2012 - Report about effects of Kaqun water on the speed of cognitive functions

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Summary

Our research project „The effects of Kaqun water on the speed of cognitive functions" was conducted on randomly selected healthy elderly individuals who fit the age group. The average age of the groups was around 65 years. We made 4 groups, 1.5l; 1l; 0.5l daily consumption of Kaqun water as well as the control group whose members drank 1l tap water. During the measurements the people who made the measurements and who assessed the results did not know who was in which group, it was only made known to them after the data have been processed (double blind). The connection between the dose and the therapeutic effect has also been examined.

We examined: plethysmogram, the spread of the pulse relaxed and under load with tools of HRV analysis; blood pressure (systolic and diastolic), oxygen saturation, SRT (reaction time) and CRT (cognitive reflex time).

The results of the measurements and the significance of the changes were assessed by RopStat software.

We have gotten significant results for blood pressure lowering effect (systolic, diastolic).

By examining the spread of the pulse we managed to determine the stress index. In the 1.5l and 1l daily groups significance could be shown in some intervals.

In case of the decreasing of the reflex time, we have gotten significant results in all three groups.

In case of the cognitive time we have gotten significant results in all three groups.

The oxygen saturation has only increased significantly in the 1,5l group.

The data of the control group have shown similar results to the consumption of Kaqun water in the base data-first week interval in several cases, but this effect is not lasting. The cause of this might lie in the psychic area, but more likely that by ceasing the lack of fluids, the circulating blood volume is diluted that's why improvements are shown.

This improved effect is not as lasting as the effect caused by consumption of Kaqun water.

By examining the dose and effect duration it can be seen that in case of the 1-1.5l/day the maximal effects are shown in the 3rd-4th week, there is constant improvement, while in case of 0.5l/day consumption the best results are in the 2nd week, after that the results deteriorate. This signifies that basically 1-1.5l/day dose is appropriate.

We can see from this examination that Kaqun water improves the haemodynamics, it speeds up the reflex and thought processess, increases the body's oxygen content in case of elderly people.

Introduction

The theory of Kaqun water

Kaqun water is specially produced water for consumption and bathing (functional water), whose physical properties, ph, oxygen level are different from normal drinking water (OTH permit 420-2/2007, OKI expert opinion: 6212/2011). Kaqun water is a fluid, which contains 16 mg oxygen per litre, pH value is between 7.5 and 8.5 (slightly alkaline), it has lower osmotic pressure than cytoplasm, whose effect mechanism is:

- modified absorption and utilization conditions
- high dissolved oxygen content
- burst-like pro-oxidant effect, which speeds up cell regeneration, boosts the immune system, causes vasodilation and potentiates the body's antioxidant enzyme system
- alkaline effect, which decreases acidic deposition, and through this tissue edema

We associate the deceleration of memory, neural and cognitive functions with old age. We assume this is due to the accumulation of pro-oxidant radicals, metabolites accumulating in the body and the decrease of neural and mental activity.

The decline of neural and mental functions is one of the early signs of aging, which can be objectively determined by measurements.

Aim:

1. To justify or reject the hypothesis that the consumption of Kaqun water influences:
    a. basic mental functions
    b. impact on the operation of the autonomic nervous system
    c. influences blood pressure
    d. effects vasodilation
2. To examine whether these effects depend on the dosage
3. To examine the rate of development in time and durability of the effects

Materials and methods

The examination was led by András Huszár dr. PhD, implemented in practice by Iván Szalkai dr., with the involvement of the workers of Kaqun Ltd. A total of 60 people took part. They formed 4 groups with 15 people each. The groups were:

1. Consumption of 0.5l Kaqun water daily
2. Consumption of 1l Kaqun water daily
3. Consumption of 1.5l Kaqun water daily
4. Control group; consumption of 1l water daily

Table 1. Group characteristics

	composition			age	
	male	female	total	average	standard deviation
1.	5	8	13	65,69 years	4,73
2.	3	12	15	63,73 years	6,56
3.	3	8	11	68,36 years	6,12
4.	2	7	9	66.44 years	7,9
total / average	13	35	48	65,93 years	6,33

The dropout during the examination was not due to side effects. One volunteer complained about headache, but relationship with the water consumption could not be proven.

The study was a **placebo controlled, randomized, double blind trial.**

The materials: Kaqun water, placebo; tap water in Kaqun glass.

The study included volunteers of both sexes between 50 and 75 years of age, who did not consume Kaqun water nor bathed in Kaqun water for 2 months prior to the examination. Health status was appropriate for their age. The sorting of the people was done in order of arrival, no other factor determined it (0.5 – 1 – 1.5), random method. Members of the control group were chosen from visitors from another town, they did not meet with the real group.

When selecting the sample, the following criteria had to be fulfilled by the volunteers.

Self-sufficient, or still active worker in the given age group, lives an active social life, has average health status, (non-hospital treatment) elderly for this study.

The examination consisted of the following tests:

1. Serial reflex time (SRT) – testing the dominant hand 35 times. We analyzed the average P200 time, filtering out the 3 highest values we deem as a learning phase. We also examine the wave of the P200 time. Normal value is 200msec.
2. Cognitive reflex time (CRT) – recognizing different sounds, signaling with the push of a button, making it more difficult with counting backwards, pushing the button and simultaneously saying the number. Length of the test is 35 times. Normal value is 300 msec. In the examination we did not include the 3 highest values and values

under 200msec. We deemed the highest value a learning value, which falsely stretches the results and the values under 200msec are not the results of a cognitive process.

3. HVR measurement, standard deviation, standard deviation % in normal condition and after 10 squats (30 watt load). We recorded base data and the differences. The standard deviation data represents the stimuli of the sympathetic and parasympathetic nervous system, so can ve used as stress index. We determine the minimal and average value of vasodilation, which shows the flexibility of the capillaries.

4. Measuring oxygen saturation

5. Blood pressure and heart rate were recorded. The heart rate was measured in a relaxed state and after load in an every 10 second cycle, the fit index, ie. the time when the heart rate reached the relaxed heart rate after load.

Instruments for measuring:

Oxygen saturation: Innomed joint-stock company Oxycard device, which records the oxygen saturation of the peripheral blood and the average heart rate.

Other tests: Kellényi's tremometer, which records the time between a signal and the response, also a software can dynamically record the measures valued after statistical analysis.

Statistical analysis: FFT analysis, linear correlation- and regression analysis, standard error analysis, normality test, dependent variables (equality of averages test, stochastic homogeneity test), and to assess the significance level of the changes.

The duration of the test was **½** year.

Groups were formed from the subjects, and the average (median) values of the groups were analyzed.

Patient monitoring and impact assessment

5 measurements were performed on the selected subjects, at the beginning, then on the 7th, 14th, 21st, and 28th day. The fluid supply those days was dine with calculated quantities (3, 5, 7 bottles of water). The data we measured are kept both in electronic form and in a paper dossier, group composition was recorded separately. People who made the measurements were not did not know the group composition.

Among the paper documents are stored the certificate for voluntary participation in the study, general information document, examination sheet and certified receipt of the water.

Test results

1. **Evaluation of systolic blood pressure**

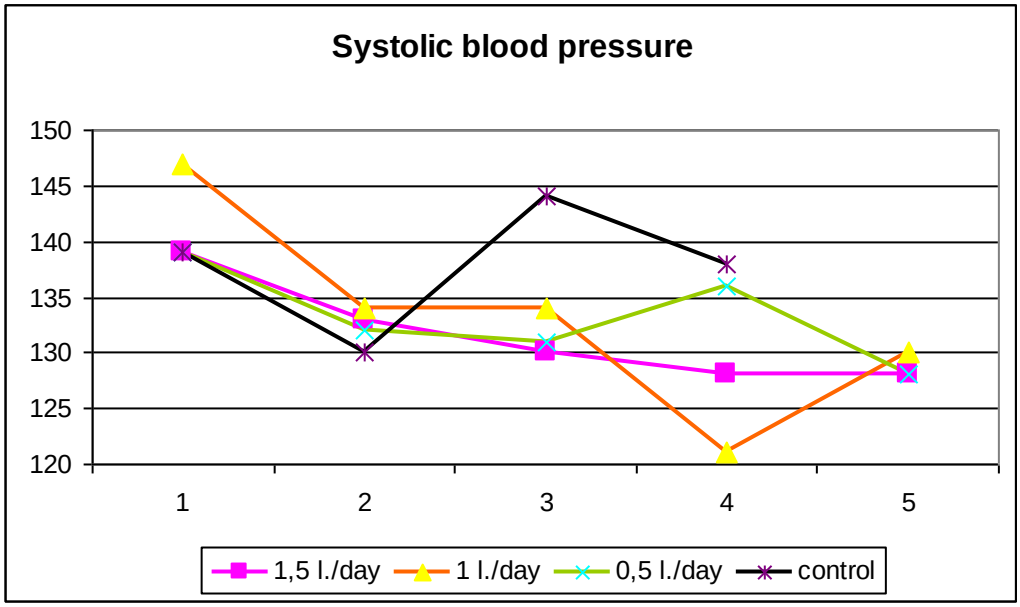
   The blood pressure was measured before everything else, after at least 10 minutes rest. The results are as follows (comparison of median values):

Table 2. Comparative data

change of systolic blood pressure median value						rate of decrease
weeks	base	1	2	3	4	
1,5 l./day	139	133	130	128	128	11
1 l./day	147	134	134	121	130	(26), 17
0,5 l./day	139	132	131	136	128	11
control	139	130	144	138		(9), 1

The biggest rate in the decrease of the systolic blood pressure occurred in the 1l group, in the control group it was minimal.

