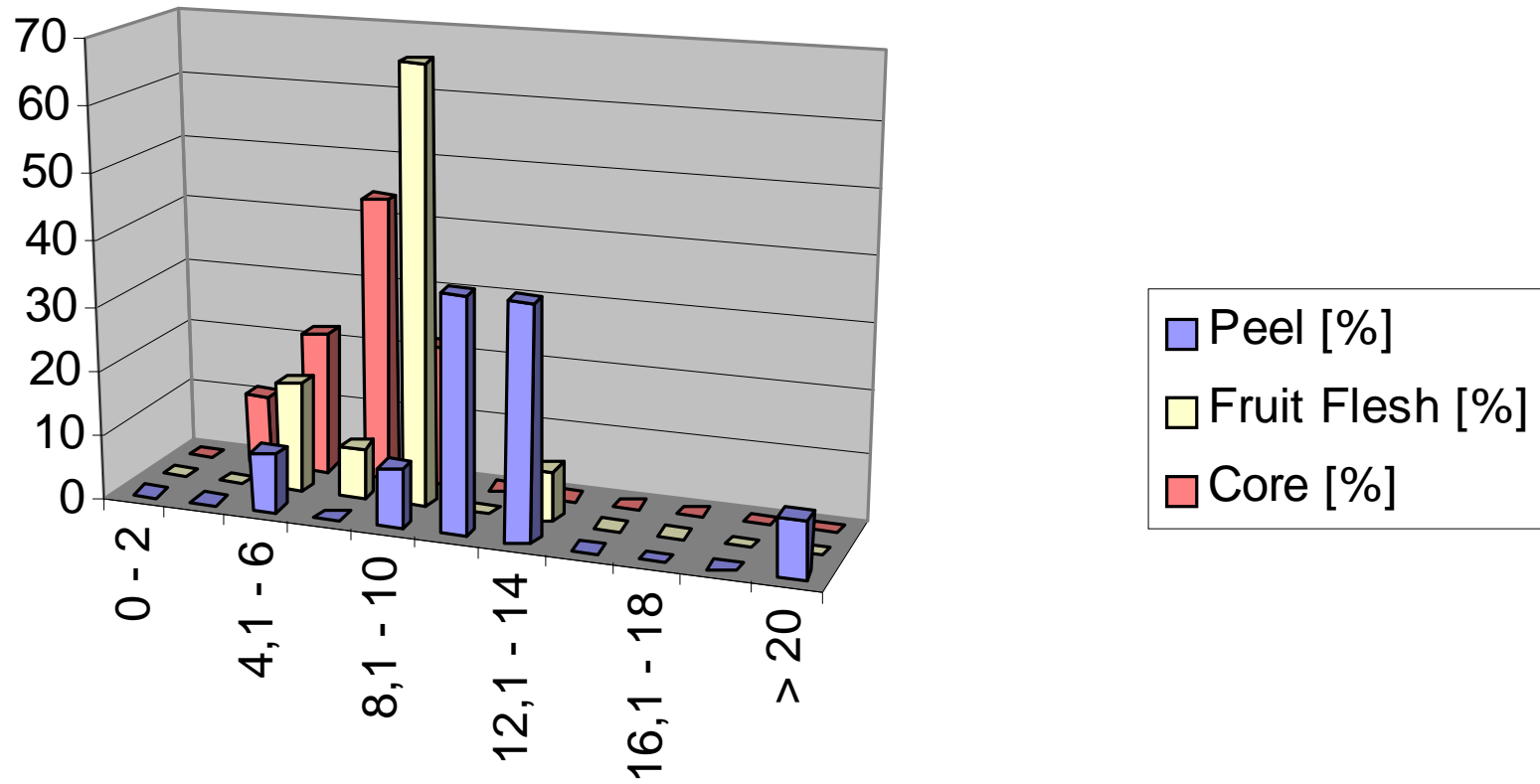
Ash [g/L]



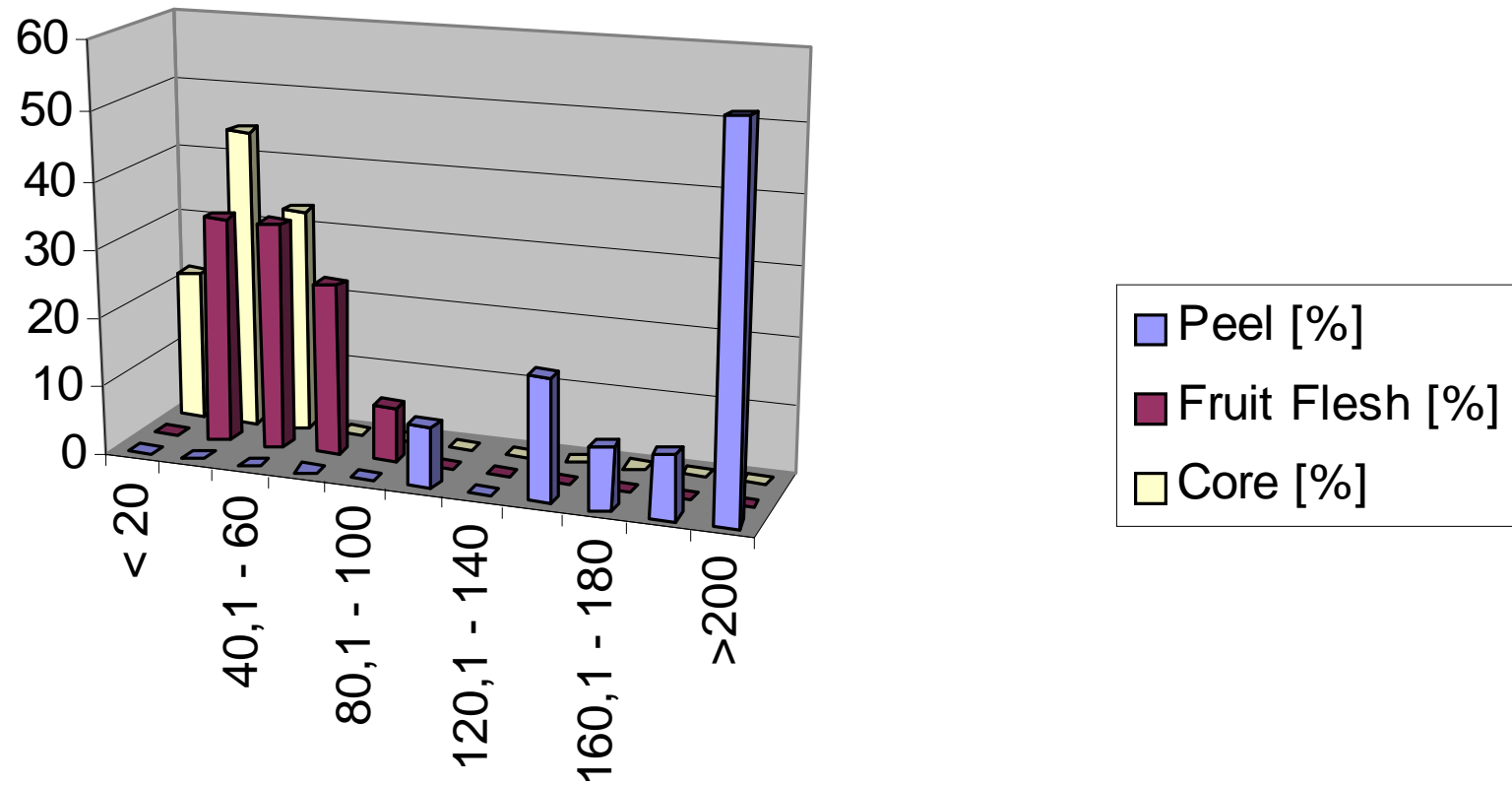
potassium in ash [%]



