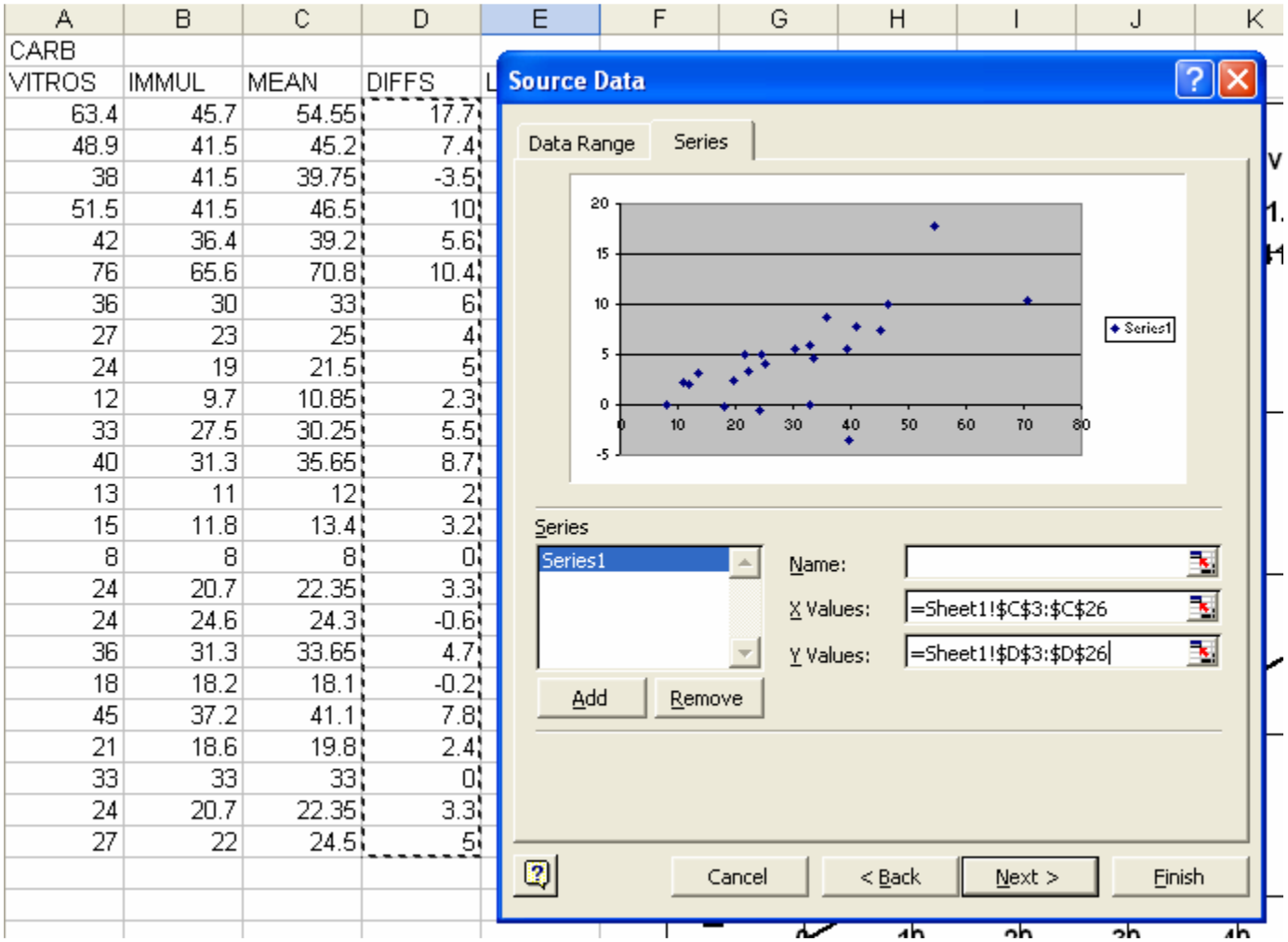
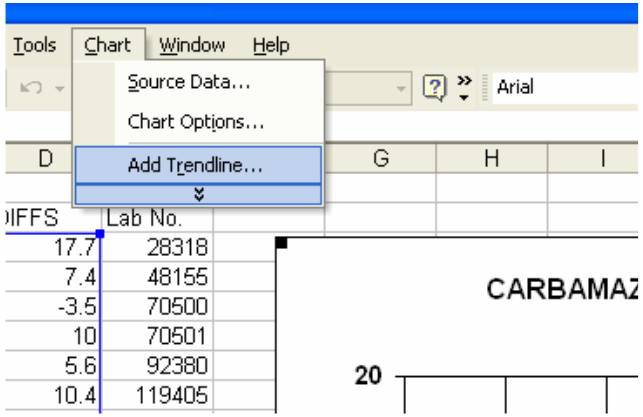
INSTRUCTIONS FOR BLAND AND ALTMAN PLOTS USING EXCEL : Dr Tom Hartley : October 2005.

