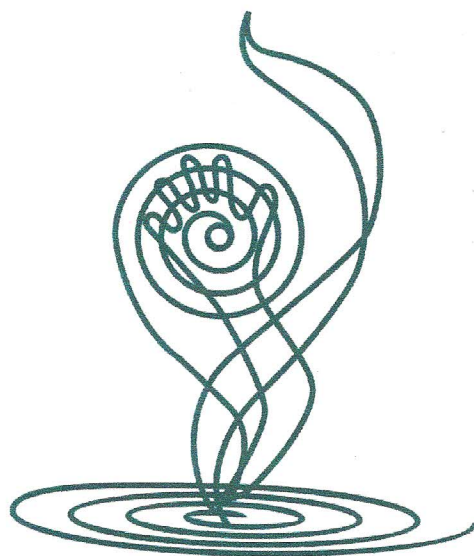# INSTITUT ZDRAVILNI GAJ Tunjice

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Detailed report on processing of GDV water images in the Flaška bottle

Date and time of processing: 28/6/2011

KIRLIAN TEHNOLOGY

The measurements were made using a GDV camera PRO.
Imaging was performed by first making images of tap water, and then of the water that was in the Flaška bottle for 5 minutes. Then we captured images of the water that was in the Flaška bottle for 1 hour. Tap water was from the Domžale public water supply.

1. Tap water
2. Flaška water after 5 min
3. Flaška water after 1 hour

During each imaging session we made 100 images.

The EPC/GDV camera operates automatically, and makes images in 5-second intervals.

GDV-image processing parameters

Noise filter parameters:
Rel. noise level (%): 100%
Base intensity: Mean + RMS error
Min. fragment area: 30
Work radius: 0

Center of the glow:
In the center of inner contour

The following GDV parameters of GDV images were calculated during processing:
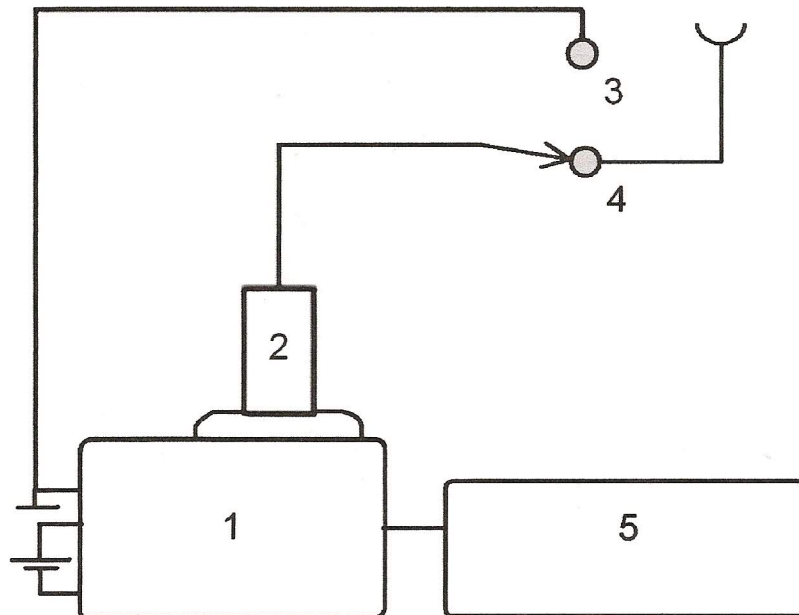
Area
Average intensity
Entropy by isoline
Normalized RMS of isoline radius

Measurement principle:

Measurement principles: 1) EPC/GDV camera; 2) cylinder; 3) grounding; 4) water measurement sensor 5) computer

The water images reasonably exclude the possibility that the human energy field could have an effect on the water itself.

Statistical comparison of 3 samples of static GDV images is performed:

1. *Tap water*
2. *Flaška water after 5 min*
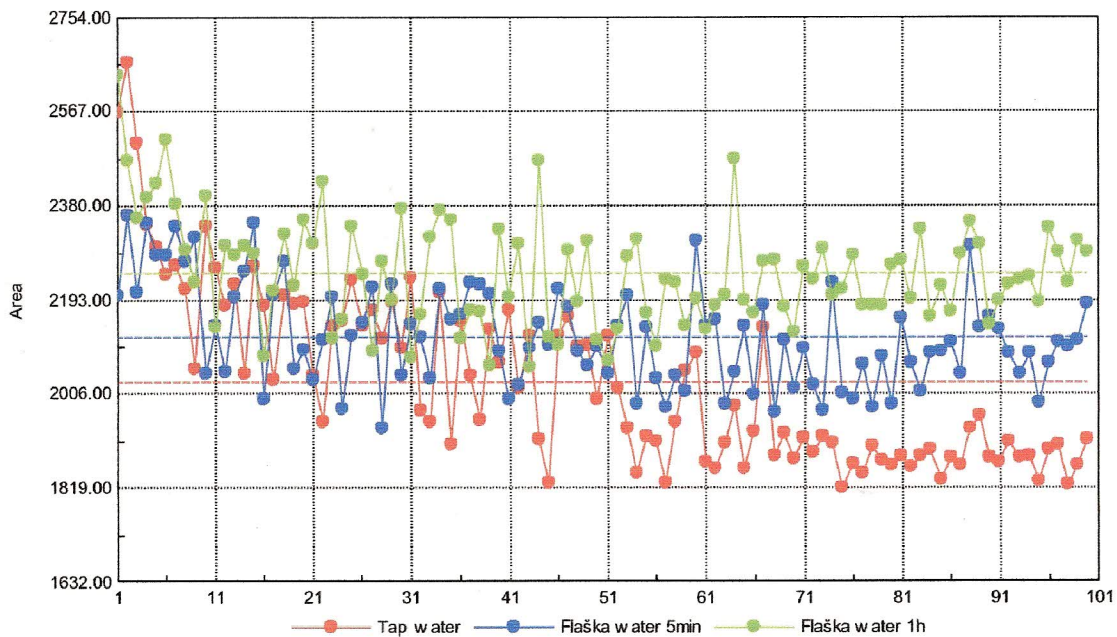3. *Flaška water after 1 hour*

Selection of GDV parameters:

Table 1: Time interval of water images and their area

The image shows that the water area gradually changes.The largest area was found in the water that was in the Flaska bottle for one hour. Next is the water that was in the Flaska bottle for 5 minutes. The lowest area was found in the tap water.
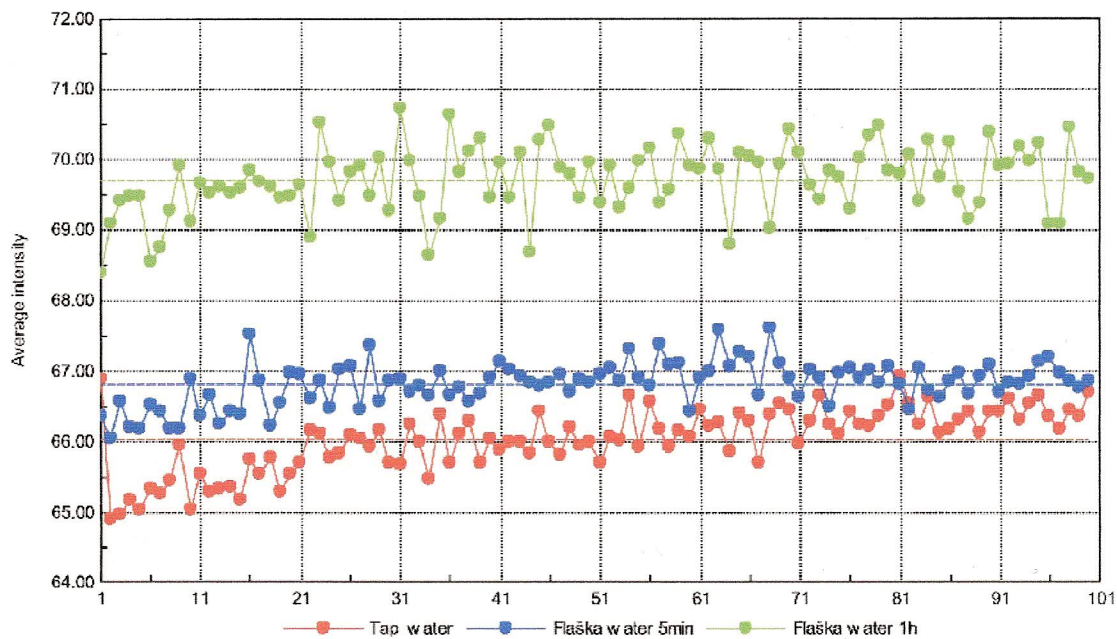

Table 2: Average intensity of water

4

The image shows the intensity of water. The lowest intensity is in tap water. Intensity increases in the water that was in the Flaska bottle for five minutes. The highest intensity is in the water that was in the Flaska botte for one hour.
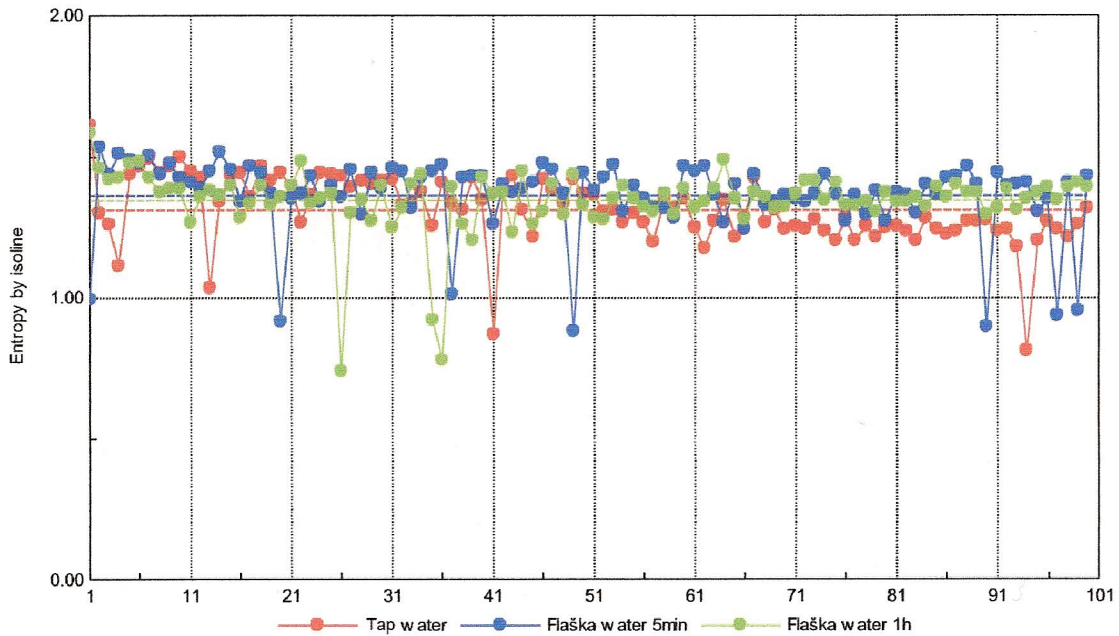

Table 3: Entropy by isoline by time

It is difficult to determine from the above image where entropy is larger or smaller. This will be visible in one of the images below.
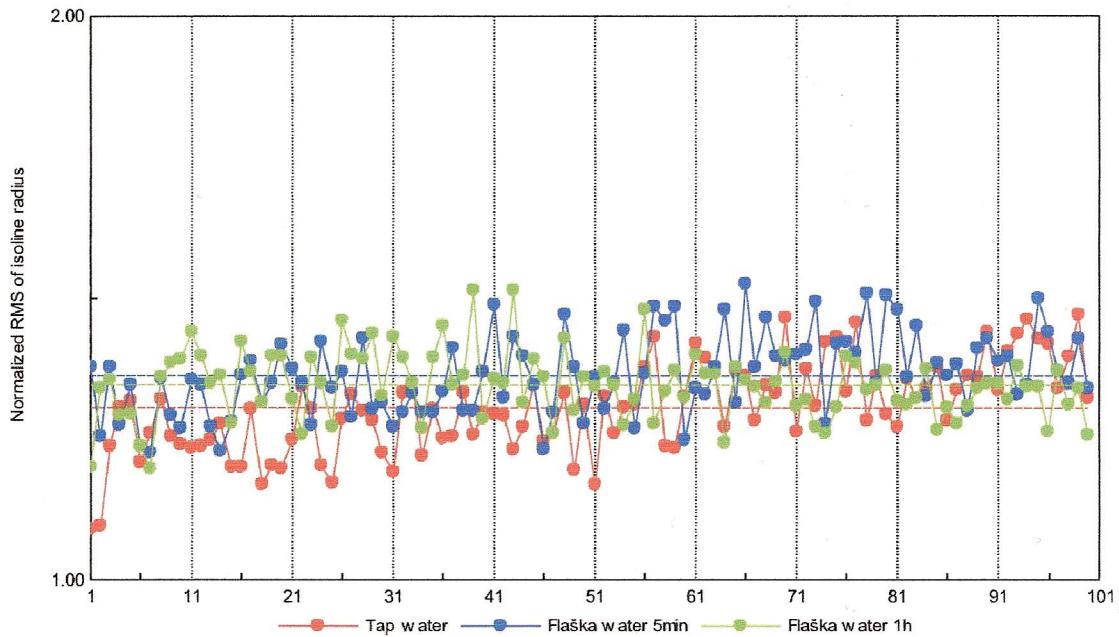

Table 4: Normalized RMS index in time

5

The normalized RMS index changes with time and is higher in water that was in the Flaska bottle for five minutes, followed by water in the Flaska bottle for one hour. The normalized RMS index is lowest in tap water.