phosphate in ash [%]



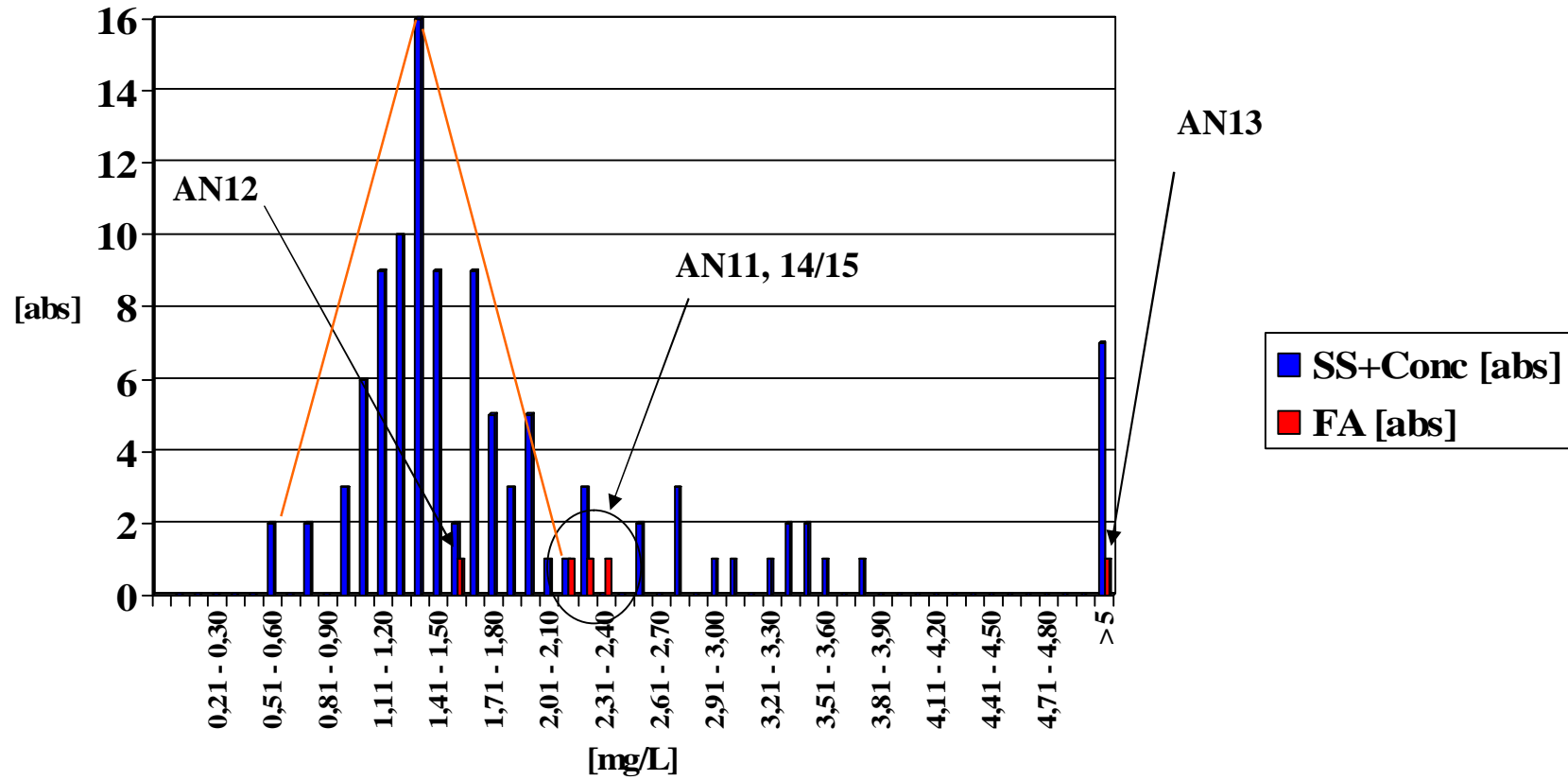
iron in ash [%*1000]



Final Assessment - Results

	<u>AN 11</u>	<u>AN 12</u>	<u>AN 13</u>	<u>AN 14</u>	<u>AN 15</u>
Brix	60,2	60,8	63,0	64,4	64,2
Ash [g/L]	3,9	3,1	4,0	3,3	3,3
Iron [mg/L]	2,37	1,59	11,1	2,23	2,17
Sodium [mg/L]	10,1	5,3	4,1	6,0	5,4
Potassium [mg/L]	1688	1446	1877	1588	1591
Calcium [mg/L]	166,2	55,2	116,2	102,6	102,1
Magnesium [mg/L]	147,3	126,0	162,9	125,5	125,0
Nitrate [mg/L]	11,1	9,2	7,1	14,4	13,0
Phosphate [mg/L]	238	187	224	276	276
Total phosphorus [mg/L]	77,6	61,0	73,1	90,0	90,0
Sum of soluble polysaccharides [mg/L]	563	382	669	305	306
Glucose [mg/L]	80	27	97	32	32
Galaktose [mg/L]	77	89	111	71	73
Mannose [mg/L]	248	111	304	110	106
Glucuronic acid [mg/L]	18	16	19	9	9
Galacturonic acid [mg/L]	70	64	49	31	32
Arabinose [mg/L]	42	50	56	36	38
Xylose [mg/L]	26	23	32	15	15
Rhamnose [mg/L]	2	2	1	1	1

Iron [mg/L] SS + Conc.