Graph 1. Systolic blood pressure



The analysis clearly shows that a significant reduction of the blood pressure can be achieved in all 3 groups, while the control group only moves with the test groups in the first week, later it goes back to the base value (psychic effect, filling of water bodies).

1,5l/day group analysis:

Table 3. 1.5l/day group data

group	average	median	standard deviation	relative deviation	normality (norm=1)
base	142	139	18,52566	0,13	0,9891
1. week	131,45	133	11,55304	0,0879	0,9778
2. week	129,45	130	10,99421	0,0849	0,9785
3. week	124	128	13,29662	0,107	0,7428
4. week	130,64	128	16,98984	0,13	0,8006

When testing the **dependent variables** the equality of averages were tested (analysis of variance, robust analysis of variance with degrees of freedom correction, Geisser-Greenhouse analysis, Huynh-Feldt analysis), significance level $p<0.001$

Stochastic homogeneity test (Friedman test, analysis of variance by ranking numbers, robust analysis of variance with degrees of freedom correction, Geissel-Greenhouse analysis, Huynh-Feldt analysis), significance level $p<0.005$

Table 4. Significance level of linear correlation

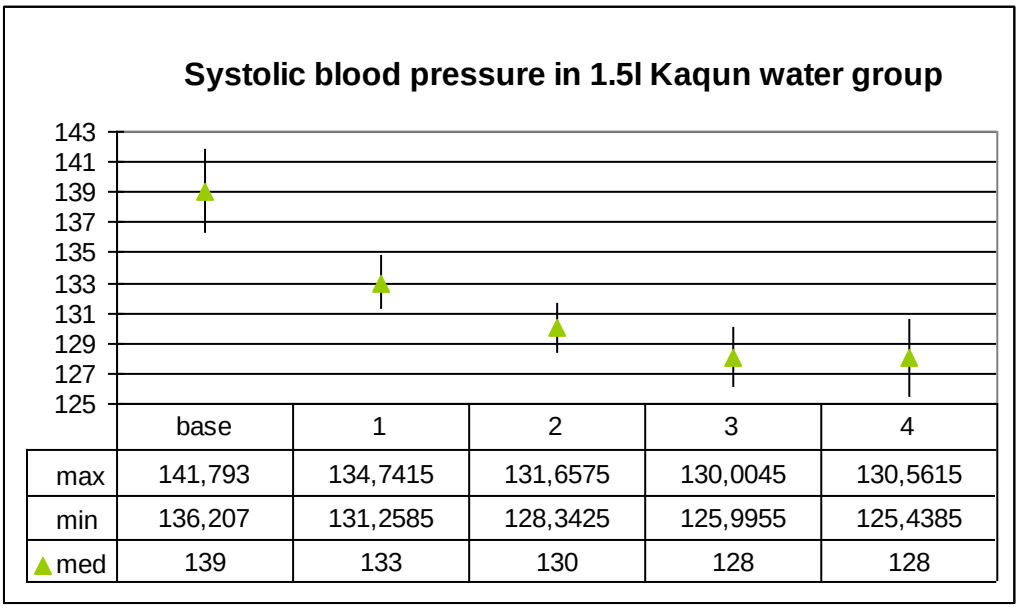
Pearson's correlation coefficient

	1	2	3	4
base	p=0,2159	p=0,2624	p=0,1550	p=0,0292
1		p=0,0385	p=0,0054	p=0,0044
2			p=0,2504	p=0,0046
3				p=0,0471
4				

(white: not significant, yellow: $p<0.05$, green: $p<0.01$, blue: $p<0.001$)

The systolic blood pressure started significantly decreasing at the end of the second week, and kept that until the end of the study.

Graph 2. 1.5l group standard error changes



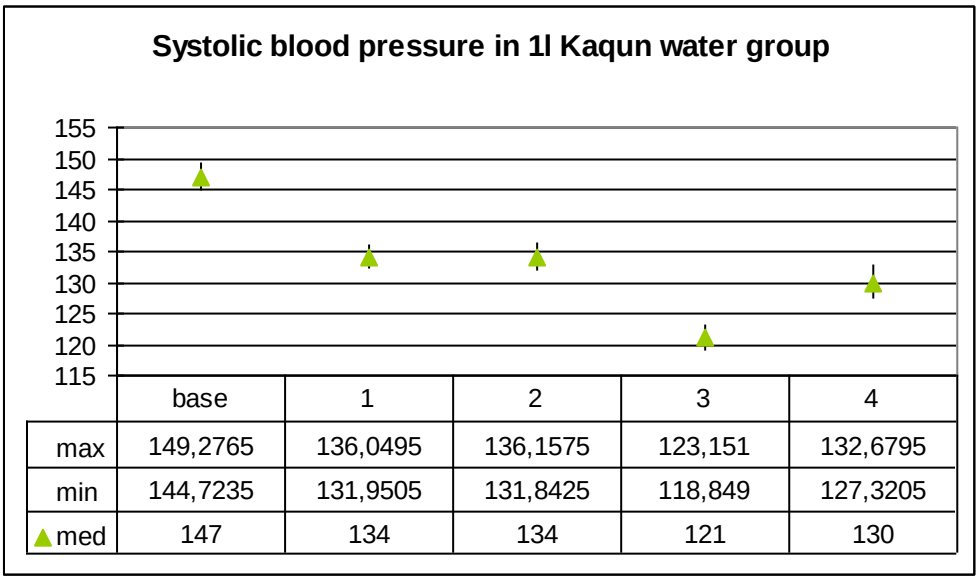
	base	1	2	3	4
max	141,793	134,7415	131,6575	130,0045	130,5615
min	136,207	131,2585	128,3425	125,9955	125,4385
▲med	139	133	130	128	128

From the second week onwards, the measured values fall outside the margin of the standard error; this indicates that there is an effect behind it, and not measurement fluctuation.

Evaluation: the dependent variables and the stochastic test proved that the grouping was correct. The linearity test examines the difference between each phase, so it determines the therapeutic period. From this we can see that the biggest change occurs related to the second week of the treatment, when the third and fourth week values are in strong significance. At the fourth week there is significant change in every comparison.

1l/day group analysis

Graph 3. 1l/group standard error analysis



	base	1	2	3	4
max	149,2765	136,0495	136,1575	123,151	132,6795
min	144,7235	131,9505	131,8425	118,849	127,3205
▲med	147	134	134	121	130

The change in the values is outside of the boundary of the standard error at the first week already. The decrease continues until the third week, when the blood pressure rises, but does not reaches the base value.

Table 5. 1 l/day data

group	average	median	standard deviation	relative deviation	normality (norm=1)
base	140,4	147	17,63438	0,126	0,721
1. week	136,8667	134	15,87391	0,116	0,9505
2. week	136,2	134	16,7127	0,123	0,9982
3. week	126,8	121	16,66133	0,131	0,6611
4. week	132,4667	130	20,75664	0,157	0,7439

The average decrease in the systolic blood pressure is 8 mmHg (best value 14 mmHg), median 17 mmHg (best value 26mmHg). At the last measurement, the blood pressure increased. The base value, third and fourth week values were not of normal distribution.

When testing the **dependent variables** the equality of averages were tested (analysis of variance $p<0.001$, robust analysis of variance with degrees of freedom correction, Geisser-Greenhouse analysis, Huynh-Feldt analysis), significance level $p<0.005$

Stochastic homogeneity test (Friedman test, analysis of variance by ranking numbers, robust analysis of variance with degrees of freedom correction, Geissel-Greenhouse analysis, Huynh-Feldt analysis), significance level $p<0.005$

Table 6. Significance level of linear correlation

Pearson's correlation coefficient

	1	2	3	4
base	p=0,0178	p=0,0009	p=0,0035	p=0,1185
1		p=0,0005	p=0,0051	p=0,0000
2			p=0,0008	p=0,0025
3				p=0,0139
4				

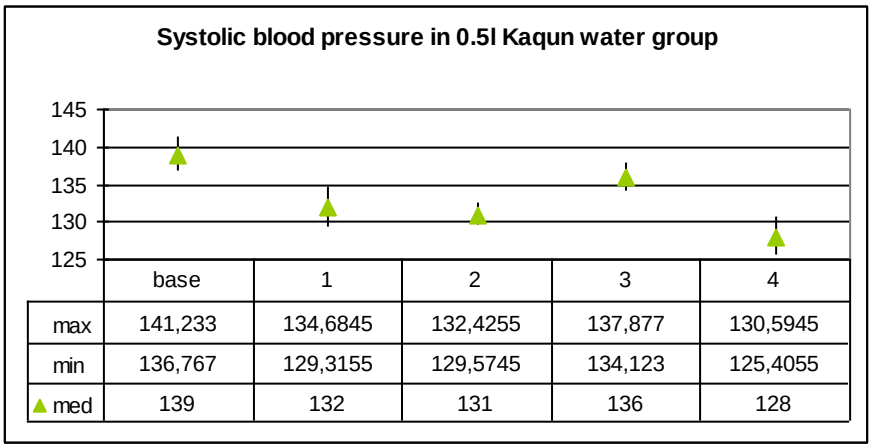
(white: not significant, yellow $p<0,05$, green: $p<0,01$, blue: $p<0,001$)

Evaluation: While the dataset is different from normal, the dependent variables and the stochastic test proved that the grouping was correct. The linearity test examines the

difference between each phase, so it determines the therapeutic period. From this we can see that the change from the second week (blue) indicates very high significance. When compared to the base value, the difference is significant except for the last week and this stands related to all previous values as well (we evaluate increase in the fourth week).