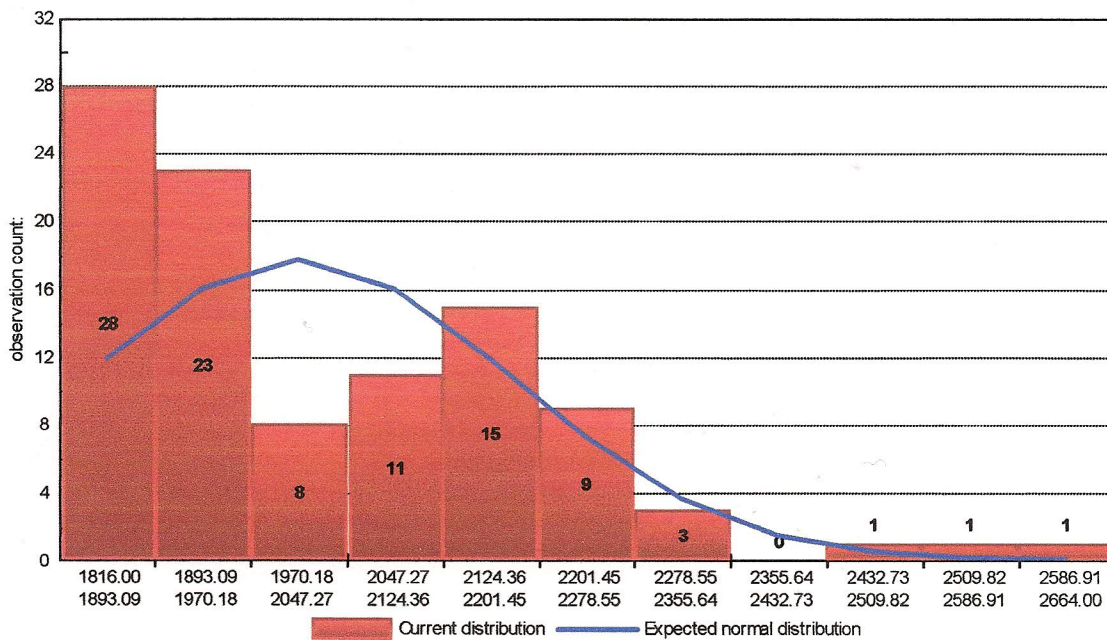## Distribution of GDV parameters:

Tap water

Area

Table 5: Area of tap water

Skewness: 1.09852
Excess: 1.31213
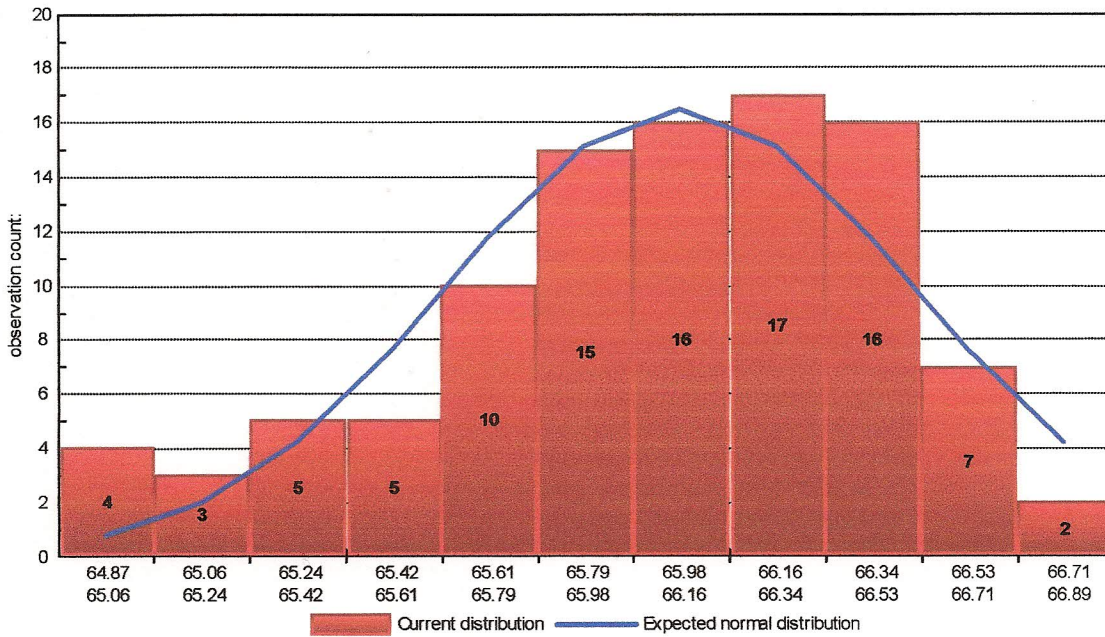Kolmogorov-Smirnov test: d = 0.160598, p = 0.0115025

Average intensity

Table 6: Intensity of tap water

Skewness: -0.567258
Excess: -0.137932
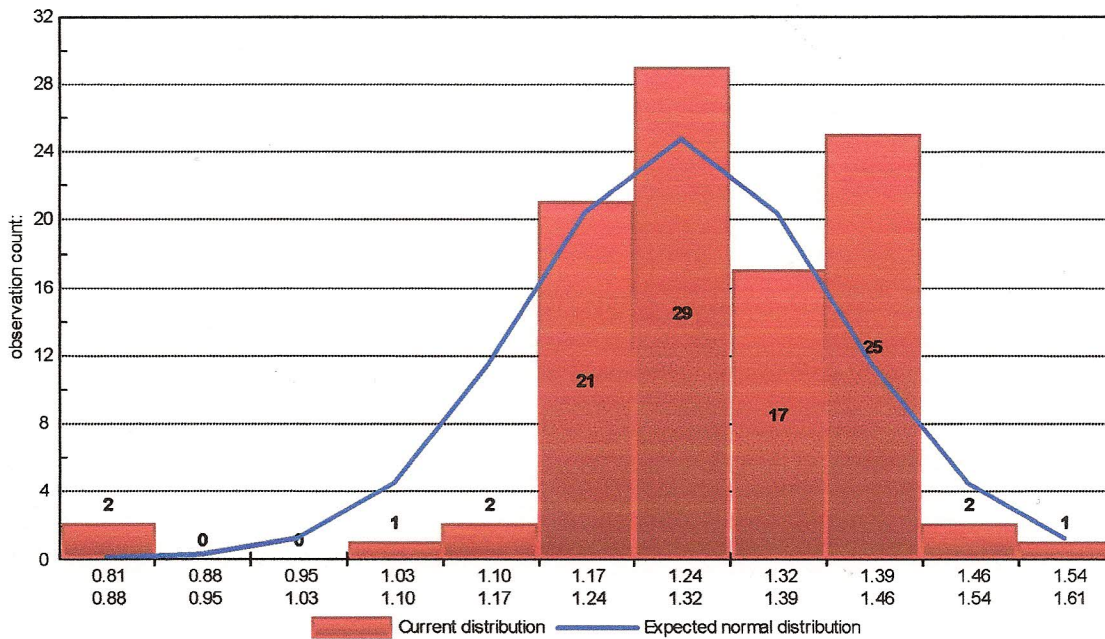Kolmogorov-Smirnov test: d = 0.0428699, p = 0.992894