1.Put your data into Excel and use the formulae functions to calculate the Means and Differences (Cols C and D in my example)
2. Use Excel chart function to construct the Scatter graph :

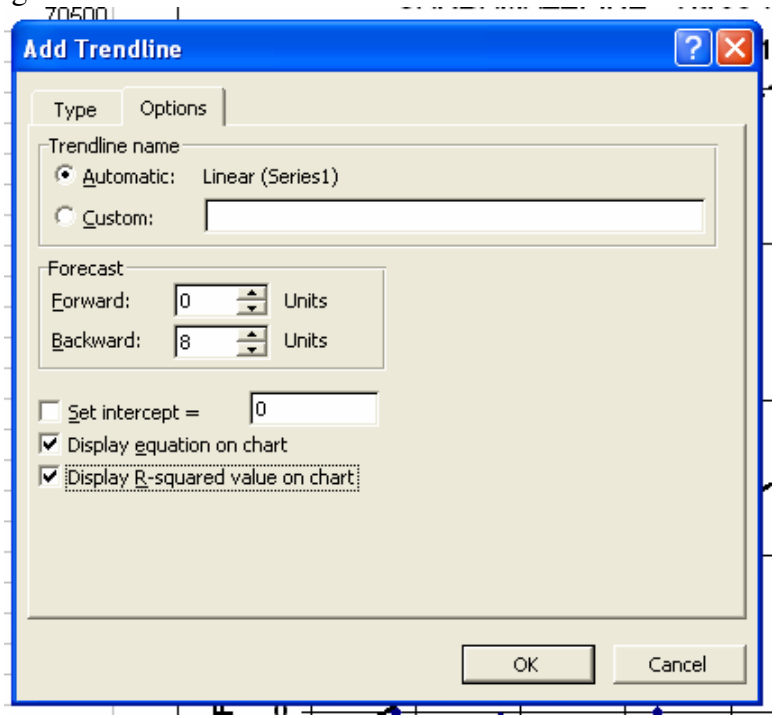


A	B	C	D
CARB			
VITROS	IMMUL	MEAN	DIFFS
63.4	45.7	54.55	17.7
48.9	41.5	45.2	7.4
38	41.5	39.75	-3.5
51.5	41.5	46.5	10
42	36.4	39.2	5.6
76	65.6	70.8	10.4
36	30	33	6
27	23	25	4
24	19	21.5	5
12	9.7	10.85	2.3
33	27.5	30.25	5.5
40	31.3	35.65	8.7
13	11	12	2
15	11.8	13.4	3.2
8	8	8	0
24	20.7	22.35	3.3
24	24.6	24.3	-0.6
36	31.3	33.65	4.7
18	18.2	18.1	-0.2
45	37.2	41.1	7.8
21	18.6	19.8	2.4
33	33	33	0
24	20.7	22.35	3.3
27	22	24.5	5