0.5l/day group analysis

Graph 4. 0.5l group standard error analysis



The change in the values is outside the boundary of the standard error from the first week already. The standard deviation is biggest in the first and fourth weeks, which signifies a slower and less lasting process of the decrease of the blood pressure.

Table 7. 0.5 l/day data

group	average	median	standard deviation	relative deviation	normality (p)
base	139	139	16,1	0,116	1
1. week	133,6923	132	19,36	0,145	0,9902
2. week	132	131	10,28	0,0779	0,7223
3. week	133,9231	136	13,54	0,101	0,4314
4. week	129,7692	128	18,71	0,144	0,646

The average decrease in the systolic blood pressure in the 0.5l group was 10 mmHg, 11mmHg in median. The biggest standard deviation is after the first week (different reactions), the deterioration in the normailty test can be seen at the third week measurement, where by on patient we measured a 28 mmHg decrease in the blood pressure. Due to this data only 3 patients were in the below average group.

The examination of the **dependent variables** and the **stochastic homogeneity** didn't show any significance even by 20% trim level.

Table 8. Significance level of linear correlation

Pearson's linear correlation coefficient

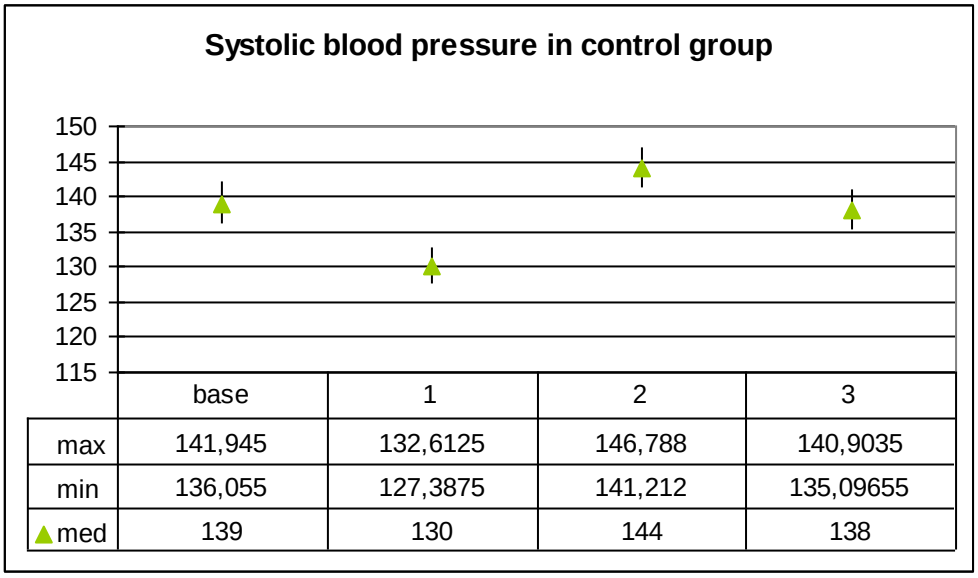
	1	2	3	4
base	p=0,0096	p=0,0330	p=0,0310	p=0,0096
1		p=0,0571	p=0,0006	p=0,0240
2			p=0,0235	p=0,0020
3				p=0,0223
4				

(white: not significant, yellow p<0,05, green: p<0,01, blue: p<0,001)

Examination of the linear correlation shows a significant change, and the significance is particularly high when comparing it to the base value.

Control examination

Graph 5. Control group systolic blood pressure standard error analysis



Significant decrease in the blood pressure can be observed, which exceeds the base value in the second week then sets back to it in the third week. The first decrease is likely due to the filling of the water bodies and the body compensates this effect and the blood pressure increases again.

Summary:

The Kaqun water significantly reduces the systolic blood pressure. For the 1.5l/day group this continuously applied during the consumption, in the 1l/day group this effect was not so lasting, a slight increase can be observed in the last week, then the decrease continues. In the 0.5l group this jump can be observed in the third week, then the decrease continues. It can be concluded that the effect is proportional to the quantity consumed.

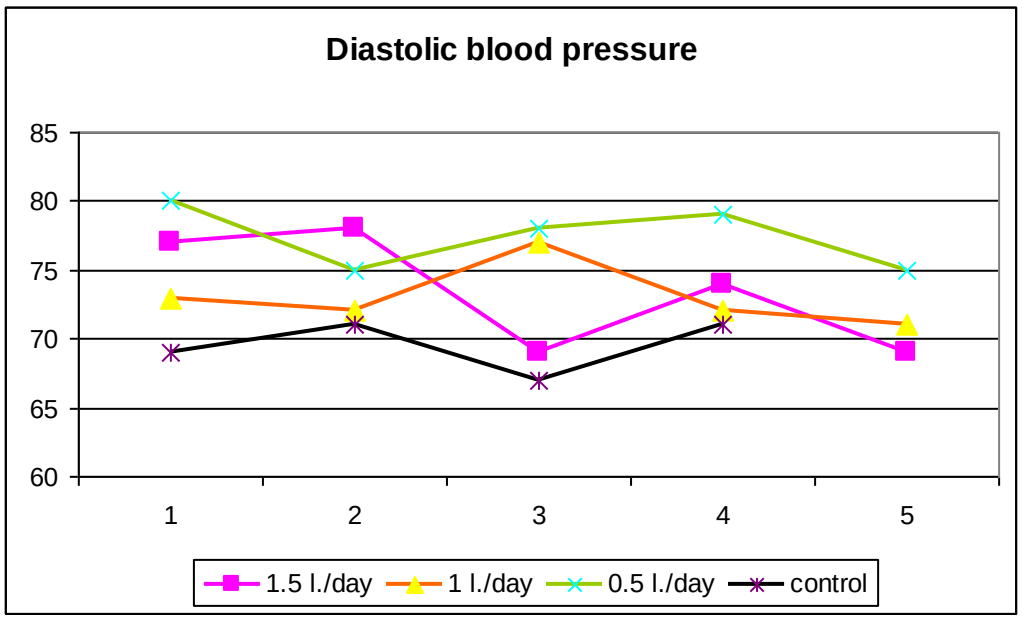
Evaluation of diastolic blood pressure

The blood pressure was measured before everything else, after at least 10 minutes rest. The results are as follows (comparison of median values):

Table 9. Diastolic values

change of diastolic blood pressure median					
weeks	**Base**	**1**	**2**	**3**	**4**
1.5 l./day	77	78	69	74	69
1 l./day	73	72	77	72	71
0.5 l./day	80	75	78	79	75
control	69	71	67	71	

Graph 6. Change of diastolic values



When measuring the diastolic values, the decreasing tendency of the blood pressure could be detected, though in an undulating manner.

1.5l group analysis

Table 10. Effect of 1.5l on diastolic blood pressure

group	average	decrease b-x	median	decrease b-x	standard deviation	relative deviation	normality (p)
base	78,90909		77		10,22	0,13	0,9901
1. week	75,81818	3,09091	78	1	9,806	0,129	0,9895
2. week	71,09091	7,81818	69	8	9,104	0,128	0,9483
3. week	76,18182	2,72089	74	3	6,539	0,0858	0,8846
4. week	72	6,90909	69	8	10,22	0,142	0,8878

Checking the median, the diastolic pressure does not change after the first week; it reaches the lowest value by the second week.

The analysis of the **dependent variables**, did not show any significance, in case of the **stochastic homogeneity test** the significance is only projected.

Table 11. significance level of linear correlation

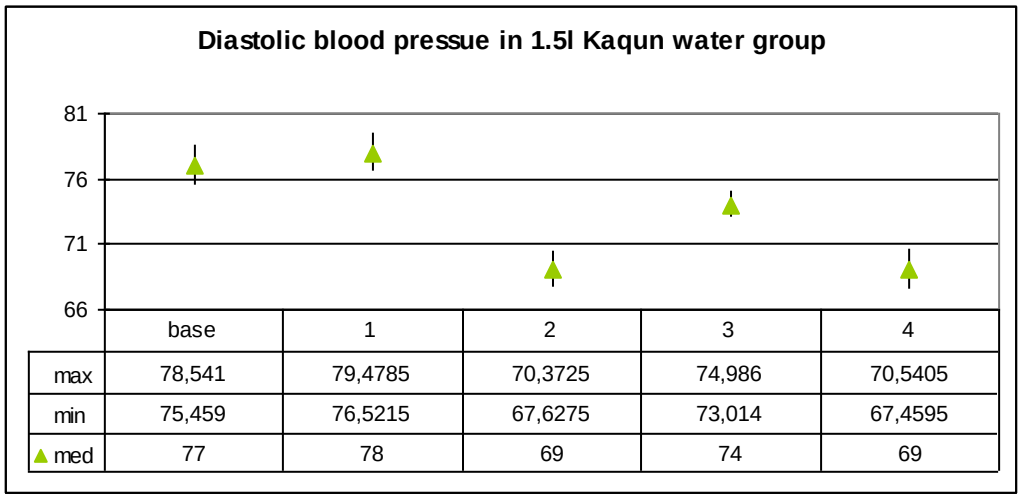
Pearson's linear correlation coefficient

	1	2	3	4
bázis	p=0,4836	p=0,8258	p=0,9102	p=0,3262
1		p=0,0986	p=0,7411	p=0,1351
2			p=0,0347	p=0,0418
3				p=0,0348
4				

(white: not significant, yellow p<0,05, green: p<0,01, blue: p<0,001)

Analysis of the linear correlation shows only the increase in the third week was significant and the decrease in the fourth week compared to the second and third week.