Entropy by isoline

Table 7: Entropy of tap water

Skewness: -1.14275
Excess: 4.14495
Kolmogorov-Smirnov test: d = 0.135249, p = 0.0515424
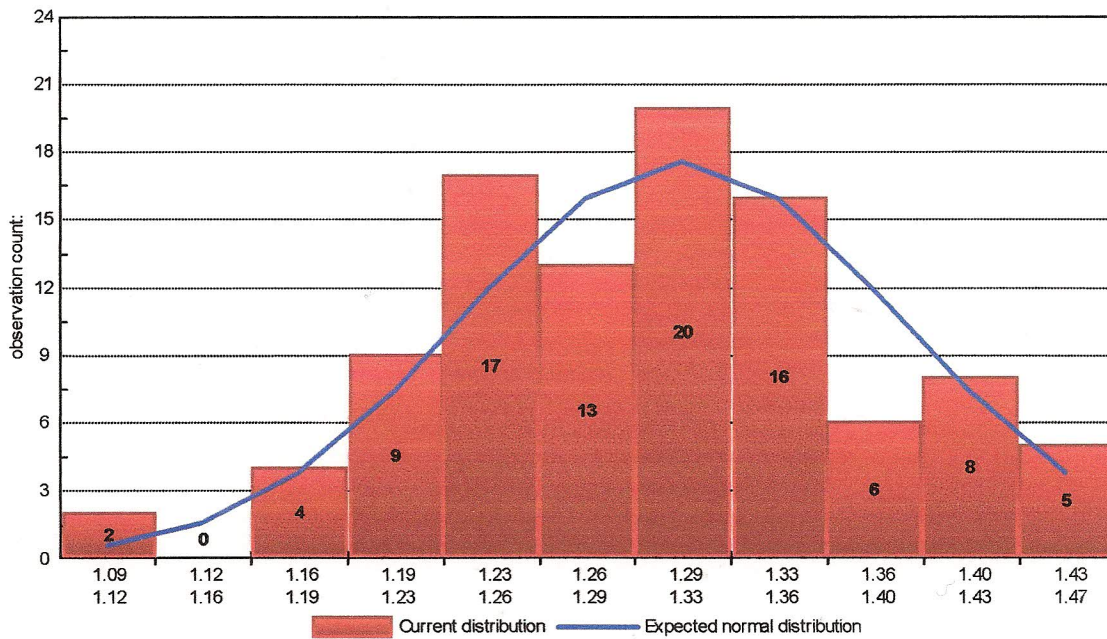
Normalized RMS of isoline radius

Table 8: Normalized RMS index of tap water

Skewness: -0.0678941
Excess: -0.0154998
Kolmogorov-Smirnov test: d = 0.0591906, p = 0.874815

Flaška water 5min

Area
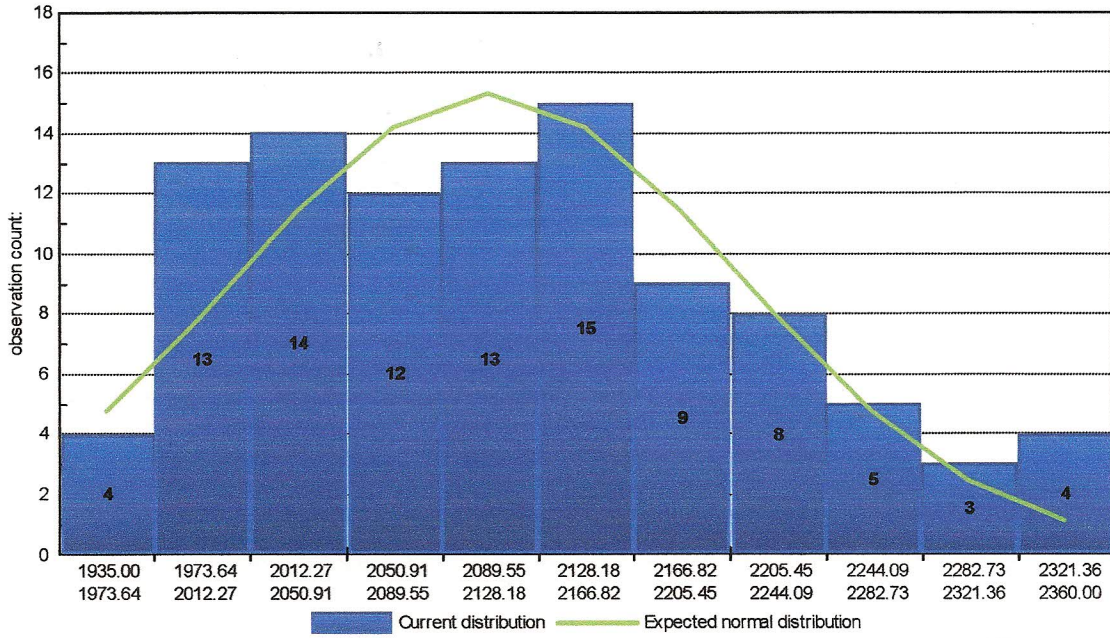

Table 9: Area of Flaška water after 5 minutes

Skewness: 0.464383
Excess: -0.441661
Kolmogorov-Smirnov test: d = 0.0510443, p = 0.95687

Average intensity
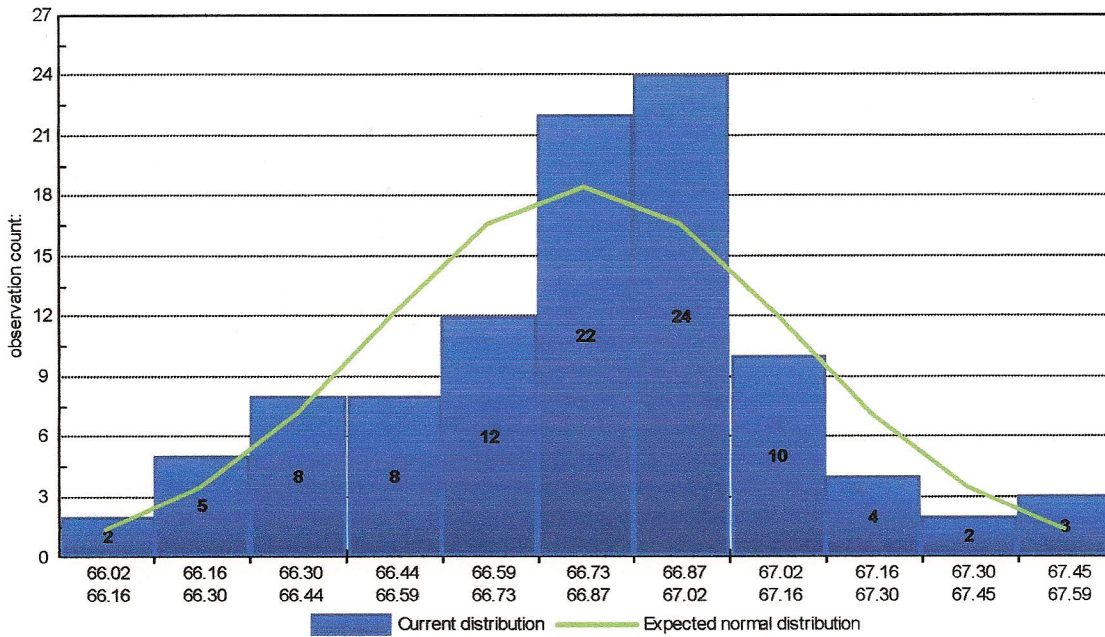
Table 10: Intensity of Flaška water after 5 minutes

Skewness: -0.138863
Excess: 0.302572
Kolmogorov-Smirnov test: d = 0.0748829, p = 0.629138

