## Supplementary Material

# Classification of Beers Through Comprehensive Physicochemical Characterization and Multi-block Chemometrics

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Table S1. Total solids (mg/mL), lag time (h) organic acid and sugar contents (g/L), pH values and alcohol proportions (%) of beer samples.

| Sample name | Fermentation type | Beer categorization | Acetic acid (g/L) | Citric acid (g/L) | Glucose (g/L) | Malic acid (g/L) | Saccharose (g/L) | Total acid (g/L) | Total sugar (g/L) | Solids (mg/mL) | Lag time (h) | pH | Alcohol (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S30 | Bottom | Lager | 0.59 | 7.34 | 26.65 | 0.35 | 14.00 | 2.80 | 31.70 | 61.62 | 8.5 | 3.49 | 6.3 |
| S31 | Bottom | Lager | 0.45 | 3.54 | 12.05 | 0.90 | 7.25 | 2.35 | 14.10 | 37.86 | 14.9 | 3.32 | 4.9 |
| S32 | Bottom | Lager | 0.77 | 7.30 | 23.70 | 0.45 | 12.90 | 4.05 | 28.45 | 36.50 | 12.8 | 3.42 | 5.2 |
| S33 | Bottom | Lager | 0.35 | 5.57 | 18.95 | 0.40 | 10.40 | 2.45 | 22.00 | 46.21 | 13.7 | 3.37 | 4.8 |
| S34 | Bottom | Lager | 0.53 | 5.70 | 17.70 | 0.35 | 9.80 | 2.75 | 21.60 | 34.60 | 8.2 | 3.25 | 5.8 |
| S35 | Bottom | Lager | 0.37 | 3.56 | 12.90 | 1.10 | 7.05 | 2.40 | 15.60 | 46.09 | 15.8 | 3.23 | 4.7 |
| S36 | Bottom | Lager | 0.66 | 9.52 | 34.85 | 0.80 | 18.05 | 3.30 | 40.30 | 67.54 | 14.7 | 3.43 | 5.5 |
| S37 | Bottom | Lager | 0.41 | 4.25 | 13.40 | 0.45 | 7.75 | 2.25 | 15.50 | 40.45 | 9.7 | 3.50 | 8.2 |
| S38 | Bottom | Lager | 0.50 | 6.29 | 20.20 | 0.20 | 11.30 | 2.55 | 22.35 | 67.00 | 9.5 | 3.39 | 5.5 |
| S39 | Bottom | Lager | 0.44 | 4.13 | 13.97 | 0.77 | 8.30 | 2.40 | 16.87 | 53.68 | 9.5 | 3.35 | 6.9 |
| S40 | Bottom | Lager | 0.46 | 4.07 | 13.45 | 0.40 | 8.10 | 2.15 | 15.60 | 73.93 | 10.4 | 3.32 | 6.4 |
| S41 | Bottom | Lager | 0.45 | 4.24 | 13.65 | 0.20 | 8.10 | 2.20 | 16.10 | 39.33 | 12.2 | 3.53 | 7.4 |
| S42 | Bottom | Lager | 0.39 | 4.32 | 15.40 | 0.60 | 8.25 | 2.30 | 19.35 | 42.01 | 11.5 | 3.17 | 4.4 |
| S43 | Bottom | Lager | 0.49 | 4.50 | 16.55 | 1.55 | 9.35 | 2.85 | 20.00 | 52.38 | 10.3 | 3.41 | 4.7 |
| S44 | Bottom | Lager | 0.43 | 3.88 | 12.75 | 0.10 | 6.95 | 2.15 | 14.50 | 37.94 | 12.9 | 3.31 | 4.6 |