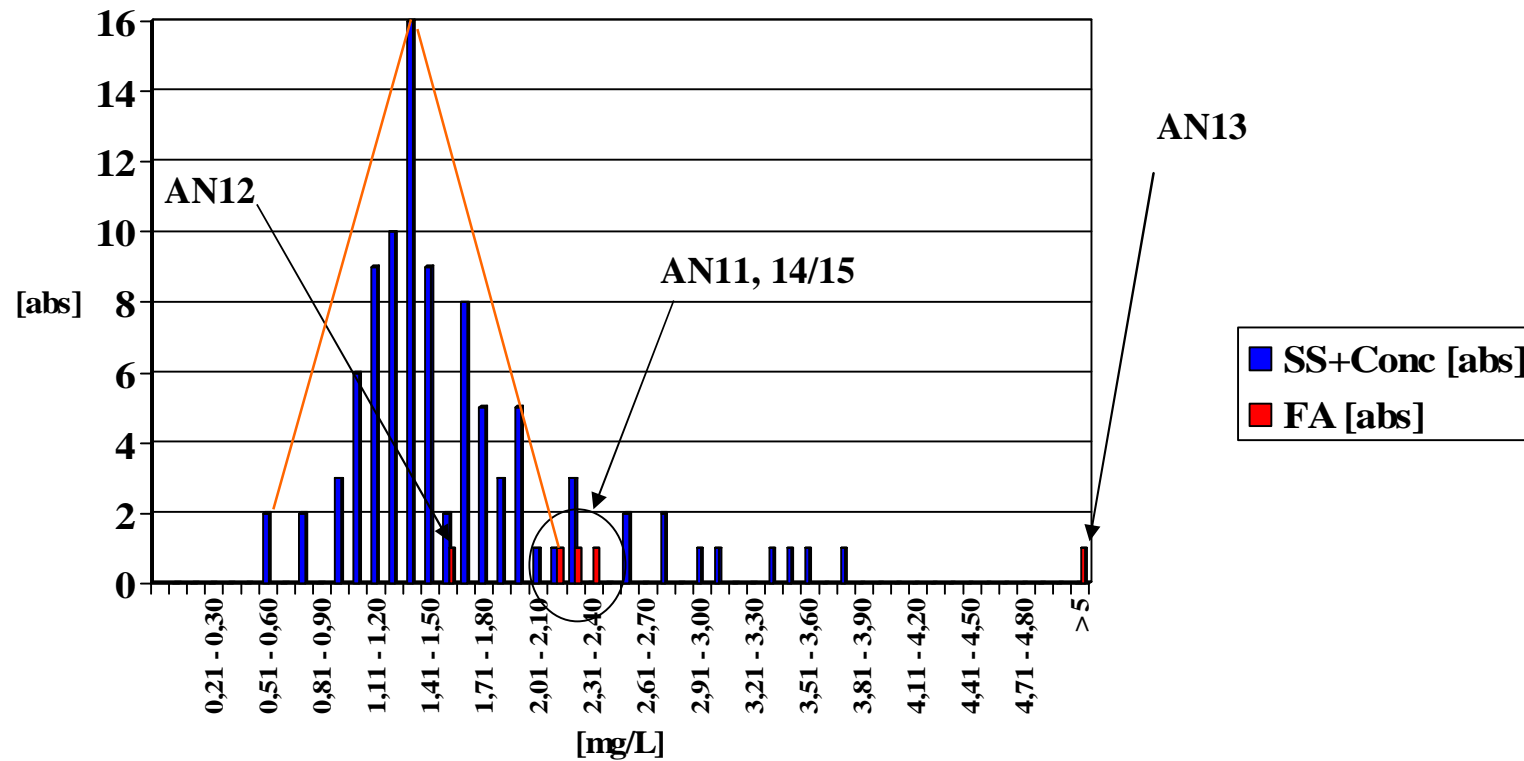


78 %

	SS [amount]	Iron >2	Iron >2,3	Iron >3
Brazil	9	3	3	1
Costa Rica	6	1		
Honduras	2			
Indonesia	4			
Kenya	4			
Martinique	1	1	1	1
Philippines	3			
South Africa	11	6	6	5
Thailand	27	2	2	2
Vietnam				
Total	67	13	12	9

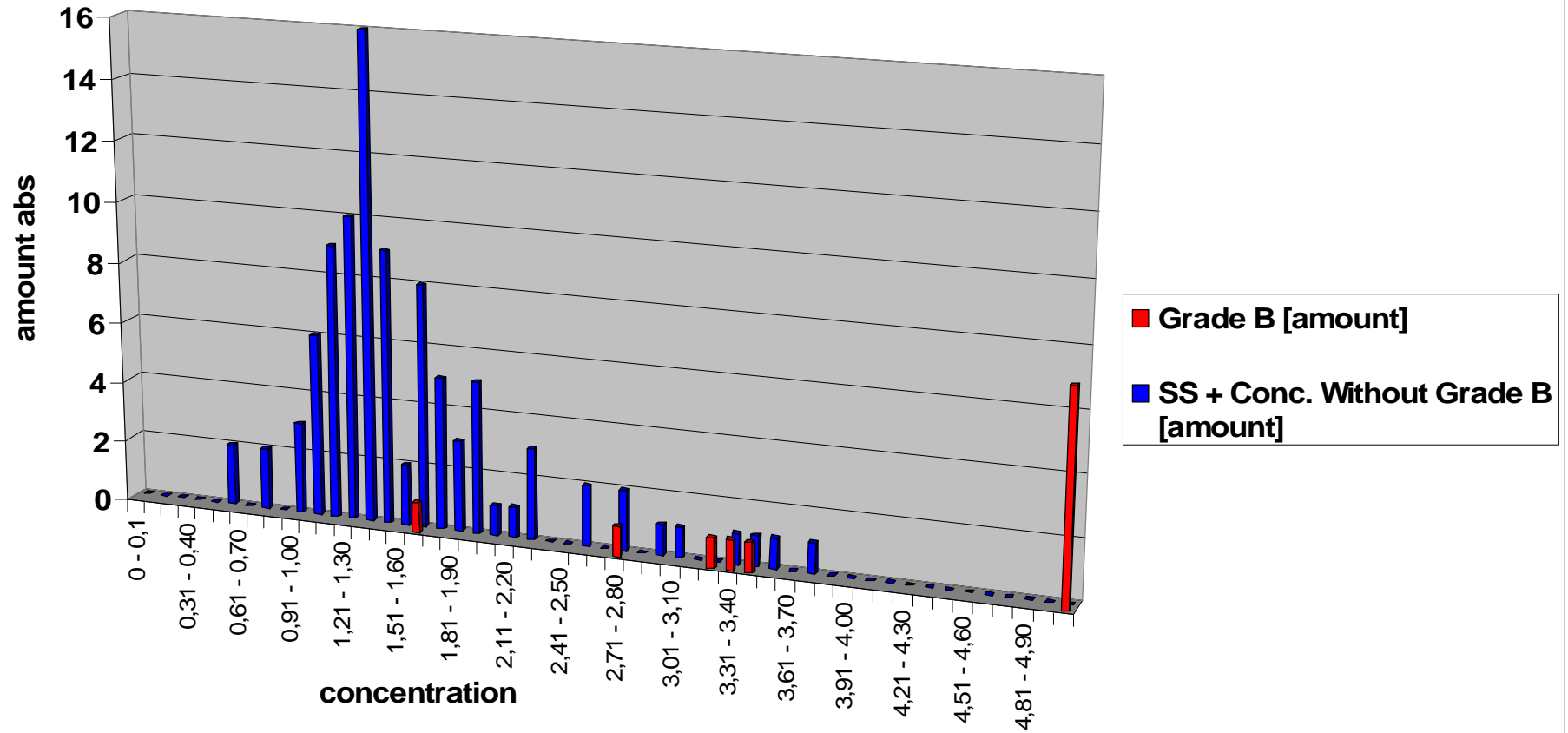
	Conc.	Iron >2	Iron >2,3	Iron >3
	[amount]			
Brazil	7	1		
Costa Rica	1	1		
Honduras	2			
Indonesia	4	3	1	
Kenya	2			
Martinique				
Philippines	3			
South Africa	8	8	8	7
Thailand	11			
Vietnam	2			
Total	40	13	9	7