Entropy by isoline
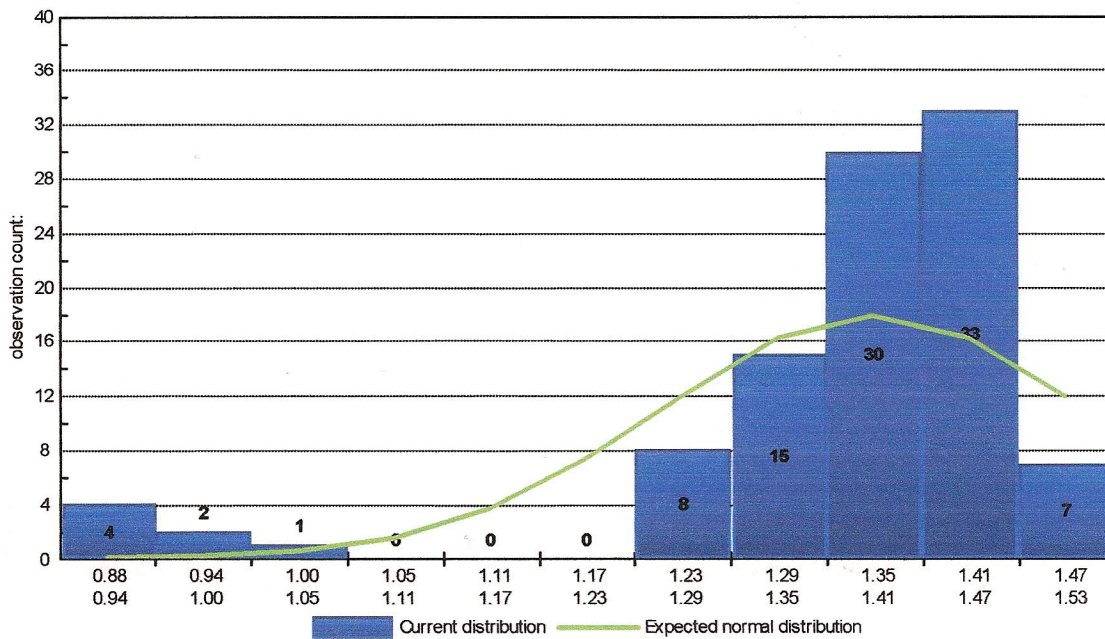
Table 11: Entropy of Flaška water after 5 minutes

Skewness: -2.30631
Excess: 5.48717
Kolmogorov-Smirnov test: d = 0.168398, p = 0.00688494

Normalized RMS of isoline radius
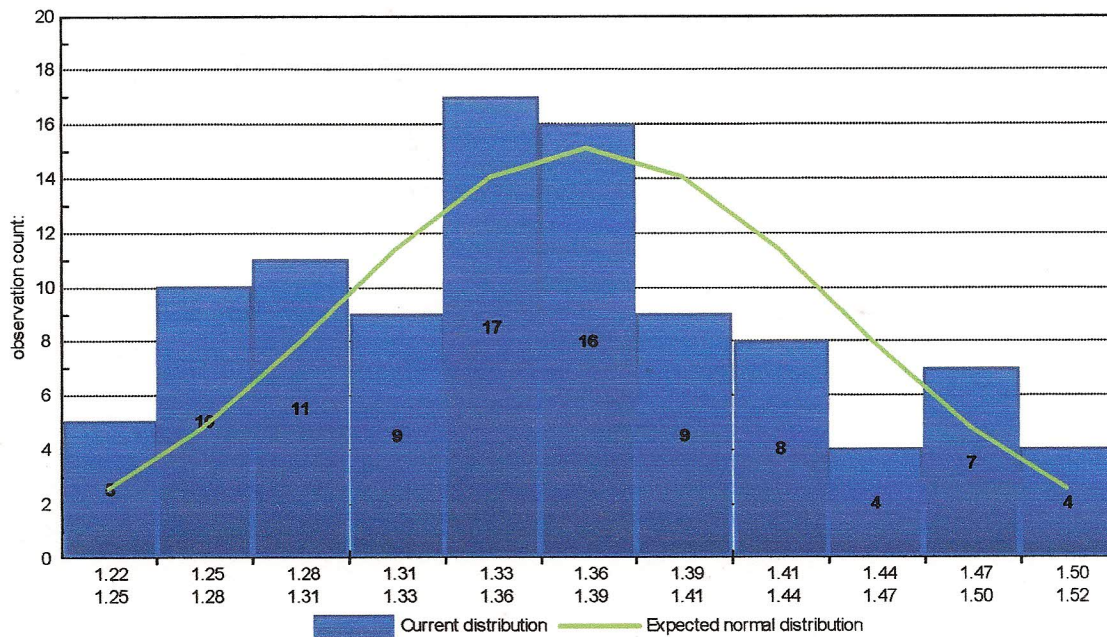
Table 12: Normalized RMS index of Flaška water after 5 minutes

Skewness: 0.2299
Excess: -0.570056
Kolmogorov-Smirnov test: d = 0.0519793, p = 0.949857

Flaška water 1h

Area

Table 13: Area of Flaška water after 1 hour

Skewness: 0.71383
Excess: 0.963287
Kolmogorov-Smirnov test: d = 0.0463395, p = 0.982701

Average intensity
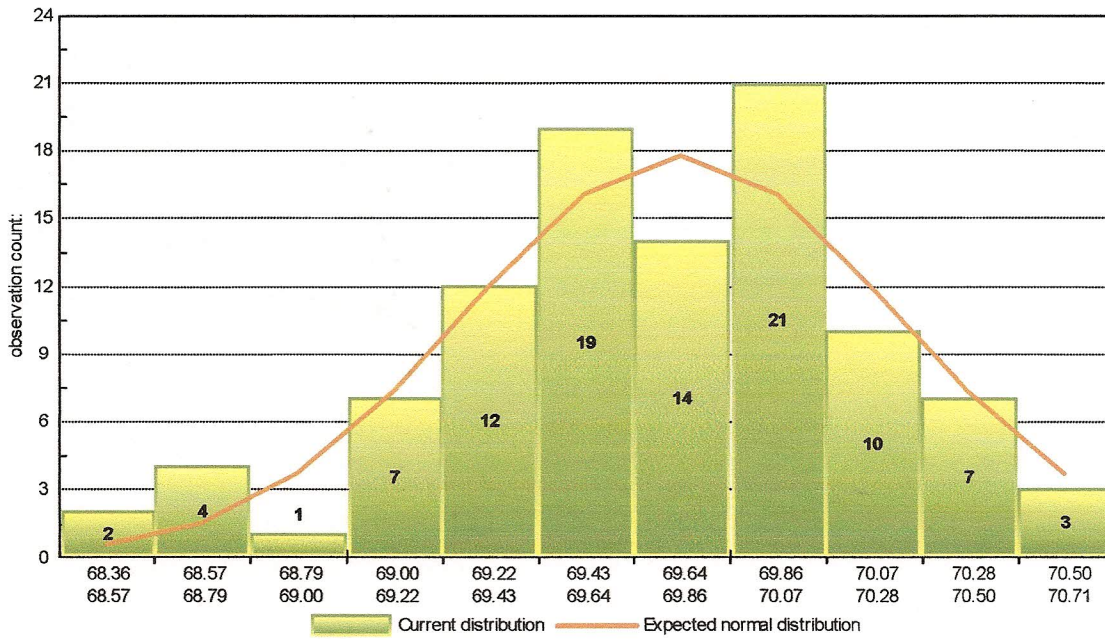
Table 14: Intensity of Flaška water after 1 hour