| S45 | Bottom | Lager | 0.56 | 6.86 | 22.50 | 1.40 | 12.55 | 3.05 | 25.35 | 62.30 | 9.1 | 3.24 | 6.0 |
| S50 | Bottom | Lager | 0.46 | 4.41 | 15.98 | 0.45 | 8.83 | 2.43 | 19.68 | 46.15 | 10.3 | 3.36 | 5.5 |
| S51 | Bottom | Lager | 0.46 | 4.41 | 15.98 | 0.45 | 8.83 | 2.43 | 19.68 | 46.15 | 10.9 | 3.36 | 5.5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S52 | Bottom | Lager | 0.46 | 4.41 | 15.98 | 0.45 | 8.83 | 2.43 | 19.68 | 46.15 | 11.7 | 3.36 | 5.5 |
| S53 | Bottom | Lager | 0.46 | 4.41 | 15.98 | 0.45 | 8.83 | 2.43 | 19.68 | 46.15 | 14.3 | 3.36 | 5.5 |
| S54 | Bottom | Lager | 0.46 | 4.41 | 15.98 | 0.45 | 8.83 | 2.43 | 19.68 | 46.15 | 11.0 | 3.36 | 5.5 |
| S48 | Bottom | Lager | 0.40 | 5.41 | 18.75 | 0.65 | 9.90 | 2.50 | 21.85 | 35.42 | 15.6 | 3.31 | 4.9 |
| S49 | Bottom | Lager | 0.58 | 7.91 | 27.55 | 0.15 | 14.50 | 2.85 | 31.25 | 46.66 | 13.9 | 3.28 | 7.3 |
| S55 | Bottom | Lager | 0.49 | 6.66 | 23.15 | 0.40 | 12.20 | 2.68 | 26.55 | 41.04 | 12.8 | 3.29 | 6.1 |
| S56 | Bottom | Lager | 0.49 | 6.66 | 23.15 | 0.40 | 12.20 | 2.68 | 26.55 | 41.04 | 15.8 | 3.29 | 6.1 |
| S57 | Bottom | Lager | 0.49 | 6.66 | 23.15 | 0.40 | 12.20 | 2.68 | 26.55 | 41.04 | 14.2 | 3.29 | 6.1 |
| S58 | Bottom | Lager | 0.49 | 6.66 | 23.15 | 0.40 | 12.20 | 2.68 | 26.55 | 41.04 | 12.8 | 3.29 | 6.1 |
| S1 | Top | Ale | 0.43 | 4.13 | 14.50 | 0.50 | 8.10 | 2.40 | 17.15 | 36.52 | 5.8 | 3.31 | 5.0 |
| S2 | Top | Ale | 0.50 | 6.78 | 23.35 | 0.70 | 12.75 | 2.50 | 25.75 | 53.29 | 5.6 | 3.22 | 5.1 |
| S3 | Top | Ale | 0.42 | 5.07 | 16.75 | 0.85 | 9.20 | 2.30 | 19.45 | 40.93 | 4.4 | 3.32 | 5.9 |
| S4 | Top | Ale | 0.51 | 5.69 | 17.05 | 0.55 | 10.45 | 2.35 | 18.80 | 51.72 | 5.7 | 3.43 | 7.0 |
| S5 | Top | Ale | 0.45 | 3.52 | 13.15 | 0.75 | 7.05 | 2.10 | 16.10 | 47.72 | 2.4 | 3.38 | 5.2 |
| S6 | Top | Ale | 0.57 | 6.41 | 21.90 | 0.50 | 11.95 | 2.85 | 26.45 | 56.08 | 2.8 | 3.44 | 5.7 |
| S7 | Top | Ale | 0.51 | 6.56 | 21.15 | 0.60 | 12.10 | 2.85 | 24.60 | 61.52 | 5.3 | 3.42 | 5.6 |
| S8 | Top | Ale | 0.40 | 5.89 | 18.45 | 0.25 | 10.80 | 2.25 | 19.95 | 35.15 | 6.3 | 3.30 | 5.8 |
| S9 | Top | Ale | 0.36 | 5.07 | 17.15 | 0.50 | 9.75 | 2.20 | 19.30 | 60.22 | 4.1 | 3.31 | 5.5 |