Iron [mg/L] SS + Conc. without Grade B

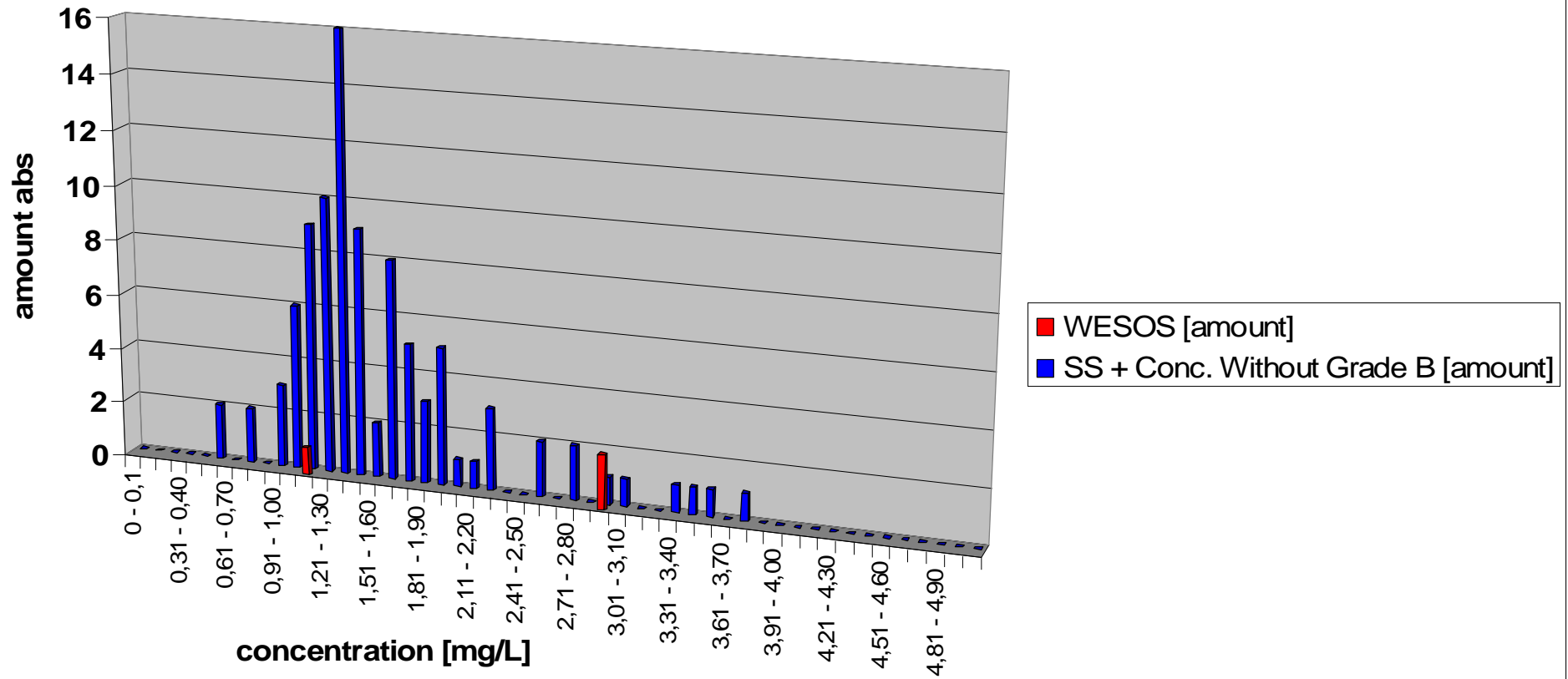


86 %

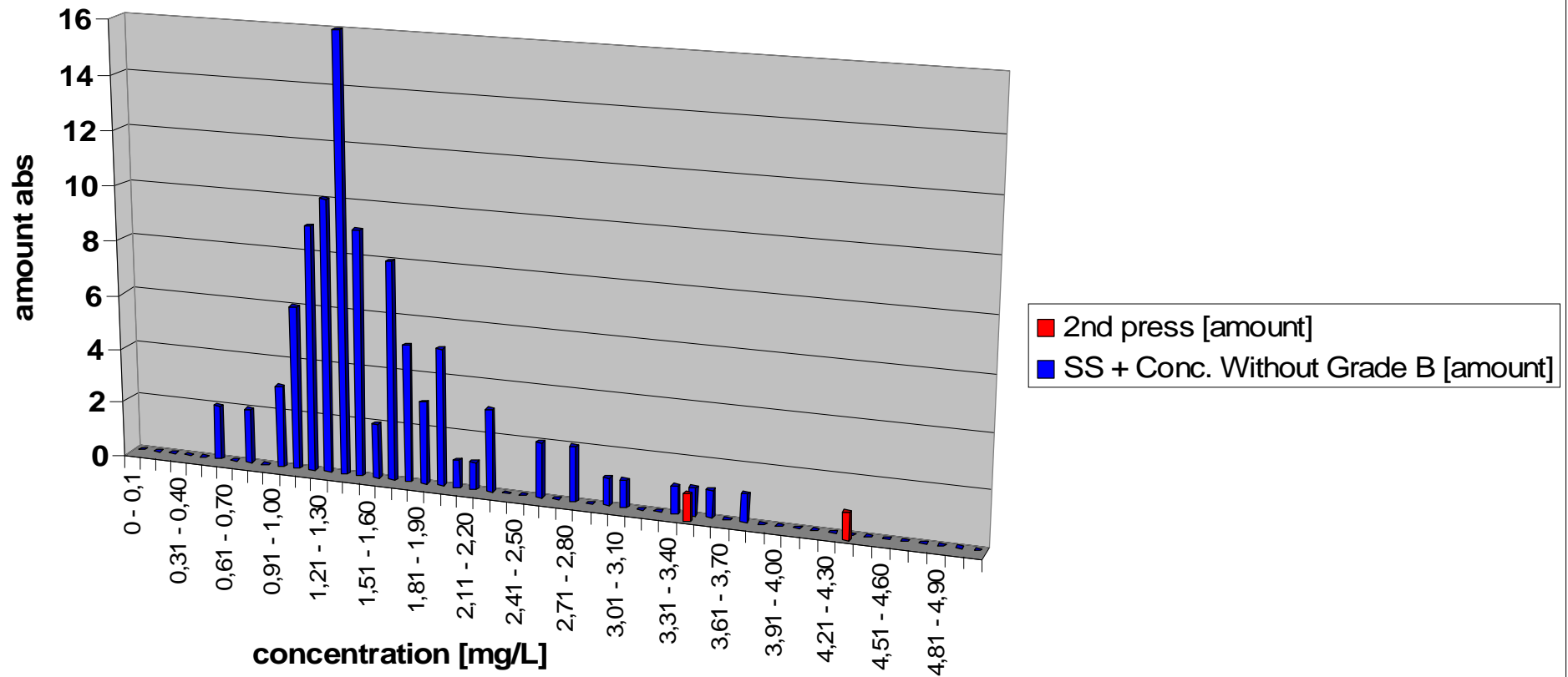