Skewness: -0.410517
Excess: 0.0862189
Kolmogorov-Smirnov test: d = 0.0492, p = 0.968833

Entropy by isoline
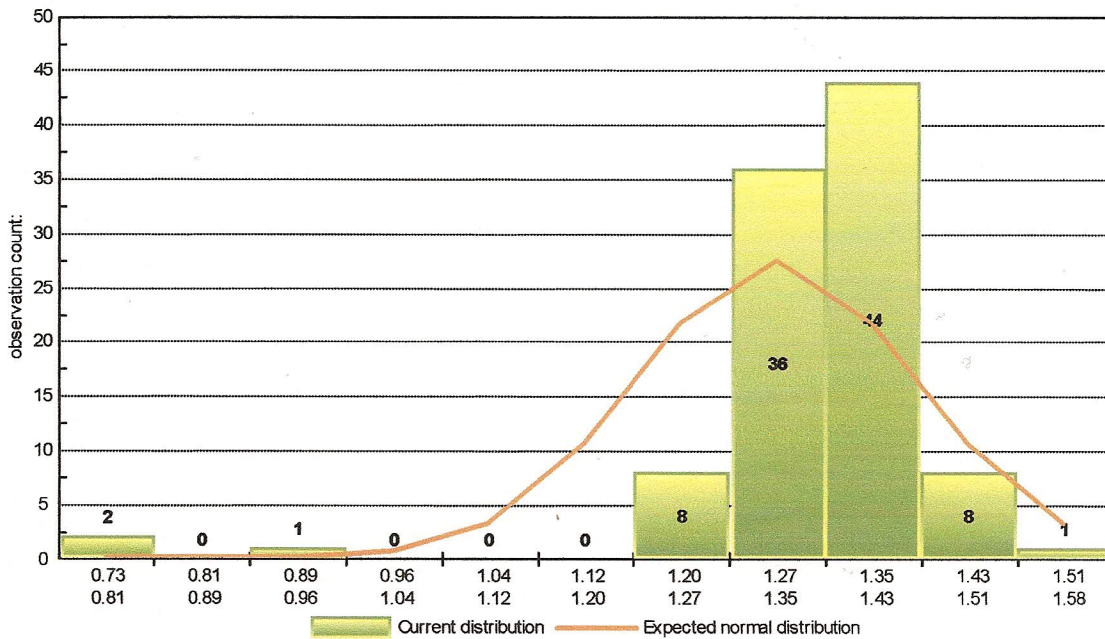
Table 15: Entropy of Flaška water after 1 hour

Skewness: -3.3229
Excess: 15.6702
Kolmogorov-Smirnov test: d = 0.223209, p = 9.40842e-005
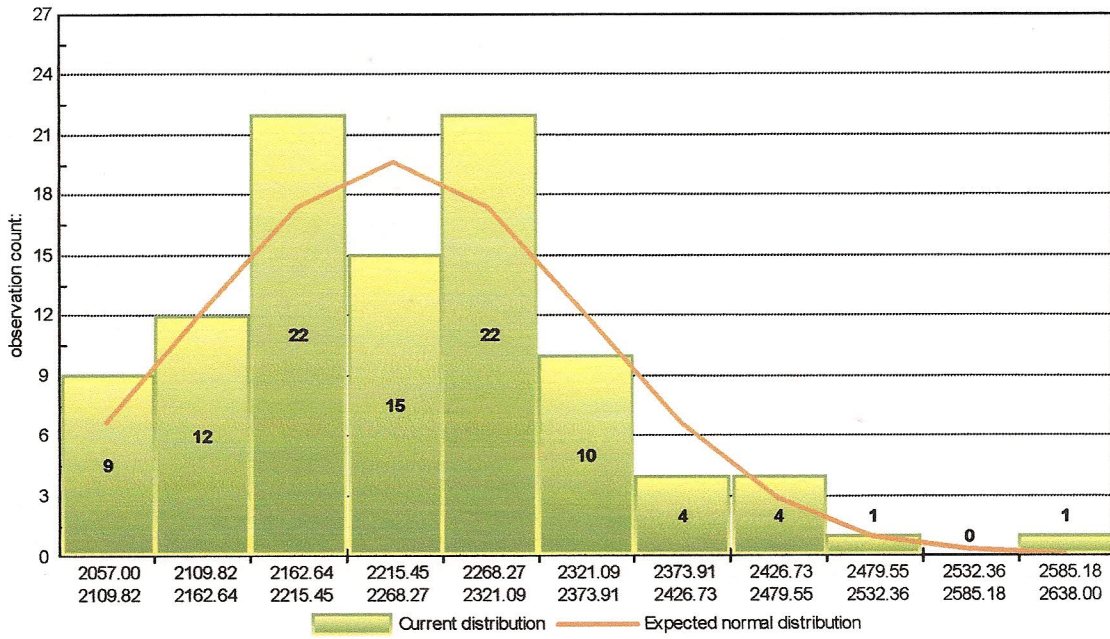
Normalized RMS of isoline radius
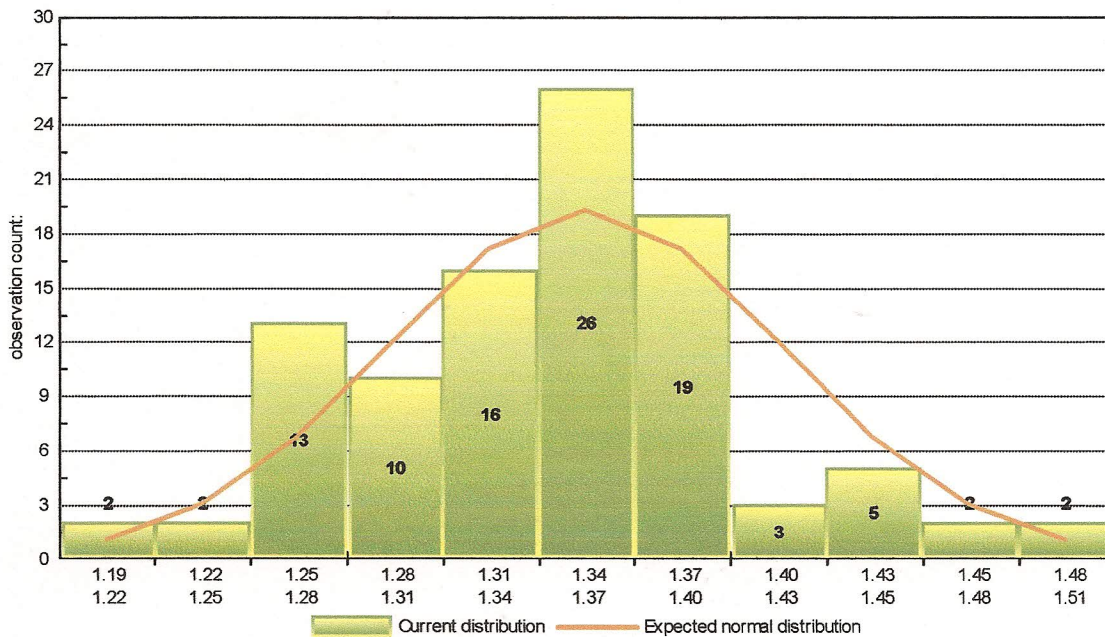
Table 16: Normalized RMS index of Flaška water after 1 hour