3. Click on the chart so that you can use the Add Trendline tool located under the Chart Tab:

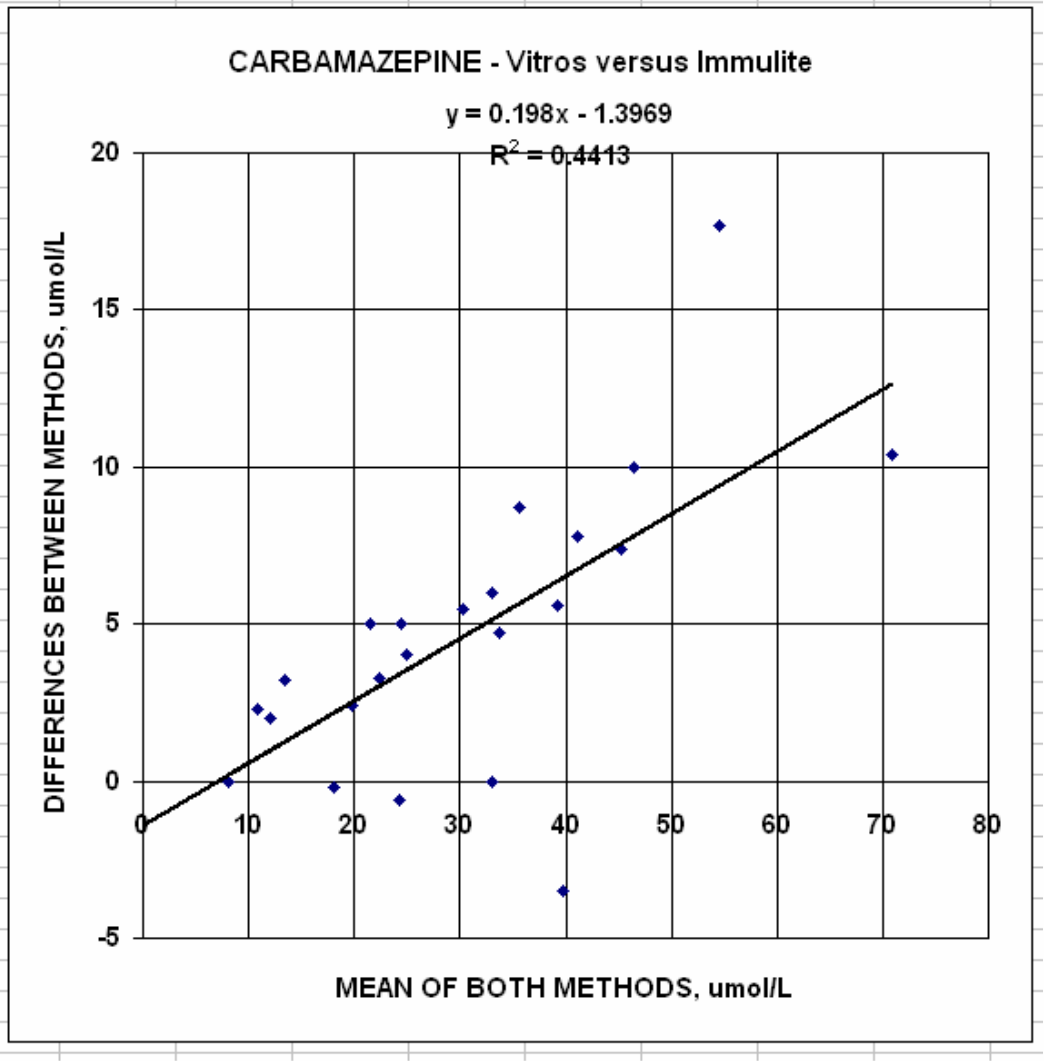


Use the following options when adding the trendline :

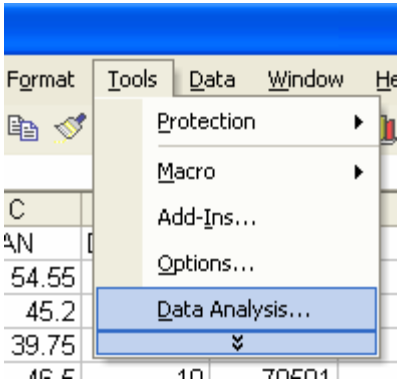


Notice that I have got it to forecast backwards – so that it meets the Y axis.
In these plots it is a good idea to have the X and Y axes to start at zero so you can see clearly what the intercept is – which of course equates to the fixed bias between the two methods.

