



Thank you for providing the data. Here's a breakdown of the values from the image for the first water sample (Zaķumuiža):

Component	Value Range (mg/l)
Sausne (Total Dissolved Solids - TDS)	168–251
Kalcijs (Calcium)	27–40
Magnijs (Magnesium)	7–12
Nātrijs (Sodium)	12–18
Kālijs (Potassium)	0.9–1.5
Hidrokarbonāti (Bicarbonates)	112–169
Sulfāti (Sulfates)	10–15
Hlorīdi (Chlorides)	21–32

Now, let's compare these to the Specialty Coffee Association (SCA) water standards:

SCA Water Standards for Brewing Coffee

- 1. **TDS (Total Dissolved Solids):** 75–250 mg/l
- 2. **Calcium Hardness:** 50–175 ppm (as CaCO₃, equivalent to about 20–70 mg/l of calcium)
- 3. **Alkalinity:** 40–75 ppm (as CaCO₃, equivalent to about 48–91 mg/l of bicarbonates)
- 4. **pH:** 6.5–8.0
- 5. **Chloride (Cl⁻):** Less than 30 mg/l
- 6. **Sodium (Na⁺):** Less than 10 mg/l (ideally)
- 7. **Magnesium:** Typically recommended at 5–10 mg/l

Comparison

1. **TDS:** The sample falls in the upper range (168–251 mg/l). Some values may exceed the ideal for coffee brewing.
 2. **Calcium:** The sample's calcium content (27–40 mg/l) is within the SCA-recommended range.
 3. **Magnesium:** The sample (7–12 mg/l) is slightly above the recommended range in the upper values.
 4. **Sodium:** The sample (12–18 mg/l) is above the ideal (under 10 mg/l).
 5. **Potassium:** Not specified by SCA, but the sample (0.9–1.5 mg/l) seems minimal and likely fine.
 6. **Bicarbonates (Alkalinity):** The sample (112–169 mg/l) is higher than the ideal range (48–91 mg/l), which could lead to over-buffering and muted coffee flavors.
 7. **Sulfates:** The sample (10–15 mg/l) is within a safe and neutral range for coffee brewing.
 8. **Chlorides:** The sample (21–32 mg/l) is close to the upper limit (30 mg/l) but generally acceptable.
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Suitability

This water sample may work for brewing coffee, but:

- **High bicarbonates** could lead to flat or overly muted flavor extraction.
- **High sodium** could add a slight saltiness to the taste.
- **TDS** at the upper limit could affect flavor clarity.

Would you like me to analyze additional samples or suggest adjustments to optimize this water for coffee brewing?



Here is the breakdown of the values for the second water sample (Venden):

Component	Value Range (mg/l or g/l)
Sausne (Total Dissolved Solids - TDS)	0.06–0.15 g/l (60–150 mg/l)
HCO ₃ ⁻ (Bicarbonates)	30–90 mg/l
SO ₄ ²⁻ (Sulfates)	10–25 mg/l
Cl ⁻ (Chlorides)	3–20 mg/l
Ca ²⁺ (Calcium)	10–30 mg/l
Mg ²⁺ (Magnesium)	2–10 mg/l
Na ⁺ (Sodium)	1–5 mg/l
K ⁺ (Potassium)	<1–3 mg/l
pH	6.0–7.1

Comparison with SCA Water Standards

1. **TDS:** The sample (60–150 mg/l) is within the SCA-recommended range (75–250 mg/l).
2. **Calcium:** The sample (10–30 mg/l) is slightly below the ideal range of 20–70 mg/l, but still acceptable.
3. **Magnesium:** The sample (2–10 mg/l) aligns well with the SCA range of 5–10 mg/l.
4. **Sodium:** The sample (1–5 mg/l) is well below the recommended maximum of 10 mg/l.
5. **Potassium:** Not specified by SCA but minimal (<1–3 mg/l), likely fine.
6. **Bicarbonates (Alkalinity):** The sample (30–90 mg/l) fits well within the SCA range of 48–91 mg/l.
7. **Sulfates:** The sample (10–25 mg/l) is acceptable and neutral for coffee brewing.
8. **Chlorides:** The sample (3–20 mg/l) is well within the safe range (under 30 mg/l).
9. **pH:** The sample (6.0–7.1) is close to or within the SCA range of 6.5–8.0.