Skewness: 0.209533
Excess: 0.565968
Kolmogorov-Smirnov test: d = 0.0908476, p = 0.381135

Tables of data statistics

Pipe water

	Area	Average intensity	Entropy by isoline	Normalized RMS of isoline radius
Count	100	100	100	100
Sum	2.027e+005	6601	130.8	130.2
Min	1816	64.87	0.8091	1.086
Max	2664	66.89	1.608	1.469
Mean	2027	66.01	1.308	1.302
RMS	173.7	0.4454	0.1173	0.07929
Median	1965	66.09	1.307	1.302
25 percentile	1881	65.73	1.241	1.248

75 percentile	2148	66.33	1.406	1.348
Skewness	1.099	-0.5673	-1.143	-0.06789
Excess	1.312	-0.1379	4.145	-0.0155
Confidence interval	34.06	0.08731	0.023	0.01554
Entropy	1.827	2.111	1.603	2.067
Fractality	1.703	1.791	1.824	1.875
Fractality RMS	0.1455	0.1031	0.1269	0.09404

Flaška water after 5min

	Area	Average intensity	Entropy by isoline	Normalized RMS of isoline radius
Count	100	100	100	100
Sum	2.117e+005	6679	136	136.1
Min	1935	66.02	0.8762	1.225
Max	2360	67.59	1.531	1.522
Mean	2117	66.79	1.36	1.361
RMS	100.8	0.3113	0.133	0.0715
Median	2107	66.83	1.395	1.357
25 percentile	2041	66.62	1.338	1.301
75 percentile	2196	66.98	1.437	1.409
Skewness	0.4644	-0.1389	-2.306	0.2299
Excess	-0.4417	0.3026	5.487	-0.5701
Confidence interval	19.77	0.06103	0.02607	0.01402
Entropy	2.166	1.988	1.563	2.205
Fractality	1.942	1.908	1.978	1.93
Fractality RMS	0.07597	0.05981	0.07191	0.07343

Flaška water after 1h

	Area	Average intensity	Entropy by isoline	Normalized RMS of isoline radius
Count	100	100	100	100
Sum	2.245e+005	6970	134	134.3
Min	2057	68.36	0.7301	1.194
Max	2638	70.71	1.584	1.513
Mean	2245	69.7	1.34	1.343
RMS	107.6	0.4807	0.1126	0.05985
Median	2231	69.77	1.354	1.345
25 percentile	2170	69.42	1.314	1.308
75 percentile	2304	70.01	1.391	1.38
Skewness	0.7138	-0.4105	-3.323	0.2095

Excess	0.9633	0.08622	15.67	0.566
Confidence interval	21.08	0.09424	0.02208	0.01173
Entropy	1.933	2.046	1.192	2.033
Fractality	1.937	1.979	1.939	1.973
Fractality RMS	0.07826	0.0768	0.05302	0.0625

Results of statistical comparison

Statistical comparison of 3 independent samples performed. Parametric test used: ANOVA one-way test

ANOVA one-way test

Area

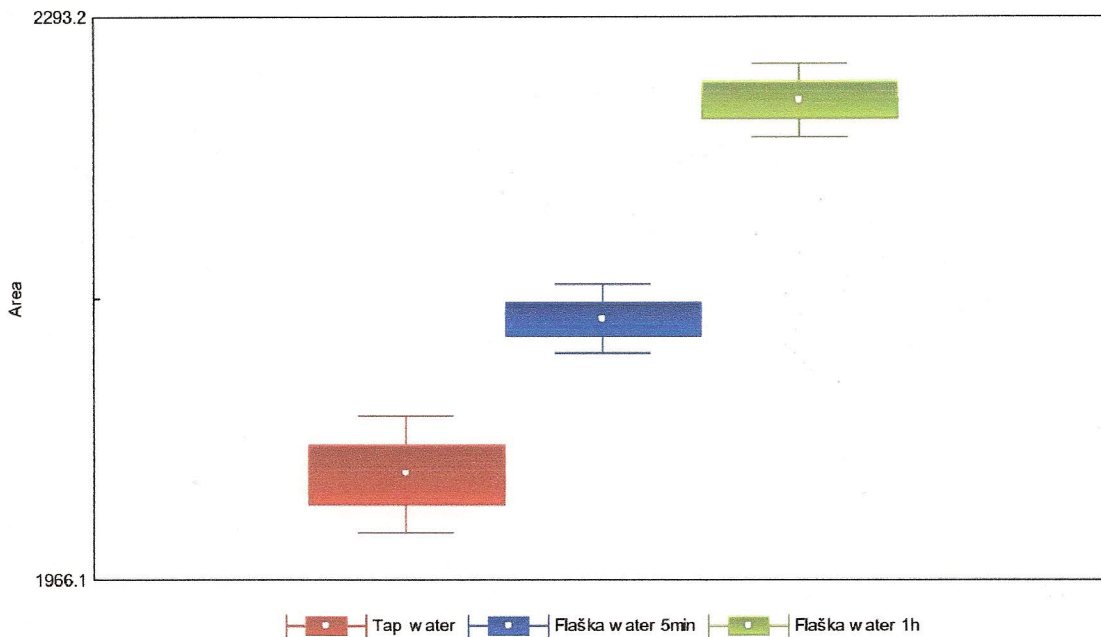According to ANOVA, the one-way test samples are statistically dissimilar; $p = 0$

Table 17: A statistical comparison of area shows Kruskal-Wallis one-way analysis variance

Image 17 shows that the Flaška bottle has an effect on tap water. The area of the water that was in the Flaška bottle for both five minutes and one hour increased. This resulted in a statistically significant variance.

Average intensity

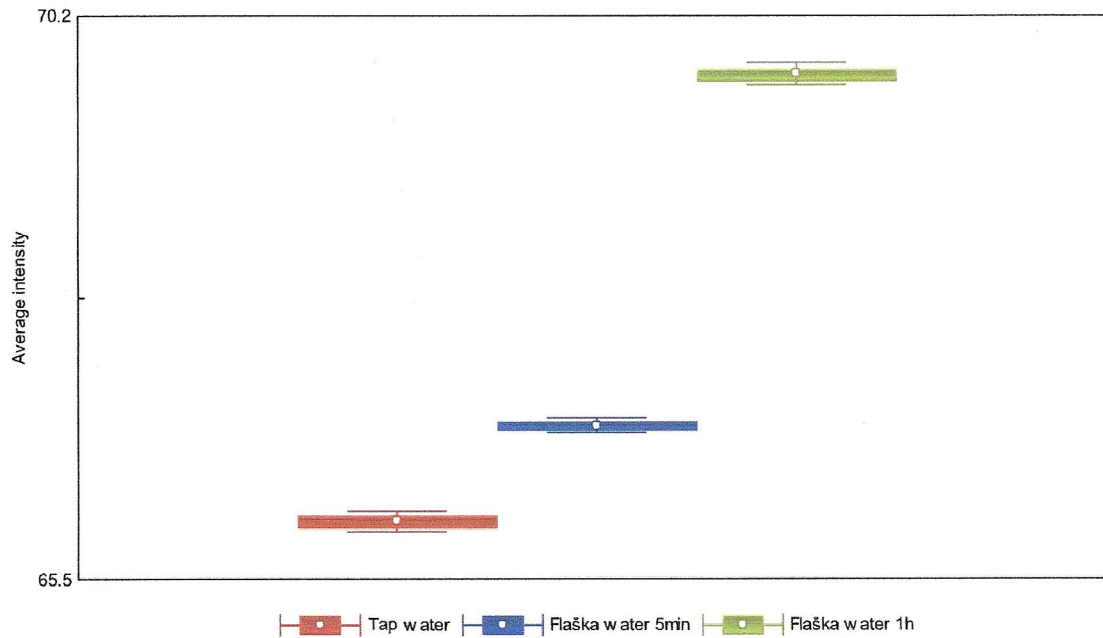According to ANOVA, the one-way test samples are statistically dissimilar; p = 0