| S12 | Top | Ale | 0.51 | 5.43 | 19.97 | 1.13 | 10.53 | 2.73 | 24.67 | 32.37 | 4.4 | 3.32 | 4.4 |
| S13 | Top | Ale | 0.62 | 8.50 | 28.97 | 1.20 | 16.33 | 3.07 | 32.53 | 77.30 | 2.7 | 3.36 | 6.3 |
| S14 | Top | Ale | 0.59 | 7.02 | 22.90 | 0.10 | 12.75 | 2.80 | 25.90 | 37.42 | 2.3 | 3.47 | 5.8 |
| S15 | Top | Ale | 0.39 | 5.00 | 16.00 | 0.40 | 9.55 | 2.25 | 18.50 | 44.08 | 5.8 | 3.38 | 5.8 |
| S16 | Top | Ale | 0.31 | 3.82 | 13.55 | 0.20 | 7.70 | 2.20 | 16.45 | 39.96 | 5.9 | 3.51 | 6.6 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S17 | Top | Ale | 0.33 | 4.03 | 14.40 | 0.60 | 8.15 | 2.00 | 16.50 | 42.88 | 5.2 | 3.36 | 5.9 |
| S18 | Top | Ale | 0.53 | 4.22 | 17.15 | 1.05 | 9.35 | 2.20 | 20.90 | 37.75 | 3.2 | 3.32 | 5.4 |
| S19 | Top | Ale | 0.40 | 4.27 | 14.35 | 0.40 | 8.05 | 2.40 | 16.35 | 42.37 | 2.4 | 3.28 | 5.0 |
| S20 | Top | Ale | 0.41 | 5.51 | 18.75 | 0.45 | 10.15 | 2.45 | 22.00 | 61.21 | 4.7 | 3.40 | 7.1 |
| S21 | Top | Ale | 0.66 | 7.90 | 26.25 | 1.20 | 14.80 | 3.35 | 29.50 | 37.00 | 3.8 | 3.33 | 5.7 |
| S22 | Top | Ale | 0.43 | 5.09 | 14.60 | 0.35 | 9.30 | 2.65 | 17.55 | 48.67 | 2.5 | 3.34 | 5.5 |
| S23 | Top | Ale | 0.46 | 5.55 | 17.85 | 0.70 | 10.85 | 2.90 | 19.90 | 55.58 | 4.0 | 3.40 | 5.7 |
| S24 | Top | Ale | 0.43 | 6.76 | 21.55 | 0.40 | 11.75 | 2.95 | 22.90 | 46.83 | 2.1 | 3.24 | 5.1 |
| S25 | Top | Ale | 0.56 | 8.29 | 28.80 | 2.15 | 15.40 | 3.60 | 31.45 | 40.95 | 5.6 | 3.23 | 4.8 |
| S26 | Top | Ale | 0.34 | 4.51 | 13.90 | 0.00 | 7.70 | 1.85 | 15.05 | 44.71 | 3.0 | 3.31 | 5.4 |
| S27 | Top | Ale | 0.51 | 5.29 | 19.30 | 0.50 | 9.65 | 2.35 | 22.30 | 37.28 | 4.7 | 3.33 | 5.1 |
| S28 | Top | Ale | 0.37 | 3.14 | 11.50 | 0.30 | 5.95 | 1.95 | 13.10 | 45.84 | 3.3 | 3.39 | 4.8 |
| S29 | Top | Ale | 0.43 | 3.90 | 13.20 | 0.75 | 7.85 | 2.15 | 14.75 | 66.47 | 4.1 | 3.41 | 7.1 |
| S10 | | Hybrid | 0.46 | 5.19 | 17.15 | 0.45 | 9.70 | 2.43 | 19.93 | 45.97 | | 3.34 | 5.5 |
| S11 | | Hybrid | 0.46 | 5.19 | 17.15 | 0.45 | 9.70 | 2.43 | 19.93 | 45.97 | | 3.34 | 5.5 |
| S46 | | Hybrid | 0.46 | 5.19 | 17.15 | 0.45 | 9.70 | 2.43 | 19.93 | 45.97 | | 3.34 | 5.5 |
| S47 | | Hybrid | 0.46 | 5.19 | 17.15 | 0.45 | 9.70 | 2.43 | 19.93 | 45.97 | | 3.34 | 5.5 |