Iron in Grade B products [mg/L]



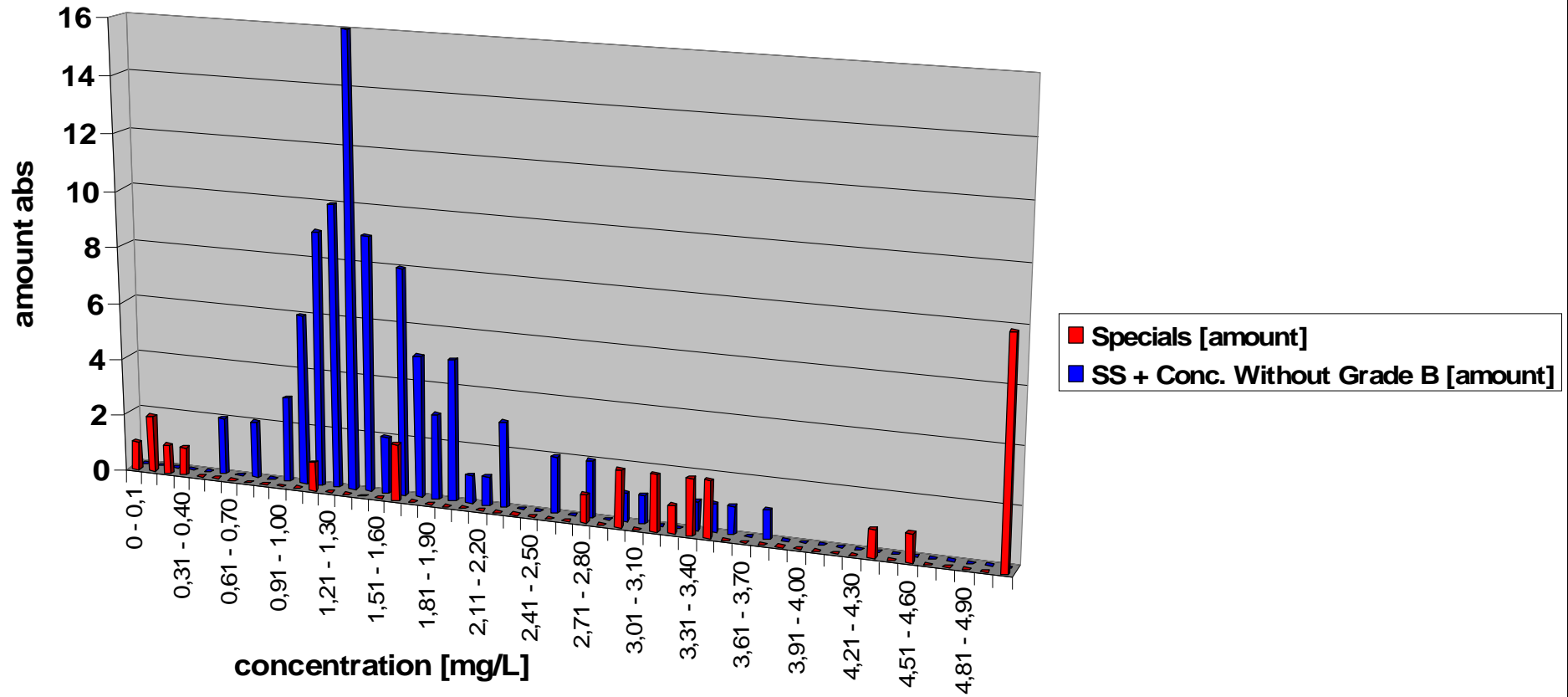
Iron WESOS [mg/L]