Table 18: Statistical comparison of average intensity

The Flaška bottle changes the intensity of tap water. A higher intensity compared to tap water was found both in the water that was in the Flaška bottle for five minutes and for one hour. In both cases, statistically significant differences were recorded. The greatest change occurred in the water that was in the Flaška bottle for one hour.

Entropy by isoline

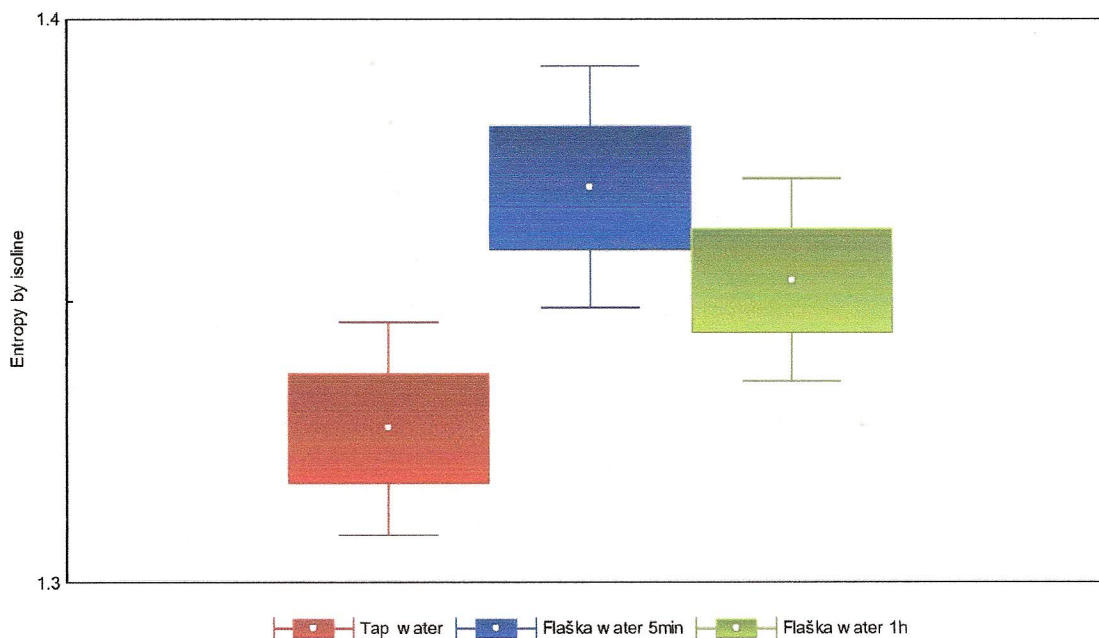According to ANOVA, the one-way test samples are statistically dissimilar; p = 0

Table 19: Statistical comparison of entropy

With regard to entropy, a change was observed in order, but no major variances occurred. There is no statistically significant difference between tap water and the water that was in the Flaška bottle for one hour. The entropy of tap water is 1,308, and the entropy of water after five minutes and one hour in the Flaška bottle is 1,36 and 1,34, respectively.

Normalized RMS of isoline radius

According to ANOVA, one-way test samples are statistically dissimilar; p = 0
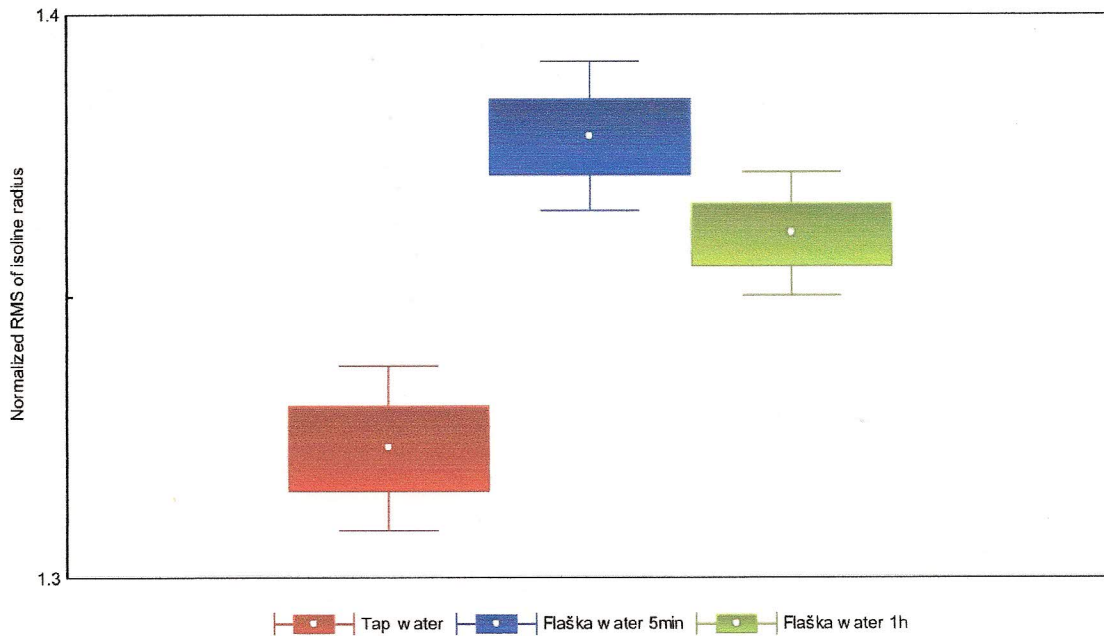

Table 20: Statistical comparison of Normalized RMS index

The normalized RMS index of water is higher in the water that was in the Flaška bottle. In comparison with tap water, a statistically significant difference occurred in this value.

	Area	Average intensity	Entropy by isoline	Normalized RMS of isoline radius
TAP WATER	9518	5686	1.195e+004	1.135e+004
FLAŠKA 5min	1.395e+004	1.441e+004	1.832e+004	1.781e+004
FLAŠKA 1hour	2.169e+004	2.505e+004	1.488e+004	1.599e+004
criterion	100.8	250	27.01	29.53
p-value	0.002544	0.006261	0.0007018	0.0007639

CONCLUSION

The study shows that the Flaška bottle has an effect on the change in water. A higher effect was observed in the water that was in the Flaška bottle for one hour. This water showed a higher variance in area and intensity. However, the water that was in the Flaška bottle for five minutes showed increased entropy and RMS index. As regards the viewed variables, the water changes each time it is poured into the Flaška bottle. Also significant is the amount of time that the water remains in the Flaška bottle.

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