Table S2. Color parameters (L*, a*, b*, C*, h) of beer samples.

| Sample name | Fermentation type | Beer categorization | L* | a* | b* | C* | h |
|---|---|---|---|---|---|---|---|
| S30 | Bottom | Lager | 35.5 | 4.6 | 12.6 | 13.41 | -0.43 |
| S31 | Bottom | Lager | 37.4 | 4.1 | 6.2 | 7.43 | 17.04 |
| S32 | Bottom | Lager | 22.9 | 13.7 | 11.5 | 17.89 | 1.11 |
| S33 | Bottom | Lager | 30.2 | 7.7 | 16.7 | 18.39 | -1.47 |
| S34 | Bottom | Lager | 37.9 | 2.4 | 7.1 | 7.49 | -0.19 |
| S35 | Bottom | Lager | 39 | 4.3 | 3.5 | 5.54 | 1.06 |
| S36 | Bottom | Lager | 36.9 | 2.2 | 14.6 | 14.76 | 0.37 |
| S37 | Bottom | Lager | 37.3 | 5.8 | 3.6 | 6.83 | 0.71 |
| S38 | Bottom | Lager | 35.5 | 6.3 | 9.5 | 11.40 | 15.89 |
| S39 | Bottom | Lager | 34.9 | 7.4 | 13.7 | 15.57 | -3.47 |
| S40 | Bottom | Lager | 36.2 | 5.2 | 7.2 | 8.88 | 5.31 |
| S41 | Bottom | Lager | 35.8 | 8.1 | 8.9 | 12.03 | 1.96 |
| S42 | Bottom | Lager | 37.1 | 6.1 | 6.1 | 8.63 | 1.56 |
| S43 | Bottom | Lager | 38.3 | 4.1 | 6.6 | 7.77 | -25.65 |
| S44 | Bottom | Lager | 26.1 | 7.8 | 14.7 | 16.64 | -3.08 |
| S45 | Bottom | Lager | 37.7 | 2.1 | 8.6 | 8.85 | 1.41 |
| S50 | Bottom | Lager | 36.55 | 5.5 | 8.75 | 10.14 | 0.89 |
| S51 | Bottom | Lager | 36.55 | 5.5 | 8.75 | 10.14 | 0.89 |
| S52 | Bottom | Lager | 36.55 | 5.5 | 8.75 | 10.14 | 0.89 |
| S53 | Bottom | Lager | 36.55 | 5.5 | 8.75 | 10.14 | 0.89 |
| S54 | Bottom | Lager | 36.55 | 5.5 | 8.75 | 10.14 | 0.89 |
| S48 | Bottom | Lager | 36.5 | 2.1 | 11.8 | 11.99 | -0.78 |
| S49 | Bottom | Lager | 17.7 | 13.7 | 4.1 | 14.30 | 0.31 |
| S55 | Bottom | Lager | 27.1 | 7.9 | 7.95 | 13.14 | -0.24 |

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|---|---|---|---|---|---|---|---|
| S56 | Bottom | Lager | 27.1 | 7.9 | 7.95 | 13.14 | -0.24 |
| S57 | Bottom | Lager | 27.1 | 7.9 | 7.95 | 13.14 | -0.24 |
| S58 | Bottom | Lager | 27.1 | 7.9 | 7.95 | 13.14 | -0.24 |
| S1 | Top | Ale | 15.5 | 11 | 1.5 | 11.10 | 0.14 |
| S2 | Top | Ale | 31.6 | 5.4 | 17 | 17.84 | 0.01 |
| S3 | Top | Ale | 39.6 | 2 | 6.3 | 6.61 | 0.01 |
| S4 | Top | Ale | 31.3 | 7 | 16.6 | 18.02 | -0.97 |
| S5 | Top | Ale | 38.5 | 1.9 | 5.2 | 5.54 | -0.43 |
| S6 | Top | Ale | 36.7 | 6.2 | 6.9 | 9.28 | 2.03 |
| S7 | Top | Ale | 37 | 4.1 | 10.6 | 11.37 | -0.62 |
| S8 | Top | Ale | 34.6 | 4.8 | 18.1 | 18.73 | 0.73 |
| S9 | Top | Ale | 32.9 | 5.7 | 17.8 | 18.69 | -0.02 |
| S12 | Top | Ale | 38.1 | 5.4 | 6.3 | 8.30 | 2.34 |
| S13 | Top | Ale | 37.4 | 4 | 8.1 | 9.03 | -2.05 |
| S14 | Top | Ale | 38.3 | 4.1 | 6.6 | 7.77 | -25.65 |
| S15 | Top | Ale | 37.9 | 4.1 | 6.8 | 7.94 | -11.37 |
| S16 | Top | Ale | 39 | 3.3 | 3.1 | 4.53 | 1.37 |
| S17 | Top | Ale | 37.2 | 8.5 | 7.4 | 11.27 | 1.19 |
| S18 | Top | Ale | 16.6 | 4.5 | 1.3 | 4.68 | 0.30 |
| S19 | Top | Ale | 25.7 | 6.8 | 9.7 | 11.85 | 6.88 |
| S20 | Top | Ale | 34.9 | 5.3 | 11.1 | 12.30 | -1.73 |
| S21 | Top | Ale | 28.5 | 14.6 | 16.2 | 21.81 | 2.01 |
| S22 | Top | Ale | 32.3 | 5.3 | 20.1 | 20.79 | 0.76 |
| S23 | Top | Ale | 31.4 | 9.1 | 19.2 | 21.25 | -1.67 |
| S24 | Top | Ale | 35.3 | 2.6 | 15.8 | 16.01 | -0.21 |
| S25 | Top | Ale | 37.2 | 1.8 | 9.6 | 9.77 | -1.40 |