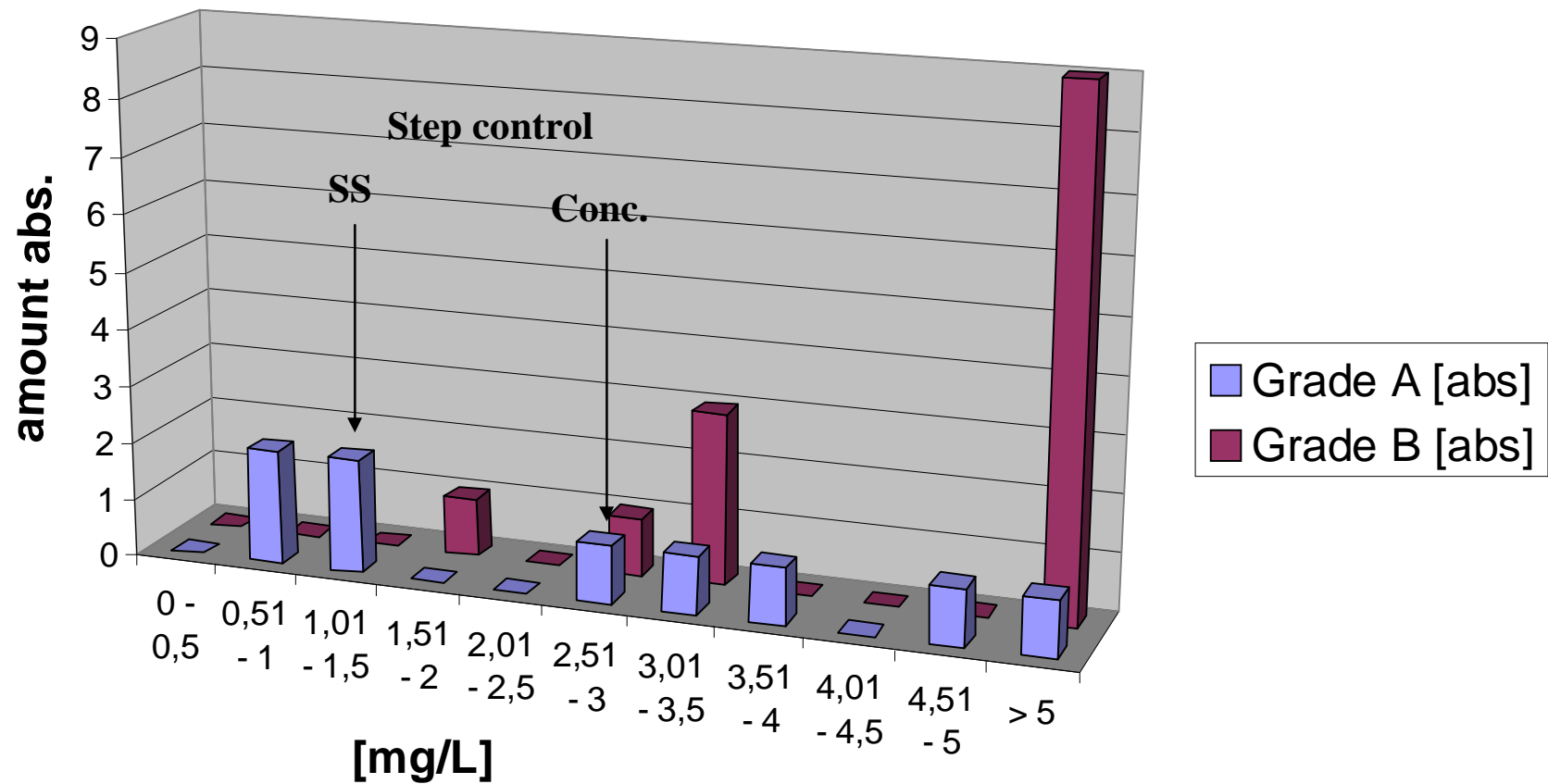
Iron second press [mg/L]



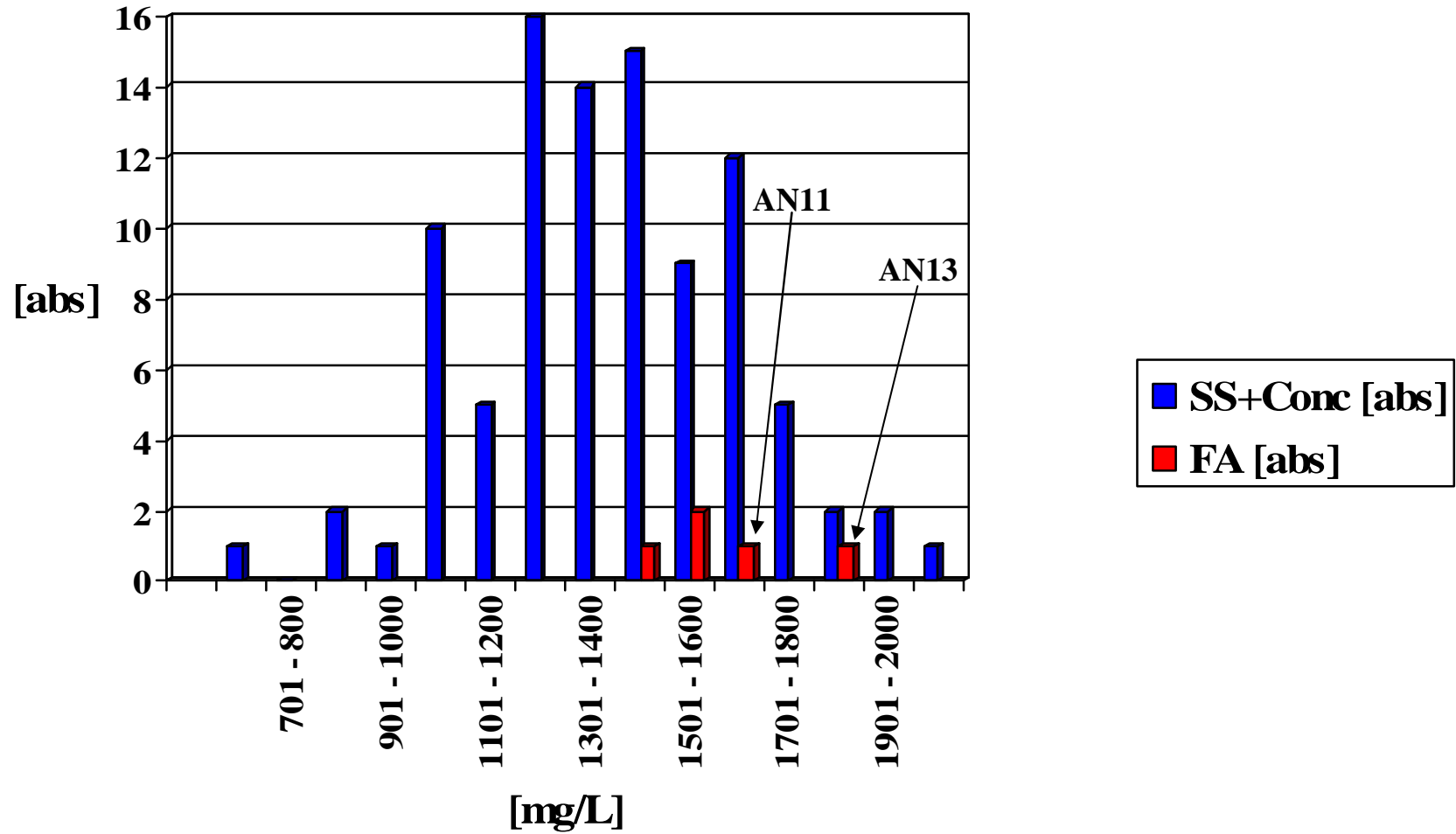
Iron Specials [mg/L]