Graph 7. 1.5l/day standard error analysis



	base	1	2	3	4
max	78,541	79,4785	70,3725	74,986	70,5405
min	75,459	76,5215	67,6275	73,014	67,4595
▲ med	77	78	69	74	69

Analysis of the average values shows that the third measurement is outside the margin of the base value's standard error, the decrease is continuous. The big standard deviation of the base value is caused by a 100mmHG value we measured in one volunteer. At the end of the test period we measured 74 mmHg by this volunteer.

1l/day group analysis

Table 12. 1 l/day effect analysis

group	average	median	standard deviation	relative deviation	normality (p)
base	73	73	5,278	0,0723	74,2
1. week	74,6	72	9,934	0,33	
2. week	77,26667	77	11,88	0,154	
3. week	71,46667	72	9,87	0,138	
4. week	74,2	71	12,64	0,17	

When analyzing the **dependent variables** and the **stochastic homogeneity test** no significance could be found.

Table 13. Significance level of linear correlation

Pearson's linear correlation coefficient

	1	2	3	4
base	p=0,6214	p=0,5564	p=0,7856	p=0,3763
1		p=0,0014	p=0,0000	p=0,0006
2			p=0,0088	p=0,0080
3				p=0,0085
4				

The linear correlation analysis shows that the change compared to the base values is not significant; the internal significance however is expressed (increase, decrease respectively).

0.5l/day group analysis

Table 14. 0.5l/day effect analysis

group	average	median	standard deviation	relative deviation	normality (p)
base	78,53846	80	7,795462	0,0993	0,7375
1. week	77,53846	75	11,11767	0,143	0,8447
2. week	77,76923	78	6,326582	0,0814	0,9505
3. week	79,15385	79	8,706761	0,11	0,9752
4. week	76,15385	75	7,776526	0,102	0,9891

When analyzing the **dependent variables** and the **stochastic homogeneity test** no significance could be found.

Table 15. Significance level of linear correlation

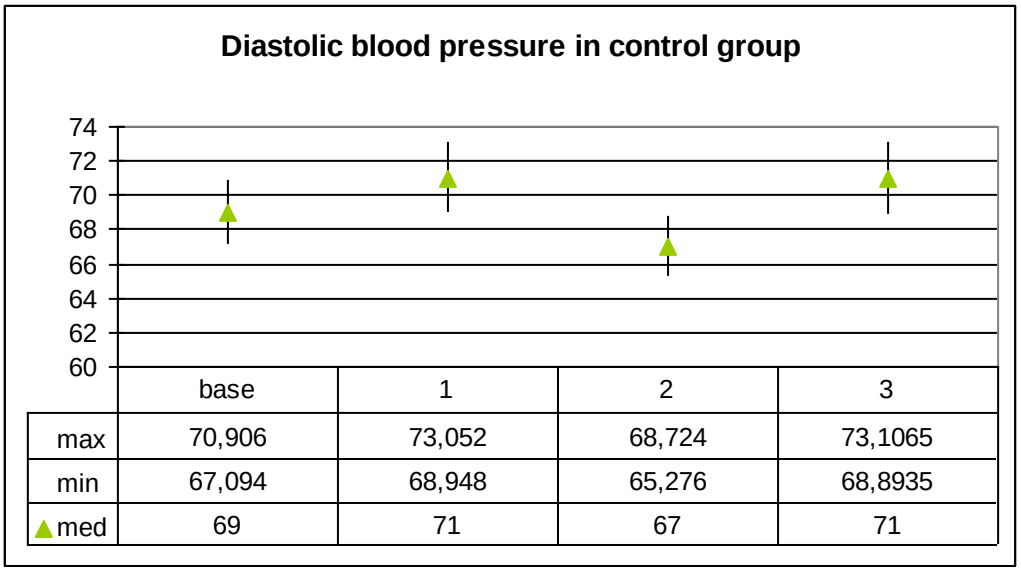
Pearson's linear correlation coefficient

	1	2	3	4
base	p=0,0069	p=0,1530	p=0,1888	p=0,3390
1		p=0,0550	p=0,0034	p=0,2198
2			p=0,1633	p=0,0562
3				p=0,4207
4				

The linear correlation analysis shows that the change compared to the base values is not significant.

Control group analysis

Graph 8. Control group diastolic values



The consumption of control water did not have a significant effect on the diastolic blood pressure values, the moves were within the margin of the standard error.

Overall only the consumption of 1.5l/day had a significant effect on the diastolic blood pressure.

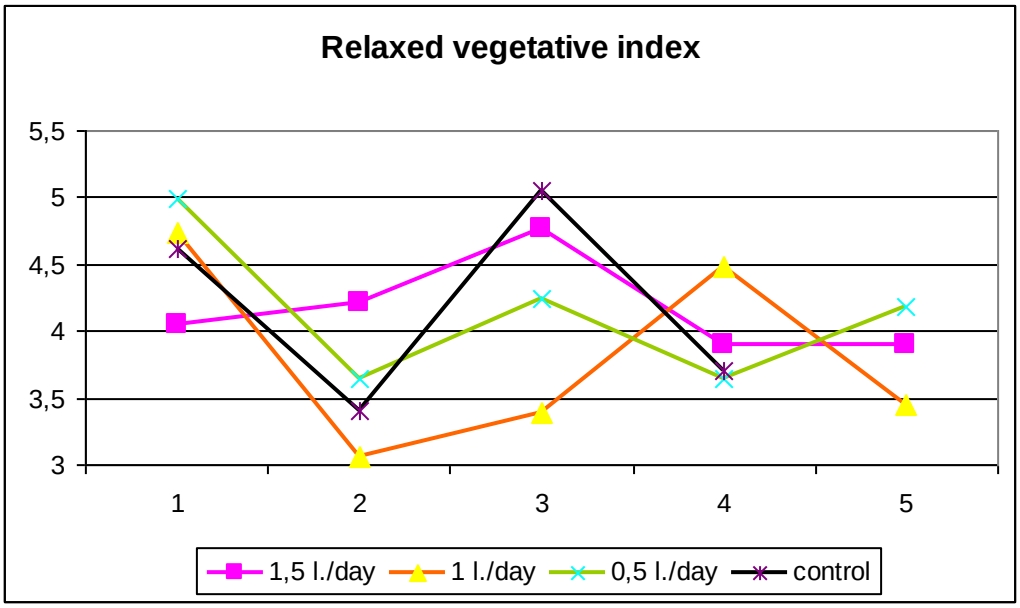
Relaxed vegetative index test

The vegetative index is the quotient of the average R-R distance divided by the standard deviation. The heart frequency is controlled by the autonomic nervous system, an immediate reaction can be seen to the body's physical and psychological effects. The hypothesis of the study is that the consumption of Kaqun water improves the body's cope with stress to physical impacts. Heart frequency is an immediate indicator of the body's physical and psychological effects. It indicates an external effect, that in the second week in every group (control included) increase was observed.

Table 16. Change in the relaxed vegetative index

Change of vegetative index median						start – end difference (max-min difference)
weeks	base	1	2	3	4	
1,5 l./day	4,05	4,22	4,76	3,9	3,9	-0,15 (-0,86)
1 l./day	4,74	3,06	3,39	4,48	3,45	-1,29 (-1,68)
0,5 l./day	4,99	3,65	4,25	3,65	4,18	-0,81 (-1,34)
control	4,62	3,4	5,05	3,71		-0,81 (+1,65)

Graph 9. Change of relaxed vegetative index



1.5l group analysis:

Table 17. 1.5l/day group change of vegetative index

group	average	median	standard deviation	relative deviation	normality (p)
base	4,4	4,05	1,629	0,37	0,6671
1. week	4,262727	4,22	1,356	0,318	0,8347
2. week	4,372727	4,12	1,903	0,435	0,9577
3. week	4,174545	3,9	1,184	0,284	0,6815
4. week	4,106364	3,9	1,582	0,385	0,8911

When analyzing the **dependent variables** and the **stochastic homogeneity test** no significance could be found.

Table 18. Significance level of linear correlation

Pearson's linear correlation coefficient

	1	2	3	4
base	p=0,4576	p=0,1763	p=0,7555	p=0,1970
1		p=0,0072	p=0,0267	p=0,0100
2			p=0,0291	p=0,0339
3				p=0,0378
4				

The linear correlation analysis shows that the change to the base value is not significant, the values increase after the first week of consumption, then a constant, significant decrease can be observed.

1l/day group analysis:

Table 19. 1l/day consumption data

group	average	median	standard deviation	relative deviation	normality (p)
base	4,753571	4,715	1,53	0,307	0,7449
1. week	3,176429	3,03	1,517	0,434	0,5176
2. week	3,307143	3,36	1,15	0,324	0,5731
3. week	4,352143	4,465	1,795	0,383	0,304
4. week	3,393571	3,37	1,634	0,438	0,027

In the first week measurement after the consumption of Kaqun water, the stress index decreased, then a constant increase was observed, which did not reach the base value, then it decreased again in the fourth week.

When testing the **dependent variables** the equality of averages were tested (analysis of variance $p<0.001$, robust analysis of variance with degrees of freedom correction, Geisser-Greenhouse analysis, Huynh-Feldt analysis), significance level $p<0.01$

Stochastic homogeneity test (Friedman test, analysis of variance by ranking numbers, robust analysis of variance with degrees of freedom correction, Geissel-Greenhouse analysis, Huynh-Feldt analysis), significance level $p<0.001$.