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|---|---|---|---|---|---|---|---|
| S26 | Top | Ale | 32.8 | 4.4 | 19.9 | 20.38 | 5.21 |
| S27 | Top | Ale | 37.2 | 4.5 | 6.2 | 7.66 | 5.12 |
| S28 | Top | Ale | 36.7 | 5.7 | 7.3 | 9.26 | 3.35 |
| S29 | Top | Ale | 32.7 | 4.6 | 21.9 | 22.38 | -20.61 |
| S10 | | Hybrid | 36.35 | 5.45 | 8.75 | 11.32 | 0.30 |
| S11 | | Hybrid | 36.35 | 5.45 | 8.75 | 11.32 | 0.30 |
| S46 | | Hybrid | 36.35 | 5.45 | 8.75 | 11.32 | 0.30 |
| S47 | | Hybrid | 36.35 | 5.45 | 8.75 | 11.32 | 0.30 |

Table S3. Total phenolic content (TPC), antiradical activity (ABTS) and antioxidant activity (FRAP) of beer samples.

| Sample name | Fermentation type | Beer categorization | TPC (mg GAE/L) | ABTS mg TE/L) | FRAP (mg $Fe^{+2}$ / L) |
|---|---|---|---|---|---|
| S30 | Bottom | Lager | 475.84 | 1319.54 | 2592.21 |
| S31 | Bottom | Lager | 168.04 | 686.48 | 884.47 |
| S32 | Bottom | Lager | 265.29 | 1012.80 | 1003.73 |
| S33 | Bottom | Lager | 163.45 | 830.06 | 851.13 |
| S34 | Bottom | Lager | 288.22 | 883.58 | 1194.80 |
| S35 | Bottom | Lager | 114.37 | 520.71 | 611.34 |
| S36 | Bottom | Lager | 245.10 | 840.50 | 1508.97 |
| S37 | Bottom | Lager | 615.75 | 938.40 | 3771.95 |
| S38 | Bottom | Lager | 356.57 | 879.66 | 1877.00 |
| S39 | Bottom | Lager | 377.21 | 1071.54 | 1696.19 |
| S40 | Bottom | Lager | 350.61 | 943.62 | 1907.78 |
| S41 | Bottom | Lager | 561.62 | 1230.78 | 2653.76 |
| S42 | Bottom | Lager | 236.39 | 793.51 | 1461.52 |
| S43 | Bottom | Lager | 315.75 | 1015.41 | 1634.64 |
| S44 | Bottom | Lager | 203.36 | 864.00 | 1231.99 |
| S45 | Bottom | Lager | 181.34 | 670.81 | 1169.15 |
| S50 | Bottom | Lager | 276.76 | 881.62 | 1485.25 |
| S51 | Bottom | Lager | 276.76 | 881.62 | 1485.25 |
| S52 | Bottom | Lager | 276.76 | 881.62 | 1485.25 |
| S53 | Bottom | Lager | 276.76 | 881.62 | 1485.25 |
| S54 | Bottom | Lager | 276.76 | 881.62 | 1485.25 |
| S48 | Bottom | Lager | 146.94 | 537.68 | 1214.03 |

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|---|---|---|---|---|---|
| S49 | Bottom | Lager | 261.16 | 879.66 | 1591.04 |
| S55 | Bottom | Lager | 204.05 | 708.67 | 1402.54 |
| S56 | Bottom | Lager | 204.05 | 708.67 | 1402.54 |
| S57 | Bottom | Lager | 204.05 | 708.67 | 1402.54 |
| S58 | Bottom | Lager | 204.05 | 708.67 | 1402.54 |
| S1 | Top | Ale | 175.84 | 687.78 | 1096.06 |
| S2 | Top | Ale | 143.73 | 431.95 | 975.52 |
| S3 | Top | Ale | 309.32 | 870.52 | 1739.79 |
| S4 | Top | Ale | 258.87 | 927.95 | 1961.63 |
| S5 | Top | Ale | 219.42 | 896.63 | 1311.49 |
| S6 | Top | Ale | 475.38 | 1262.11 | 2330.61 |
| S7 | Top | Ale | 423.09 | 991.91 | 1922.83 |
| S8 | Top | Ale | 220.33 | 592.50 | 1044.77 |
| S9 | Top | Ale | 612.23 | 1062.40 | 3092.32 |
| S12 | Top | Ale | 200.61 | 811.78 | 820.36 |
| S13 | Top | Ale | 323.09 | 960.59 | 1778.26 |
| S14 | Top | Ale | 265.75 | 1002.36 | 1276.87 |
| S15 | Top | Ale | 299.69 | 908.38 | 1262.76 |
| S16 | Top | Ale | 439.60 | 1065.01 | 1886.92 |
| S17 | Top | Ale | 263.91 | 959.28 | 1012.71 |
| S18 | Top | Ale | 255.66 | 991.91 | 1117.86 |
| S19 | Top | Ale | 193.73 | 811.78 | 910.12 |
| S20 | Top | Ale | 338.68 | 1190.32 | 1962.92 |
| S21 | Top | Ale | 268.50 | 1058.48 | 1483.32 |
| S22 | Top | Ale | 349.23 | 758.27 | 2227.08 |
| S23 | Top | Ale | 684.10 | 1497.06 | 3523.18 |