Suitability

The second sample (Venden) aligns better with SCA water standards compared to the first sample (Začumuiža). It has balanced bicarbonates, a more optimal sodium level, and TDS comfortably within range. This water is more suitable for brewing coffee, as it is likely to enhance flavor clarity and extraction without over-buffering or adding off-flavors.

Would you like a deeper analysis or suggestions for adjustments to further optimize either sample?



Here's the breakdown of the values for the third water sample (Tērvete):

Component	Value Range (mg/l)
Total Mineralization (TDS)	350–900 mg/l
Ca ²⁺ (Calcium)	70–130 mg/l
Mg ²⁺ (Magnesium)	18–45 mg/l
Na ⁺ (Sodium)	5–50 mg/l
K ⁺ (Potassium)	2–15 mg/l
Cl ⁻ (Chlorides)	5–100 mg/l
SO ₄ ²⁻ (Sulfates)	50–110 mg/l
HCO ₃ ⁻ (Bicarbonates)	200–450 mg/l

Comparison with SCA Water Standards

- TDS:** The sample's range (350–900 mg/l) exceeds the SCA recommendation of 75–250 mg/l, which may lead to overly mineralized water, muting coffee flavors.
- Calcium:** The sample (70–130 mg/l) exceeds the SCA-recommended range of 20–70 mg/l, which could contribute to excessive hardness.
- Magnesium:** The sample (18–45 mg/l) is well above the SCA range of 5–10 mg/l, leading to excessive hardness and potentially harsh flavors.
- Sodium:** The sample (5–50 mg/l) is above the ideal (under 10 mg/l) and could influence flavor negatively, especially in the upper range.
- Potassium:** Not specified by SCA, but the sample's range (2–15 mg/l) may slightly affect the water's ionic balance.
- Bicarbonates (Alkalinity):** The sample (200–450 mg/l) is significantly above the ideal range (48–91 mg/l), leading to over-buffering and reduced flavor clarity.
- Sulfates:** The sample (50–110 mg/l) exceeds typical safe ranges (under 50 mg/l), potentially introducing undesirable bitterness.
- Chlorides:** The sample (5–100 mg/l) is above the upper safe limit (30 mg/l) in its upper range, which could harm coffee flavor and equipment.

Suitability

The third sample (Tērvete) is **not suitable** for specialty coffee brewing without significant treatment. The high levels of TDS, calcium, magnesium, bicarbonates, sulfates, and chlorides could:

- Muted or distorted coffee flavors.
 - Introduce harsh or bitter notes.
 - Cause long-term damage to brewing equipment due to scaling.
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Recommendations

This water requires significant adjustment to align with SCA standards. Consider using methods such as:

- **Dilution** with low-mineral or distilled water to lower TDS and overall hardness.
- **Reverse osmosis (RO)** followed by remineralization with a balanced coffee-specific formula.

Let me know if you'd like assistance optimizing this water or analyzing another sample!



Here is the breakdown of the values for the fourth water sample (Stelpe):

Component	Value Range (mg/l)
Kalcijs (Ca ²⁺ - Calcium)	59.1–65.5 mg/l
Magnijs (Mg ²⁺ - Magnesium)	33.5–40.9 mg/l
Nātrijs (Na ⁺ - Sodium)	14.0–17.2 mg/l
Kālijs (K ⁺ - Potassium)	9.5–11.7 mg/l
Sulfāti (SO ₄ ²⁻ - Sulfates)	10.0–14.0 mg/l
Karbonāti (HCO ₃ ⁻ - Bicarbonates)	332–366 mg/l
Hlorīdi (Cl ⁻ - Chlorides)	7.6–9.4 mg/l
Mineralizācija (TDS - Total Dissolved Solids)	465–531 mg/l

Comparison with SCA Water Standards

1. **TDS:** The sample (465–531 mg/l) is **well above** the recommended range (75–250 mg/l), making the water too mineralized for ideal coffee brewing.
2. **Calcium:** The sample (59.1–65.5 mg/l) is within the SCA range (20–70 mg/l).
3. **Magnesium:** The sample (33.5–40.9 mg/l) **exceeds** the SCA range (5–10 mg/l), contributing to excessive water hardness.
4. **Sodium:** The sample (14.0–17.2 mg/l) is above the ideal (under 10 mg/l), which can subtly alter coffee flavors.
5. **Potassium:** Not specified by SCA but relatively high (9.5–11.7 mg/l) and could influence water's ionic balance.
6. **Bicarbonates (Alkalinity):** The sample (332–366 mg/l) is **significantly above** the SCA range (48–91 mg/l), leading to over-buffering and muted flavors.
7. **Sulfates:** The sample (10.0–14.0 mg/l) is within a safe range for coffee brewing.
8. **Chlorides:** The sample (7.6–9.4 mg/l) is within the SCA recommendation (under 30 mg/l).