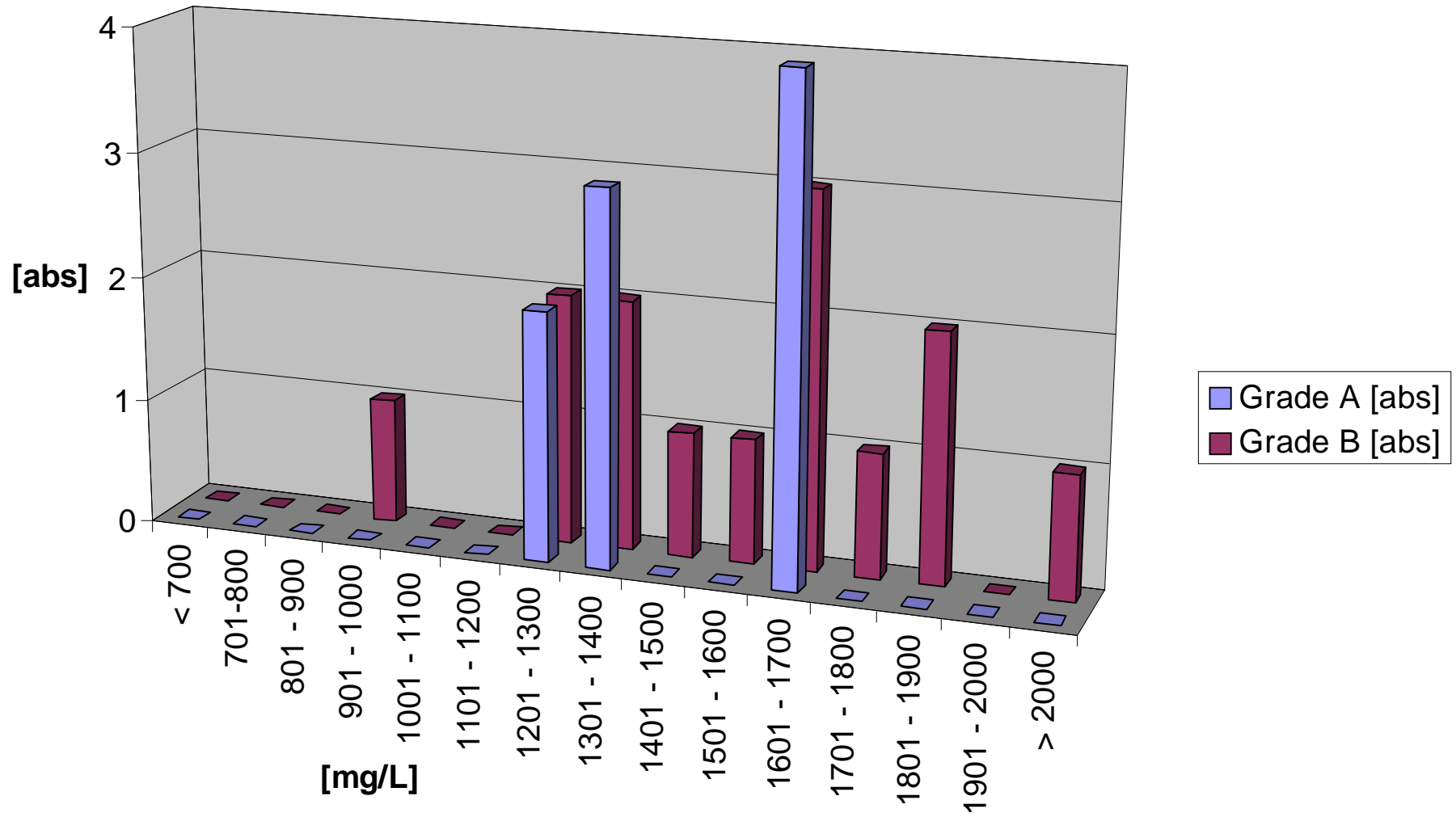
Iron South Africa Grade A and B [mg/L]