Table 20. Significance level of linear correlation

Pearson's linear correlation coefficient

	1	2	3	4
bázis	p=0,0270	p=0,0234	p=0,9962	p=0,0284
1		p=0,0002	p=0,4958	p=0,0000
2			p=0,1560	p=0,0006
3				p=0,3152
4				

The change is significant compared to the base values except for the third week. The change is significant compared to the first week.

0.5l/day group analysis:

Table 21. 0.5l/day group data

group	average	median	standard deviation	relative deviation	normality (p)
base	4,537692	4,99	1,056	0,233	0,1681
1. week	4,566154	3,65	3,238	0,709	0,2715
2. week	4,296923	4,25	1,226	0,285	0,7581
3. week	3,601538	3,65	1,008	0,28	0,9905
4. week	4,426154	4,18	1,874	0,423	0,839

The first week consumption did not have any effect, the decrease started from the second week, then it showed increase again at the last measurement.

When analyzing the **dependent variables** and the **stochastic homogeneity test** no significance could be found.

Table 22. 0.5 l/day significance level of linear correlation

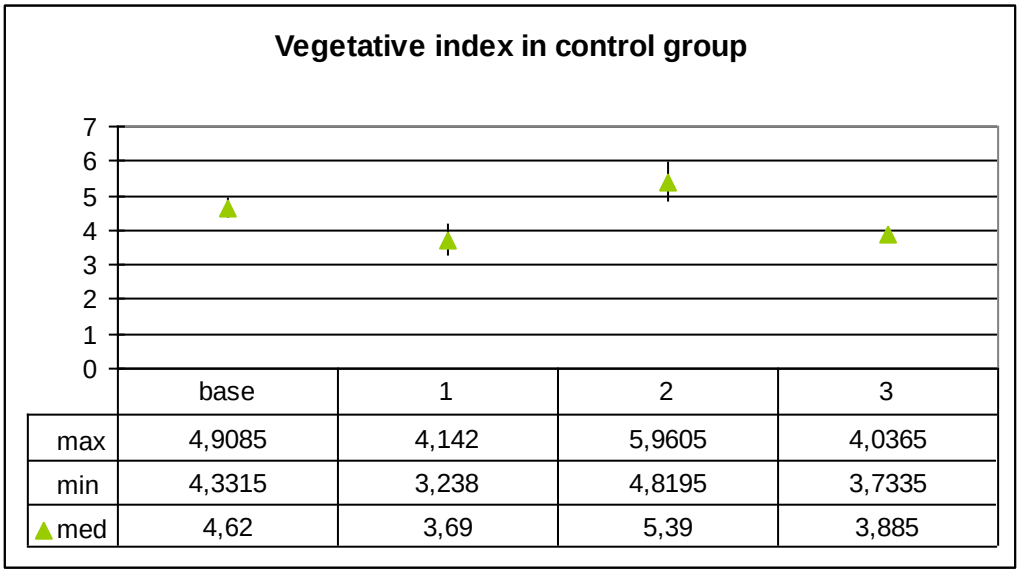
Pearson's linear correlation coefficient

	1	2	3	4
bázis	p=0,3771	p=0,8038	p=0,5253	p=0,1154
1		p=0,8662	p=0,8625	p=0,0344
2			p=0,1016	p=0,7563
3				p=0,5468
4				

No significance could be shown in the linear correlation test.

Control group analysis:

Graph 10. Change of vegetative index in control group



	base	1	2	3
max	4,9085	4,142	5,9605	4,0365
min	4,3315	3,238	4,8195	3,7335
▲med	4,62	3,69	5,39	3,885

The relaxed vegetative index shows an undulating run, but none of the changes is significant.

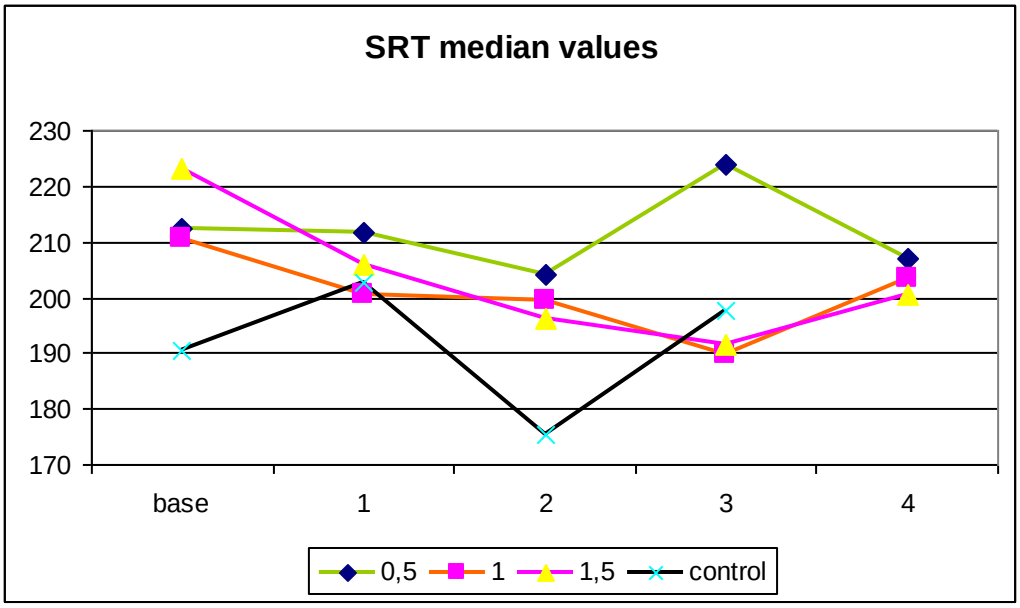
Summary:

The change of the relaxed vegetative index in the 1.5l group shows a significant increase from the second week onwards, while in the 1l group the decrease shows a constant significant value. Based on this the 1l group should be highlighted.

SRT analysis

The change in the reflex time indicates the speed of the nerve impulses. The measurement was done with classic method, push-button reply for an acoustic stimulus. The time between the sounds was random. We kept the lowest values, the three highest values were excluded.

Graph 11. Srt measurement values



In case of the raw data, visible change ban be seen in the 1.5l/day and 1l/day groups, in case of the smaller dose and control group it is unclear.

Table 23. Change of SRT values

	base	1	2	3	4
0,5	212,38	211,8445	204,207	224,0695	207,1035
1	210,741	200,483	199,517	189,793	203,429
1,5	223	205,897	196,36	191,429	200,571
control	190,625	202,824	175,5	197,667	

Due to the high standard deviation we decided to trim the values and did the evaluation after that.

1.5l group analysis:

Graph 12. Effect of 1.5l on SRT

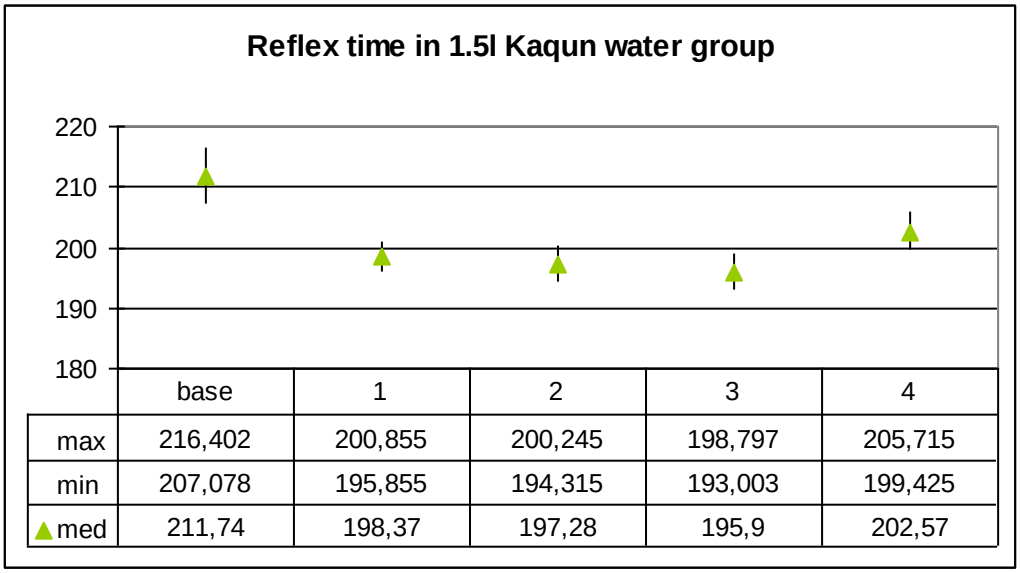


Table 24. Effect of 1.5l Kaqun water on SRT

group	average	median	standard deviation	relative deviation	normality (p)
base	211,74	210,621	27,97	0,132	0,913
1. week	198,37	201,172	15,09	0,0761	0,99
2. week	197,28	196,36	17,79	0,0902	0,9934
3. week	195,9	191,429	17,38	0,0887	0,9794
4. week	202,07	200,571	18,87	0,0934	0,9696

The reflex time constantly decreased until the fourth measure and there was a small increase at the end within the margin of error.

When testing the **dependent variables** the equality of averages were tested (analysis of variance $p<0.001$, robust analysis of variance with degrees of freedom correction, Geisser-Greenhouse analysis, Huynh-Feldt analysis), significance level $p<0.01$.

Stochastic homogeneity test (Friedman test, analysis of variance by ranking numbers, robust analysis of variance with degrees of freedom correction, Geissel-Greenhouse analysis, Huynh-Feldt analysis), significance level $p<0.001$.