Suitability

The fourth sample (Stelpe) is **not suitable** for brewing specialty coffee without significant adjustment. Key issues include:

- **Very high TDS** leading to excessive mineralization.
 - **Excess magnesium and bicarbonates**, which contribute to over-hardness and muted or off flavors.
 - **Elevated sodium**, which can subtly alter flavor clarity.
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Recommendations

To make this water suitable for coffee:

1. **Dilute** with distilled or low-mineral water to bring TDS, bicarbonates, and magnesium into range.
2. Consider **reverse osmosis** treatment with remineralization to optimize balance.

Would you like help in creating an adjustment plan or analyzing additional samples?



Here is the breakdown of the values for the fifth water sample (Dabīgais minerālūdens 885):

Component	Value Range (mg/l)
Potassium (K ⁺)	28–47
Calcium (Ca ²⁺)	5–9
Sodium (Na ⁺)	56–72
Sodium (Na ⁺)	8–12
Hydrogen Carbonates (HCO ₃ ⁻)	370–424
Sulfates (SO ₄ ²⁻)	1.5–10
Chlorides (Cl ⁻)	1.5–7
Manganese (Mn)	0.04–0.09
pH	7.4

Comparison with SCA Water Standards

1. **TDS:** While the TDS is not explicitly provided, the high levels of hydrogen carbonates (370–424 mg/l) suggest that this water is highly mineralized and likely exceeds the SCA recommendation of 75–250 mg/l for TDS.
2. **Calcium:** The sample (5–9 mg/l) is within the SCA range (20–70 mg/l), but on the low end. It may be adequate but could benefit from slightly higher calcium levels for optimal flavor extraction.
3. **Magnesium:** Not specified explicitly, but potassium (28–47 mg/l) and other minerals like calcium indicate that magnesium may also be present in similar higher amounts. Magnesium levels are not in the ideal SCA range of 5–10 mg/l.
4. **Sodium:** The sample shows a sodium range of 8–72 mg/l, which exceeds the SCA recommended maximum of 10 mg/l, especially in the upper range. High sodium levels can affect flavor clarity and might introduce a salty taste.
5. **Potassium:** The sample's potassium (28–47 mg/l) is high and not typically specified by SCA but could influence the water's ionic balance and the flavor profile.
6. **Bicarbonates (Alkalinity):** The sample (370–424 mg/l) is **well above** the SCA recommendation (48–91 mg/l), which may lead to excessive buffering and reduced flavor clarity.
7. **Sulfates:** The sample (1.5–10 mg/l) is within the safe range for coffee brewing.
8. **Chlorides:** The sample (1.5–7 mg/l) is acceptable as it's below the SCA limit of 30 mg/l.
9. **Manganese:** The sample (0.04–0.09 mg/l) is within a safe range.

Suitability

The fifth sample (Dabīgais minerālūdens 885) is **not suitable** for specialty coffee brewing without adjustments. The high levels of:

- **Bicarbonates (alkalinity)** and **sodium** will likely lead to over-buffering and dull flavor extraction.
 - **Excessive mineralization** could also mute the clarity and complexity of the coffee flavors.
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Recommendations

To make this water suitable:

1. **Dilute** with low-mineral or distilled water to reduce TDS and bicarbonate levels.
2. Consider **reverse osmosis** treatment followed by remineralization to optimize the balance of minerals.

Would you like additional help in making this water suitable or more details about optimizing any of these samples?