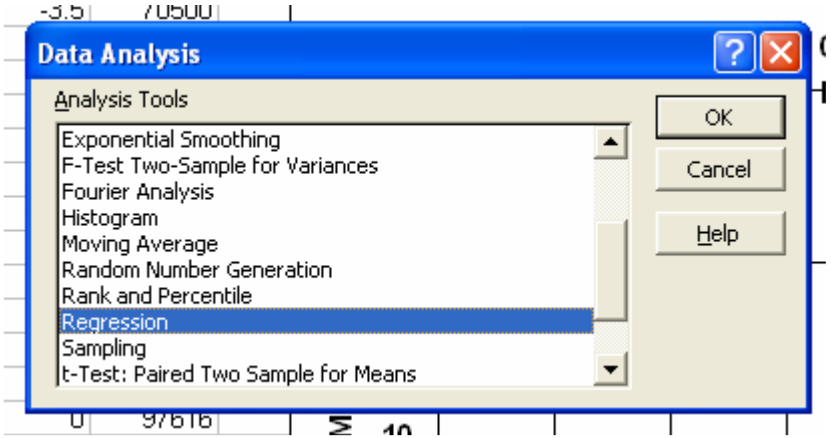
	A	B	C	D	E
2	VITROS	IMMUL	MEAN	DIFFS	Lab No.
3	63.4	45.7	54.55	17.7	28318
4	48.9	41.5	45.2	7.4	48155
5	38	41.5	39.75	-3.5	70500
6	51.5	41.5	46.5	10	70501
7	42	36.4	39.2	5.6	92380
8	76	65.6	70.8	10.4	119405
9	36	30	33	6	120228
10	27	23	25	4	87147
11	24	19	21.5	5	89509
12	12	9.7	10.85	2.3	90054
13	33	27.5	30.25	5.5	91006
14	40	31.3	35.65	8.7	91639
15	13	11	12	2	93784
16	15	11.8	13.4	3.2	96904
17	8	8	8	0	97616
18	24	20.7	22.35	3.3	98194
19	24	24.6	24.3	-0.6	103360
20	36	31.3	33.65	4.7	105587
21	18	18.2	18.1	-0.2	106320
22	45	37.2	41.1	7.8	106734
23	21	18.6	19.8	2.4	108563
24	33	33	33	0	111978
25	24	20.7	22.35	3.3	117985
26	27	22	24.5	5	117987