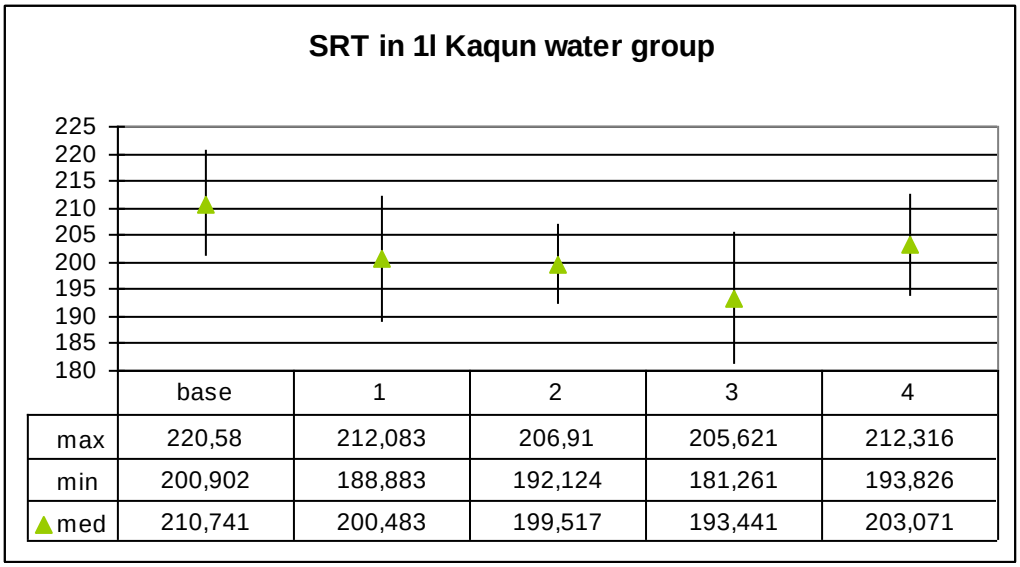
Table 25. Pearson's linear correlation coefficient

	1	2	3	4
bázis	p=0,0000	p=0,0005	p=0,0002	p=0,0003
1		p=0,0006	p=0,0000	p=0,0003
2			p=0,0000	p=0,0000
3				p=0,0000
4				

The data and analysis show a strong significance between the water consumption and the improvement in the reflex time.

1l/day group analysis:

Graph 13. Effect of 1l/day Kaqun water



	base	1	2	3	4
max	220,58	212,083	206,91	205,621	212,316
min	200,902	188,883	192,124	181,261	193,826
▲med	210,741	200,483	199,517	193,441	203,071

In the 1 liter dose there is a constant decrease in the median up until the fourth measurement, in the fifth measurement there is an increase within the margin of error.

Table 26. Effect of 1l/day on SRT

group	average	median	standard deviation	relative deviation	normality (p)
base	208,0353	210,741	35,47	0,171	0,9013
1. week	209,4009	200,483	41,83	0,2	0,7479
2. week	205,6957	199,517	26,66	0,13	0,9732
3. week	207,1317	193,441	43,91	0,212	0,8896
4. week	210,7258	203,071	33,33	0,158	0,6636

The equality of averages and the stochastic homogeneity test does not show any significance.

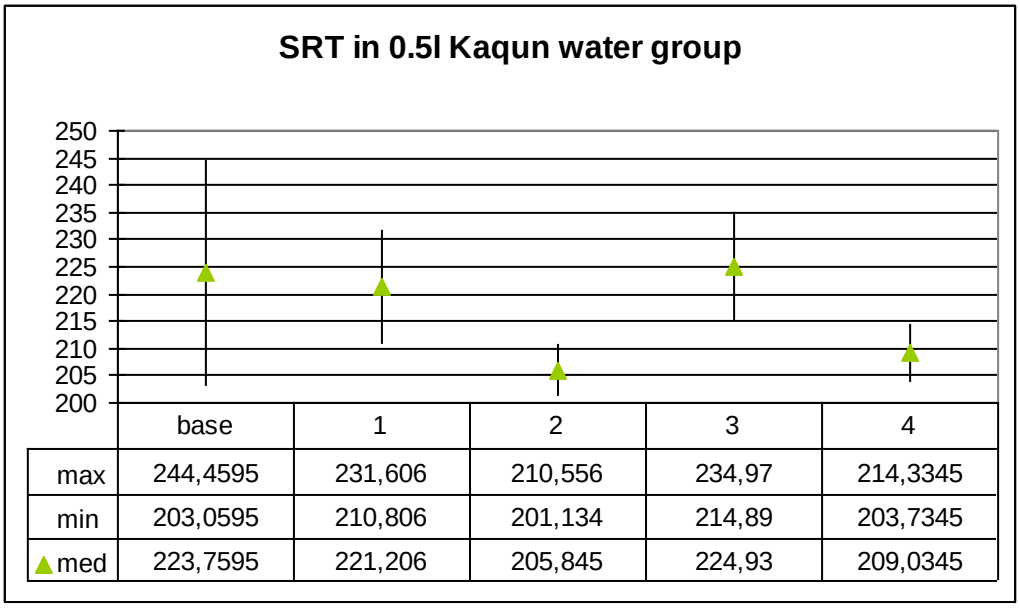
Table 27. Pearson's linear correlation coefficient

1	2	3	4
p=0,0000	p=0,0000	p=0,0000	p=0,0000
	p=0,0000	p=0,0000	p=0,0000
		p=0,0000	p=0,0000
			p=0,0000

The linear correlation analysis shows a big significance in the values.

0.5l/day group analysis:

Graph 14. 0.5 l/day effect on SRT



	base	1	2	3	4
max	244,4595	231,606	210,556	234,97	214,3345
min	203,0595	210,806	201,134	214,89	203,7345
▲med	223,7595	221,206	205,845	224,93	209,0345

The base value has a high standard deviation due to a 403 value, so the standard error is also high. To the second and third measurement the value of the standard error also decreased significantly, which resulted in a decrease of the standard deviation in the test subjects.

Table 28. Effect of 0,5l Kaqun water on SRT

group	average	median	standard deviation	relative deviation	normality (p)
base	233,44	223,76	65,44	0,28	0,5082
1. week	219,12	221,21	32,88	0,15	0,9182
2. week	208,27	205,84	14,9	0,0715	0,7599
3. week	223,83	224,93	31,74	0,142	0,9208
4. week	210,99	209,03	16,76	0,0794	0,9978

The equality of averages and stochastic homogeneity test do not show any significance.

Table 29. Pearson's linear correlation coefficient

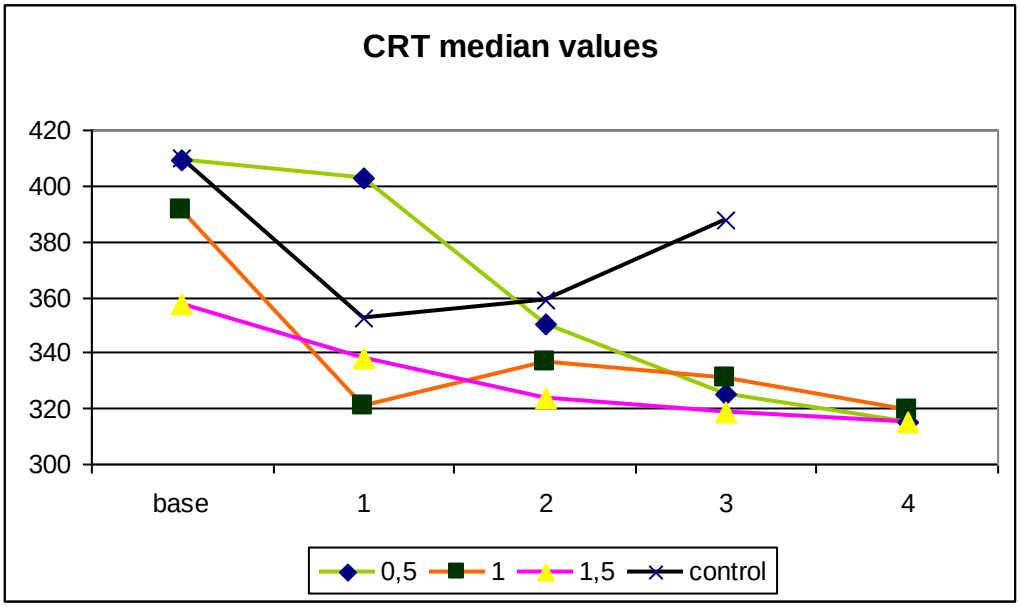
1	2	3	4
p=0,0005	p=0,0093	p=0,0038	p=0,0045
	p=0,0002	p=0,0000	p=0,0000
		p=0,0005	p=0,0000
			p=0,0000

The linear correlation test shows a strong significance.

Cognitive reaction time

The time requirement for the cognitive processes measures the usage time of the work memory besides divided attention.