Here is the breakdown of the values for the sixth water sample (Lielbāta):

Component	Value (mg/l)
pH (units)	8.0
Mineralizācija (TDS)	240.0
Kalcijs (Ca ²⁺ - Calcium)	59.0 ± 9.0
Magnijs (Mg ²⁺ - Magnesium)	<14.0
Nātrijs (Na ⁺ - Sodium)	4.2
Kālijs (K ⁺ - Potassium)	<2.0
Sulfāti (SO ₄ ²⁻ - Sulfates)	<10.0
Dzelzs (Fe - Iron)	<0.01

Comparison with SCA Water Standards

1. **TDS (Total Dissolved Solids):** The sample (240.0 mg/l) is at the upper limit of the SCA recommendation (75–250 mg/l), making it suitable.
2. **Calcium:** The sample (59.0 ± 9.0 mg/l) falls within the SCA range (20–70 mg/l), ideal for coffee brewing.
3. **Magnesium:** The sample (<14.0 mg/l) is slightly above the SCA range (5–10 mg/l) but close enough to work well.
4. **Sodium:** The sample (4.2 mg/l) is well within the SCA recommendation (under 10 mg/l), making it suitable.
5. **Potassium:** The sample (<2.0 mg/l) is not specified by SCA but is minimal and unlikely to affect brewing negatively.
6. **Sulfates:** The sample (<10.0 mg/l) is well within a safe range for coffee brewing.
7. **pH:** The sample's pH of 8.0 is at the upper limit of the SCA range (6.5–8.0), which is suitable.
8. **Iron:** The sample (<0.01 mg/l) is minimal and not a concern for coffee brewing.

Suitability

The sixth sample (Lielbāta) is **highly suitable** for coffee brewing, meeting nearly all SCA standards:

- Balanced TDS and calcium levels support good flavor extraction.
 - Low sodium and minimal sulfates and iron avoid interference with coffee flavors.
 - Slightly high magnesium may enhance extraction without significant negative impact.
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Would you like to proceed with this water or explore how it compares to the others in greater detail?



Here is the breakdown of the values for the seventh water sample (Eden Dzeramais Üdens):

Component	Value (mg/l)
pH	8.08 (±4%)
Bicarbonate (HCO_3^-)	252 (±10%)
Chloride (Cl^-)	62.1 (±10%)
Fluoride (F^-)	0.51 (±10%)
Calcium (Ca^{2+})	10.6 (±10%)
Magnesium (Mg^{2+})	4.14 (±10%)
Sodium (Na^+)	159 (±10%)
Potassium (K^+)	2.1 (±10%)

Comparison with SCA Water Standards

1. **pH:** The sample's pH (8.08) is slightly above the SCA-recommended range of 6.5–8.0 but is close enough to be acceptable.
2. **Bicarbonate (Alkalinity):** The sample (252 mg/l) is **well above** the SCA recommendation of 48–91 mg/l, leading to over-buffering and muted coffee flavors.
3. **Chloride (Cl^-):** The sample (62.1 mg/l) exceeds the SCA upper limit of 30 mg/l, which could negatively affect flavor and corrode equipment.
4. **Fluoride (F^-):** The sample (0.51 mg/l) is minimal and does not pose an issue for coffee brewing.
5. **Calcium (Ca^{2+}):** The sample (10.6 mg/l) is below the SCA range of 20–70 mg/l, which may reduce flavor clarity.
6. **Magnesium (Mg^{2+}):** The sample (4.14 mg/l) is slightly below the SCA range of 5–10 mg/l, but it is close enough to work.
7. **Sodium (Na^+):** The sample (159 mg/l) is **far above** the recommended maximum of 10 mg/l, which could introduce a salty flavor and negatively impact coffee taste.
8. **Potassium (K^+):** The sample (2.1 mg/l) is not a concern and is minimal.

Suitability

The seventh sample (Eden Dzeramais Ūdens) is **not suitable** for specialty coffee brewing without significant adjustments. The main issues include:

- **Excessive bicarbonates**, which cause over-buffering.
- **High sodium levels**, which may negatively alter the coffee's taste.
- **High chloride content**, which could corrode brewing equipment and impact flavor clarity.

Recommendations

To make this water suitable:

1. **Dilute** with distilled or low-mineral water to reduce sodium, bicarbonates, and chlorides.
2. Consider **reverse osmosis** with remineralization to adjust calcium and magnesium levels while reducing problematic elements.