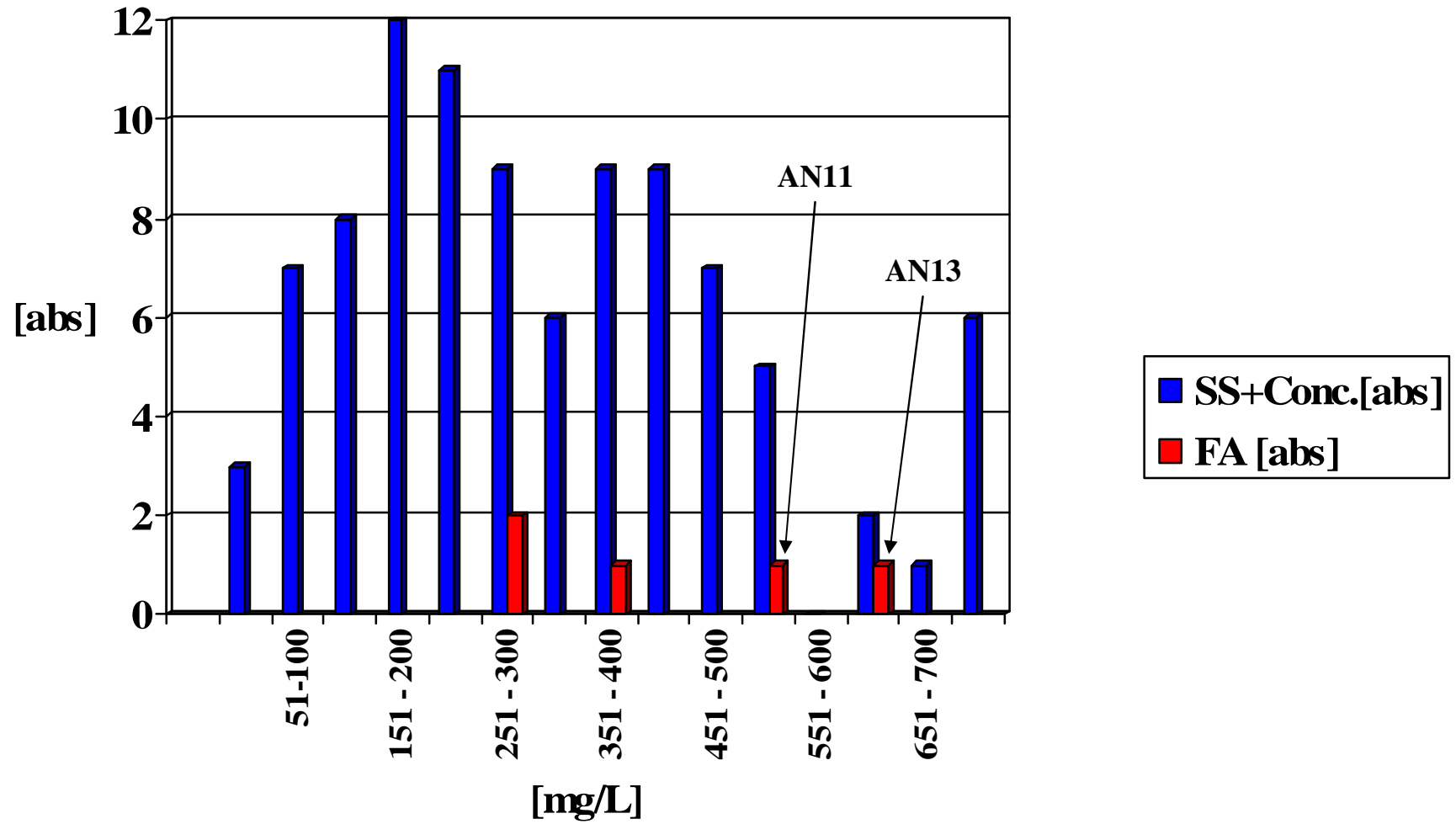
Potassium [mg/L] without Grade B



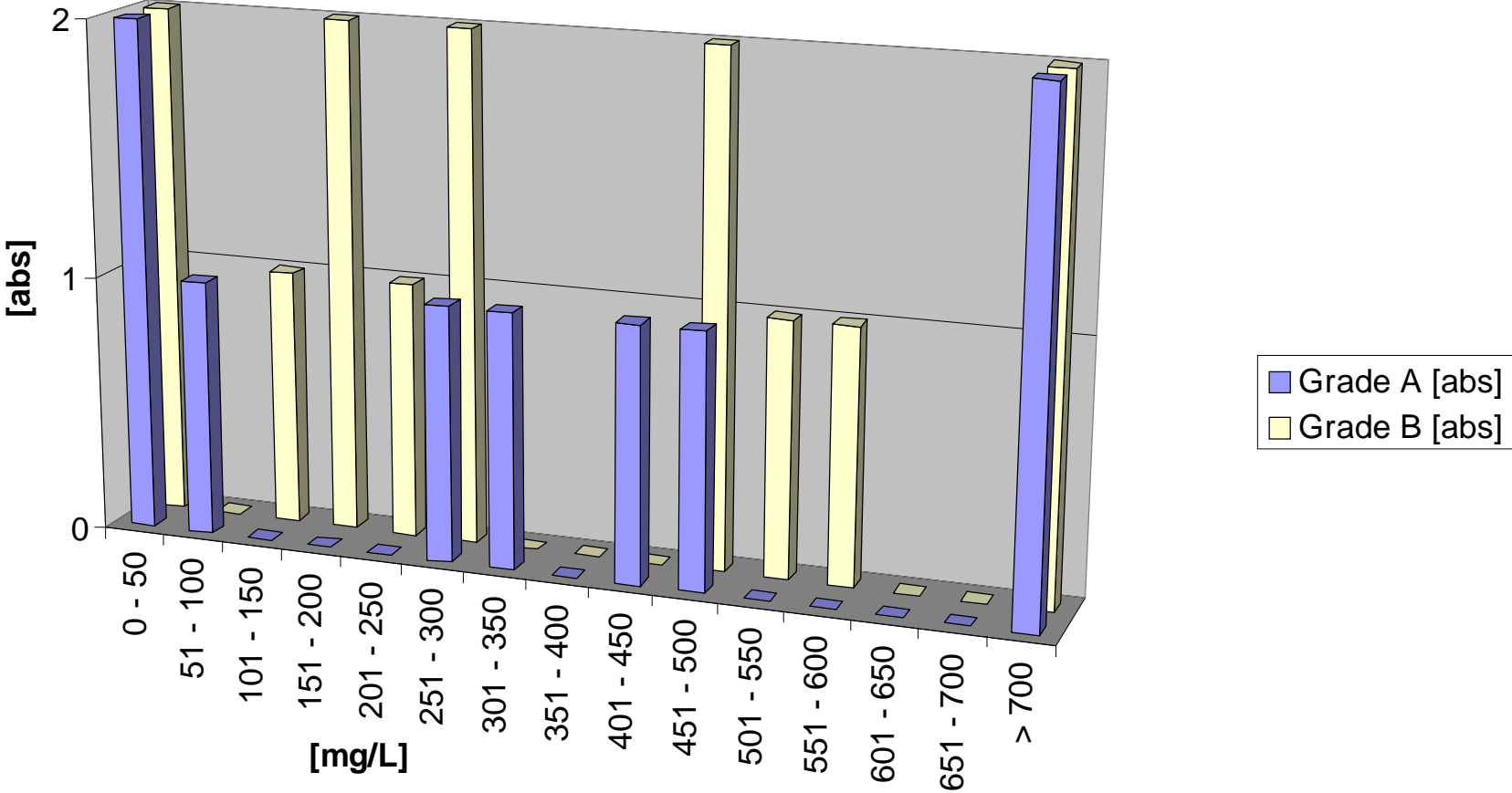
Potassium [mg/L] South Africa



Soluble Polysaccharides [mg/L] without Grade B



Soluble Polysaccharides [mg/L] Grade A and B



Summary of Final Assessment

	<u>AN11</u>	<u>AN12</u>	<u>AN13</u>	<u>AN14</u>	<u>AN15</u>
Iron	elevated	normal	too high	elevated	elevated
Potassium	elevated	normal	elevated	normal	normal
Phosphate	normal	normal	normal	normal	normal
Soluble Polysaccharides	elevated	normal	elevated	normal	normal

Conclusion

suspicious

Grade A

Grade B

Grade A

Grade A