Graph 15. CRT test results



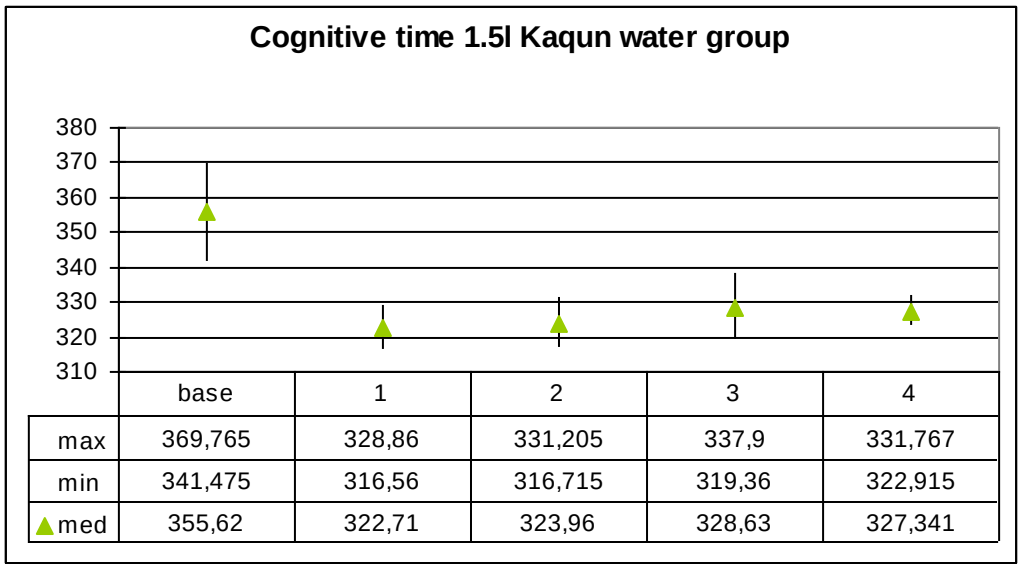
We can see that related to the base time a significant acceleration can be seen compared to the control group.

Table 30. Change of CRT values

	base	1	2	3	4
0,5	409,2105	402,444	350,493	324,999	315,149
1	391,2	320,708	336,429	330,586	319,583
1,5	357,731	338,069	323,962	318,655	315,321
control	410,101	352,692	359,269	387,333	

1.5l group analysis

Graph 16. Effect of 1.5l on CRT

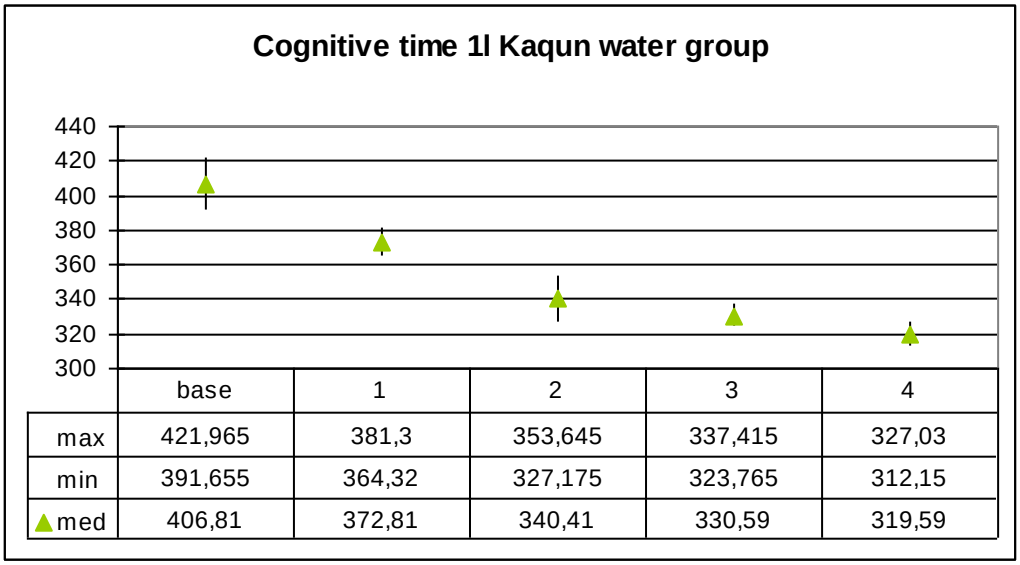


	base	1	2	3	4
max	369,765	328,86	331,205	337,9	331,767
min	341,475	316,56	316,715	319,36	322,915
▲med	355,62	322,71	323,96	328,63	327,341

The consumption of 1.5l Kaqun water shows a significant change in the first week compared to the base value in case of both Pearson's linear correlation coefficient (p=0.0276), and Wilson's robust correlation coefficient (p=0.0399). Changes in the subsequent weeks are minimal, significance can not be detected.

1l/ group analysis

Graph 17. Effect of 1l on cognitive processes

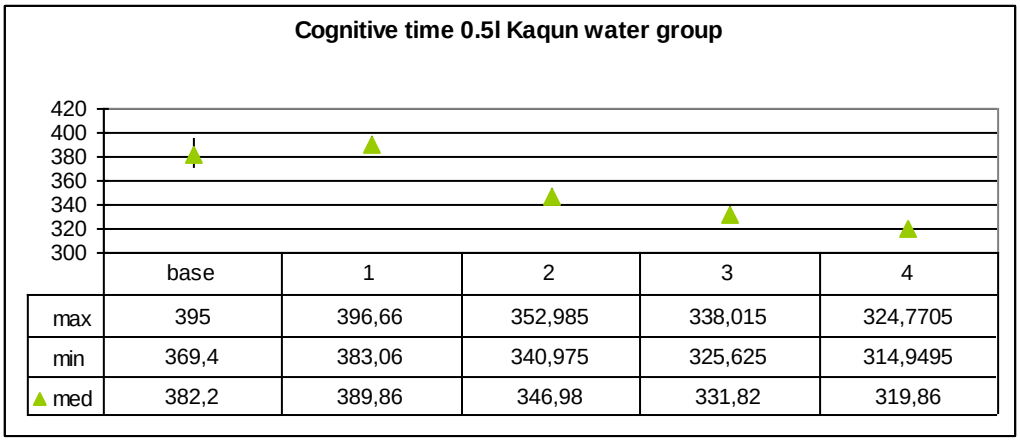


	base	1	2	3	4
max	421,965	381,3	353,645	337,415	327,03
min	391,655	364,32	327,175	323,765	312,15
▲med	406,81	372,81	340,41	330,59	319,59

The decrease is constant compared to the base value. Both the dependent variables and the stochastic homogeneity test showed strong significance. The linear regression test showed significance in changes compared to the base value.

0.5l group analysis

Graph 18. Effect of 0.5l Kaqun water on cognitive effects



	base	1	2	3	4
max	395	396,66	352,985	338,015	324,7705
min	369,4	383,06	340,975	325,625	314,9495
▲med	382,2	389,86	346,98	331,82	319,86

The median value increased in the first week compared to the base value, then a constant decrease followed. From the dependent variables the equality of averages and the stochastic homogeneity test showed significance. The linear regression test showed significance in changes compared to the first week.

Change in oxygen saturation

The consumption of water with higher oxygen content should increase oxygen saturation and improve the body's oxygen supply.

Graph 19. Change of oxygen saturation

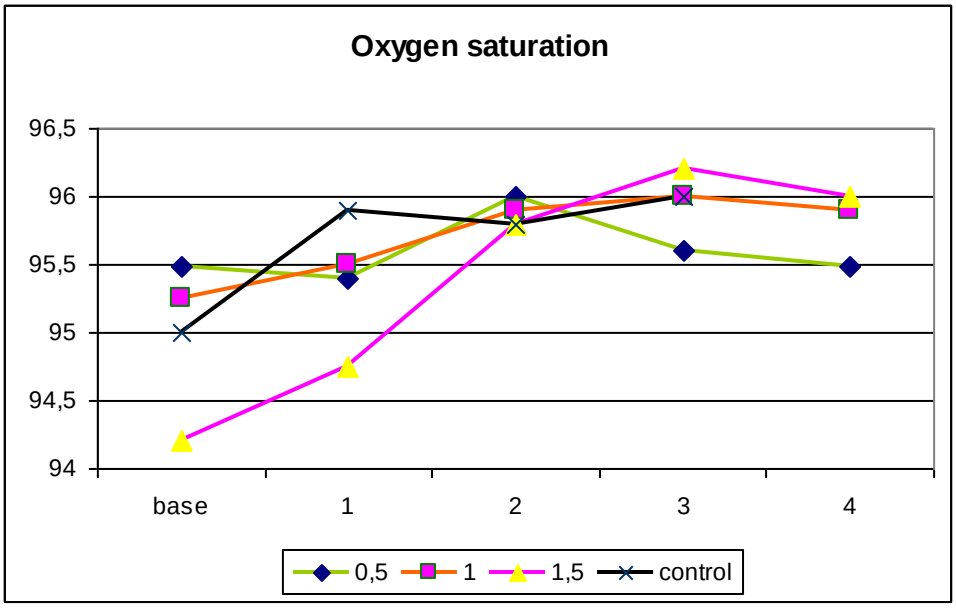
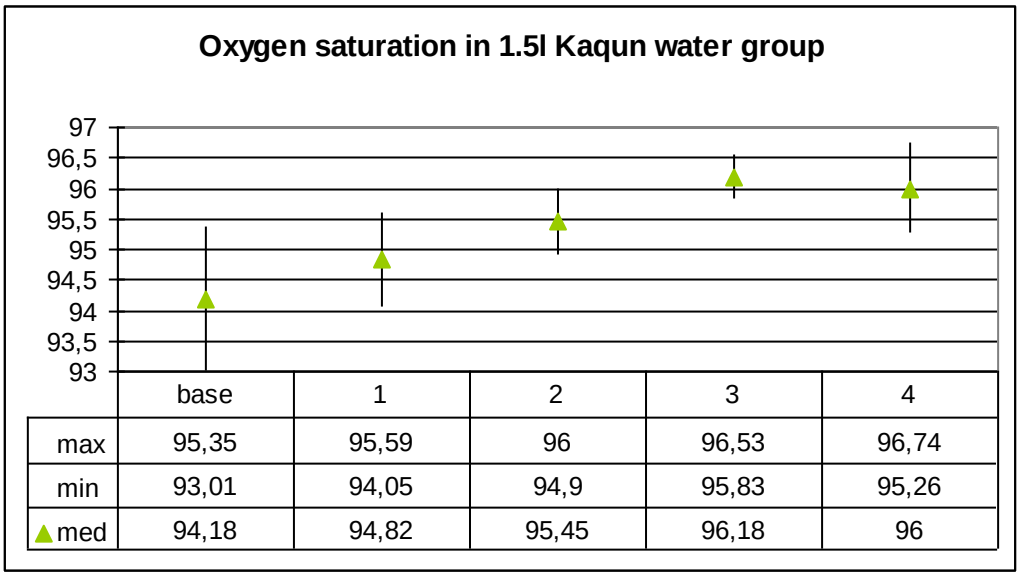