Let me know if you'd like further analysis or help with optimizing this water for brewing coffee!

water_samples_comparison (1)								
Sample	TDS (mg/l)	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	Bicarbonates (mg/l)	Chlorides (mg/l)	pH	Suitability
SCA Recommended	75-250	20-70	5-10	<10	40-75	<30	6.5-8.0	
Zaķumuiža	168-251	27-40	7-12	12-18	112-169	21-32	6.5-7.1	Moderate
Venden	60-150	10-30	2-10	1-5	30-90	3-20	6.0-7.1	Best
Tērvete	350-900	70-130	18-45	5-50	200-450	5-100	Not Specified	Not Suitable
Stelpe	465-531	59.1-65.5	33.5-40.9	14-17.2	332-366	7.6-9.4	Not Specified	Not Suitable
Dabigais minerālūdens 885	High	5-9	Not Specified	56-72	370-424	1.5-7	7.4	Not Suitable
Lielbāta	240	59 ± 9	<14	4.2	Not Specified	Not Specified	8.0	Runner-Up
Eden Dzeramais Ūdens	High	10.6	4.14	159	252	62.1	8.08	Not Suitable

OK, I see that Lielbāta haven't bicarbonates and chlorides specified. How would it affect the overall result if those values were not suitable?



If the **bicarbonates** and **chlorides** in Lielbāta were outside the SCA-recommended ranges, here's how it could impact the overall result:

1. Bicarbonates (HCO_3^-)

- **SCA Range:** 40–75 mg/L
- **If Too High:** High bicarbonates lead to over-buffering, which results in muted coffee flavors and less vibrant acidity. If Lielbāta's bicarbonates are significantly above the range, it could detract from its suitability and move it out of the "Runner-Up" position.
- **If Too Low:** Low bicarbonates may lead to excessive acidity in the water, potentially causing over-extraction or unbalanced flavors. However, this is less common in natural mineral waters.

2. Chlorides (Cl^-)

- **SCA Range:** <30 mg/L
- **If Too High:** High chloride levels can negatively impact the coffee flavor and corrode brewing equipment over time. If Lielbāta's chlorides exceed the SCA range, its suitability for coffee brewing would diminish significantly.
- **If Too Low:** Chlorides are not critical for coffee flavor, so low levels would have little to no negative impact.

Impact on Overall Result

If both bicarbonates and chlorides are outside the suitable ranges:

- **High Bicarbonates:** Lielbāta would likely fall out of the "Runner-Up" position since bicarbonates heavily influence flavor clarity and balance.
- **High Chlorides:** This would be less impactful on coffee flavor directly but would affect the water's overall quality score and its long-term effect on equipment.

If you'd like, I can simulate scenarios to explore the potential outcomes or adjust its evaluation based on assumed values for bicarbonates and chlorides. Let me know how you'd like to proceed!

Who would then take the runner-up position?



If **Lielbāta** loses its **Runner-Up** position due to unsuitable bicarbonates or chlorides, the next best candidate based on the table would likely be **Zaķumuiža**. Here's why:

Strengths of Zaķumuiža:

- 1. **TDS (168–251 mg/L):** Within the SCA range, though on the higher end.
- 2. **Calcium (27–40 mg/L):** Well within the SCA recommendation (20–70 mg/L).
- 3. **Magnesium (7–12 mg/L):** Aligns with the SCA range (5–10 mg/L) for optimal flavor extraction.
- 4. **Chlorides (21–32 mg/L):** Slightly above the ideal (<30 mg/L) but still reasonable for brewing.
- 5. **pH (6.5–7.1):** Falls perfectly within the SCA recommendation (6.5–8.0).

Weaknesses of Zaķumuiža:

- 1. **Bicarbonates (112–169 mg/L):** Slightly higher than the SCA range (40–75 mg/L), which may cause some buffering and muted flavors.
- 2. **Sodium (12–18 mg/L):** Above the SCA recommendation (<10 mg/L), which could subtly impact flavor clarity.

Revised Ranking:

- **Winner: Venden**
- **Runner-Up: Zaķumuiža**

Zaķumuiža would take the Runner-Up spot because it remains closer to the SCA standards than other samples like Tērvete, Stelpe, or Dabigais Minerālūdens 885, which have significant deviations in TDS, bicarbonates, or other critical parameters.

Let me know if you'd like me to adjust the evaluation further!