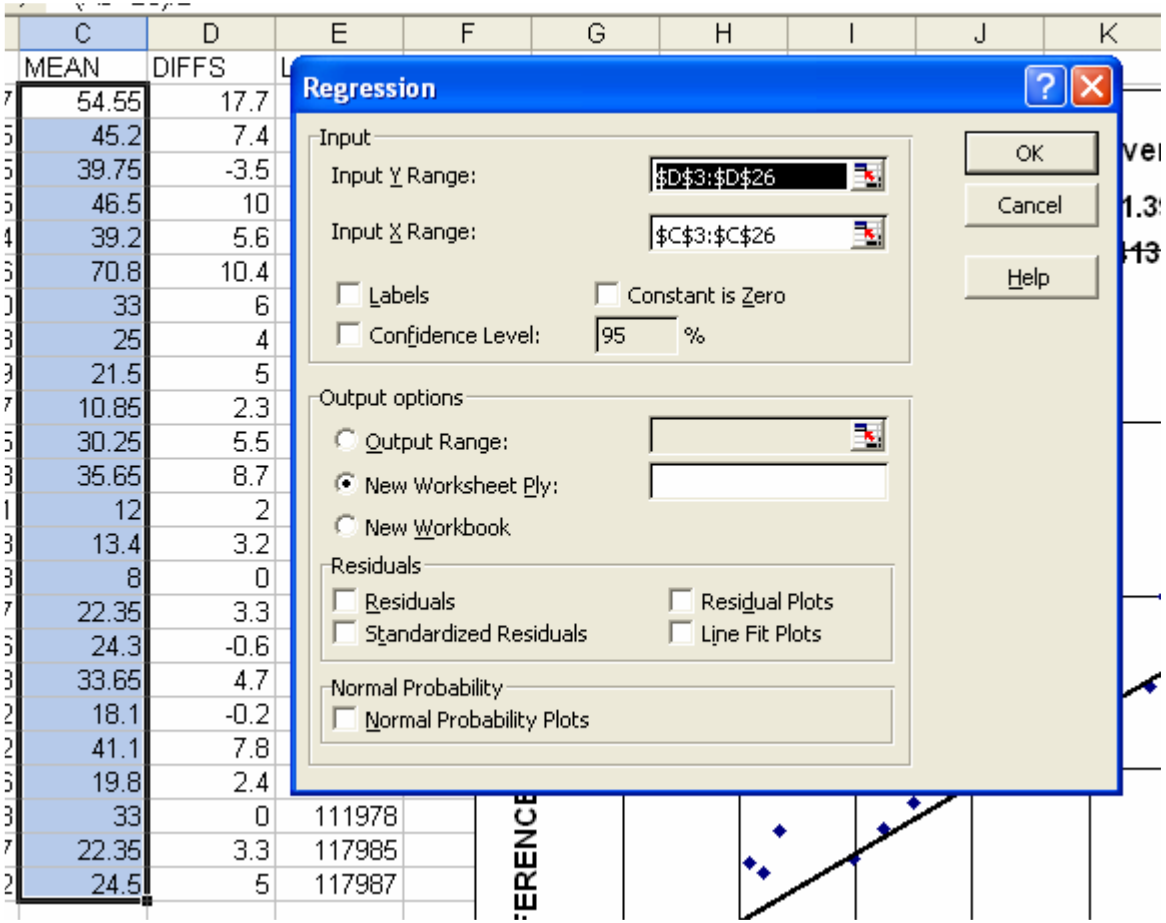
4. We now need to know the p values of the correlation coefficient, the slope and the intercept. To do this there is a Regression Tool under Tools tab in Excel.



Scroll down the list to the Regression option :



Only put in the ranges of the X and Y data :



Clicking OK puts the report onto a new worksheet, stretch out the column widths so that you can read them properly. I have highlighted the items that you need to record in yellow :

R Square – take the square root of this to get the Correlation Coefficient for your plot; in this case 0.6643, report to 4 decimal places.

Regression – Significance F – this is the P value for the Correlation Coefficient. In this example it is 0.0004, report this as <0.01 in other word only report the P values to two decimal places.

Intercept – Coefficient – this is the value of the intercept, report it to 4 significant figures; in this case -1.397
Intercept – P-Value – this is the P value for the intercept, report it to two decimal places; in this case 0.39 which is not significant
X Variable 1 – Coefficient – this is the slope of the line, report it to 4 significant figures; in this case 0.1960
X Variable 1 – P-value – this is the P value for the slope, report it to two decimal places; in this case <0.01 which is significant.

	A	B	C	D	E	F	G	H	I
1	SUMMARY OUTPUT								
2									
3	*Regression Statistics*								
4	Multiple R	0.664274896							
5	R Square	0.441261138							
6	Adjusted R Square	0.415863917							
7	Standard Error	3.395610258							
8	Observations	24							
9									
10	ANOVA								
11		*df*	*SS*	*MS*	*F*	*Significance F*			
12	Regression	1	200.3296147	200.3296147	17.37438664	0.000400043			
13	Residual	22	253.6637186	11.53016903					
14	Total	23	453.9933333						
15									
16		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
17	Intercept	-1.396891609	1.593362398	-0.876694223	0.390125642	-4.70132652	1.907543302	-4.70132652	1.907543302
18	X Variable 1	0.198020693	0.047506806	4.168259426	0.000400043	0.099497501	0.296543885	0.099497501	0.296543885
19									
20									