Table 31. Change of oxygen saturation

	1,5 l	1 l	0,5 l	control
Change in %	2	0,73	0,54	1

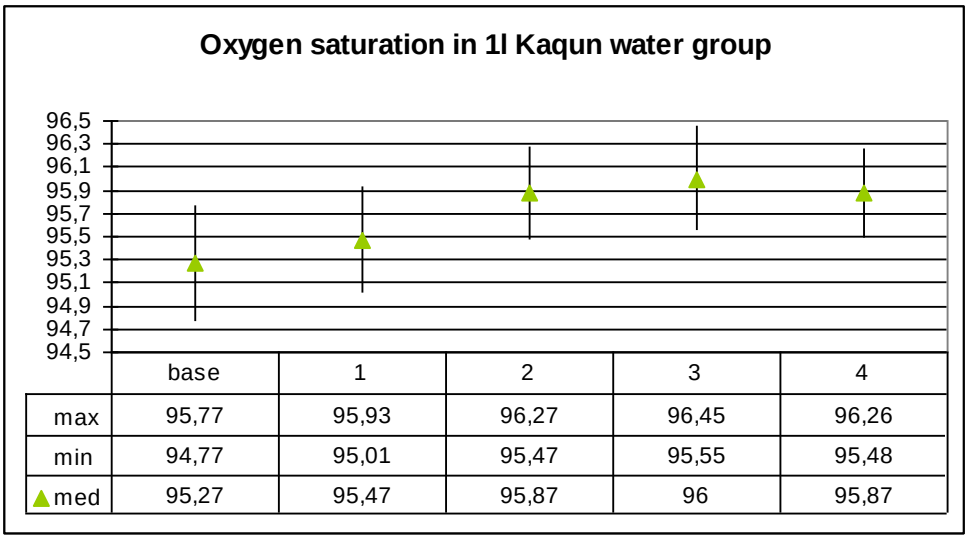
The increase in saturation in the control group was 1%. The 1% increase is probably due to the water bodies being filled up. In comparison, we observed saturation increase in the 1l and 1.5l groups. The linear correlation test showed significant changes in both the 1.5l and 1l groups.

Graph 20. Change of oxygen saturation 1.5 l/day



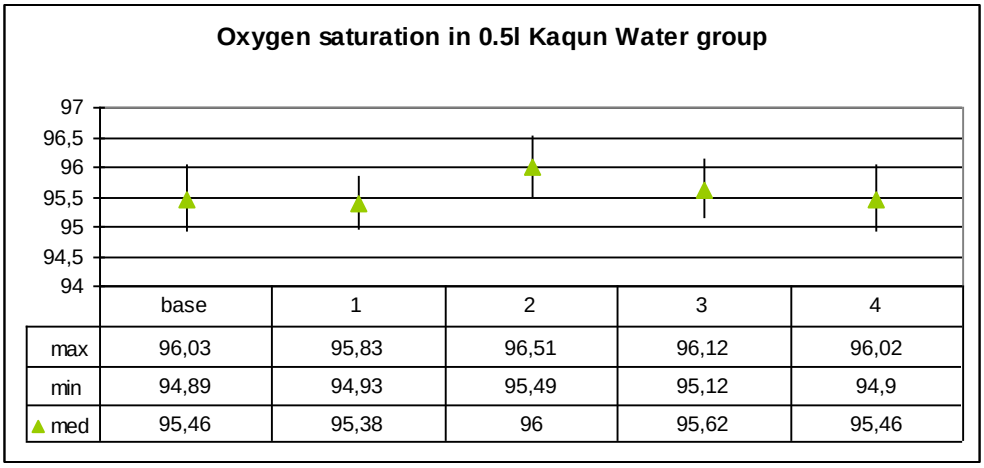
	base	1	2	3	4
max	95,35	95,59	96	96,53	96,74
min	93,01	94,05	94,9	95,83	95,26
▲med	94,18	94,82	95,45	96,18	96

Graph 21. Change of oxygen saturation 1 l/day



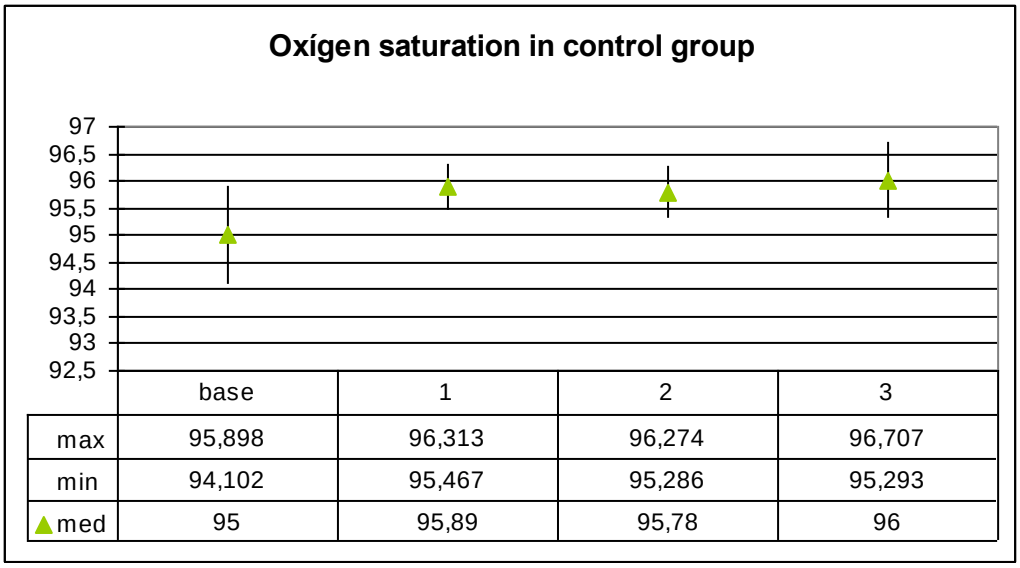
	base	1	2	3	4
max	95,77	95,93	96,27	96,45	96,26
min	94,77	95,01	95,47	95,55	95,48
▲med	95,27	95,47	95,87	96	95,87

Graph 22. Change of oxygen saturation 0.5 l/day



	base	1	2	3	4
max	96,03	95,83	96,51	96,12	96,02
min	94,89	94,93	95,49	95,12	94,9
▲med	95,46	95,38	96	95,62	95,46

Graph 23. Change of oxygen saturation control group



	base	1	2	3
max	95,898	96,313	96,274	96,707
min	94,102	95,467	95,286	95,293
▲med	95	95,89	95,78	96

Dosage and efficacy and maximum time of effect appearance

An important question is in what dosage should the water be consumed and when does the maximum impact appear at given dosage.

Table 32. Evaluating the efficacy:

	sist. RR	diast. RR	veg. index	SRT	CRT	saturation	total points
1,5 l	2	1	3	1	3	1	11
1 l	1	3	1	2	2	2	13
0,5 l	2	2	2	3	1	3	13

We put in this table depending on the scale of changes first, second or third place. From this we can prepare the dosage suggestions. So:

Consumption of 0.5l daily is recommended to increase the CRT.

Consumption of 1l daily is recommended to decrease systolic blood pressure and reduce stress sensitivity.

Consumption of 1.5l daily is recommended for other cases.

The appearance of maximum impact generally falls on the third week in case of both the 1.5l and 1l dosage, then the values decrease. The exception in the cognitive time but even here the difference between the third and fourth week is minimal. Therefore basically the three week consumption followed by a one week break is the recommended dosage.

Completed domestic so far made with Kaqun water:

1. Katalin Pál dr.: Effect of oxygen-enriched water on tumor cells. 2004
2. Semmelweis University, Faculty of Physical Education and Sports: Effect of high oxygen content Kaqun water drink therapy and Kaqun bath therapy on psycho-physiological parameters 2007.
3. Hungarian Academy of Sciences Isotopes Research Institute, Department of Surface chemistry and Catalysts: Report on assessing the role of Kaqun water with high oxygen content on formation of reactive oxygen radicals in in vitro system. 2009.
4. National Institute of Chemical Safety: Effect of Kaqun water on immunological parameters of healthy volunteers. 2009.
5. National Institute of Chemical Safety, Department of Chemical Safety Research, Department of Molecular and Cell Biology: Citotoxicity study on Kaqun water. 2010.
6. National Institute of Chemical Safety, Department of Chemical Safety Research, Department of Molecular and Cell Biology: Examination of the antioxidant capacity influencing effect of Kaqun water. 2011.