6. Put this all together into your Figure for your report :

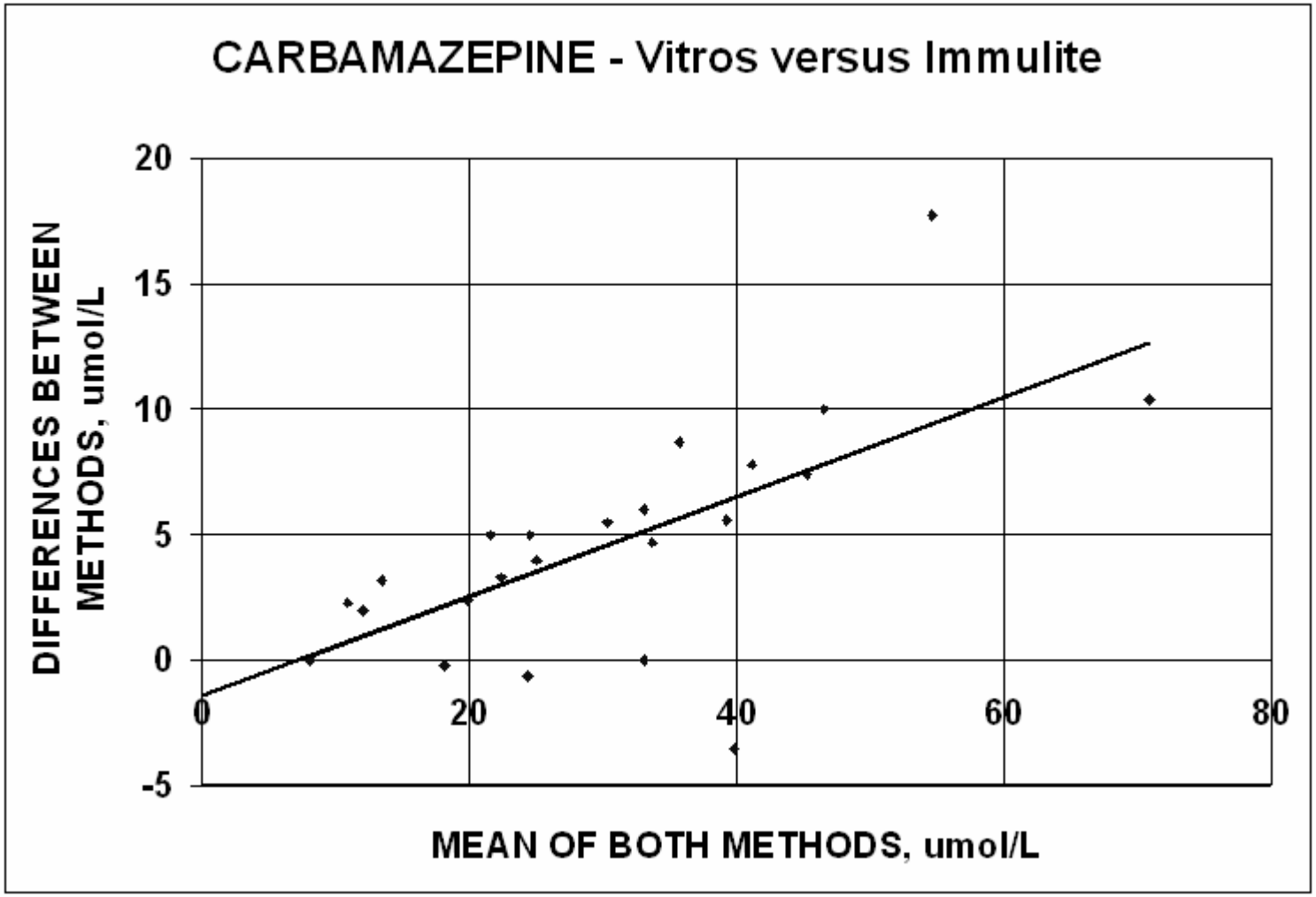


FIGURE 1 : Bland and Altman Plot of the data obtained from 24 paired samples analyzed on the Vitros 250 Analyzer and the Immulite 1000 Analyzer. Correlation R = 0.6643 (P<0.01). Slope = 0.1960 (P<0.01). Intercept = -1.397 (P=0.39)