| | | | | | |
|---|---|---|---|---|---|
| S24 | Top | Ale | 226.76 | 524.62 | 1289.69 |
| S25 | Top | Ale | 169.42 | 579.45 | 1102.47 |
| S26 | Top | Ale | 259.32 | 528.54 | 1264.05 |
| S27 | Top | Ale | 238.68 | 875.74 | 890.89 |
| S28 | Top | Ale | 289.60 | 1076.76 | 1639.77 |
| S29 | Top | Ale | 407.03 | 961.89 | 2162.96 |
| S10 | | Hybrid | 265.52 | 881.62 | 1472.42 |
| S11 | | Hybrid | 265.52 | 881.62 | 1472.42 |
| S46 | | Hybrid | 265.52 | 881.62 | 1472.42 |
| S47 | | Hybrid | 265.52 | 881.62 | 1472.42 |

Table S4. Phenolic compound concentration (mg/L) of beer samples based on the method of internal standard.

| Sample name | Fermentation type | Beer categorization | Vanillin (mg /L) | Cinnamic (mg /L) | Tyrosol (mg /L) | p-OH-benzoic (mg /L) | p-OH-phenylacetic (mg /L) | Homovannilic (mg /L) | Phloretic (mg /L) | Vanillic (mg /L) | Protocatechuic (mg /L) | Syringic (mg /L) | p-Coumaric (mg /L) | Gallic (mg /L) | Ferulic (mg /L) | Caffeic (mg /L) | Sinapic (mg /L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S30 | Bottom | Lager | 0 | 0 | 10.72 | 0.11 | 0.37 | 0.01 | 0 | 0.12 | 0.05 | 0.15 | 0.12 | 0 | 0.28 | 0.1 | 0.1 |
| S31 | Bottom | Lager | 0.01 | 0 | 5.38 | 0.11 | 0.69 | 0.01 | 0.02 | 0.18 | 0.01 | 0.1 | 0.1 | 0.07 | 0.23 | 0.08 | 0.12 |
| S32 | Bottom | Lager | 0 | 0 | 8.15 | 0.11 | 0.69 | 0.02 | 0.01 | 0.14 | 0.04 | 0.05 | 0.02 | 0.08 | 0.05 | 0.05 | 0.08 |
| S33 | Bottom | Lager | 0.01 | 0.01 | 6.03 | 0.09 | 0.58 | 0.02 | 0.02 | 0.16 | 0.06 | 0.78 | 0.05 | 11.57 | 0.1 | 0.05 | 0.1 |
| S34 | Bottom | Lager | 0.01 | 0.01 | 4.78 | 0.18 | 0.62 | 0.02 | 0.02 | 0.18 | 0.04 | 0.07 | 0.24 | 0.15 | 0.26 | 0.17 | 0.11 |
| S35 | Bottom | Lager | 0.01 | 0.01 | 7.44 | 0.3 | 0.54 | 0.02 | 0.02 | 0.16 | 0.04 | 0.1 | 0.11 | 0.07 | 0.19 | 0.08 | 0.1 |
| S36 | Bottom | Lager | 0.01 | 0.01 | 7.18 | 0.26 | 0.66 | 0.02 | 0.04 | 0.15 | 0.03 | 0.07 | 0.09 | 0.08 | 0.13 | 0.05 | 0.04 |
| S37 | Bottom | Lager | 0 | 0 | 2.28 | 0.04 | 0.17 | 0.01 | 0 | 0.12 | 0.08 | 0.09 | 0 | 0 | 0 | 0.03 | 0.05 |
| S38 | Bottom | Lager | 0.03 | 0 | 0.97 | 0.1 | 0.54 | 0.02 | 0.16 | 0.18 | 0.11 | 0.15 | 0.25 | 0 | 0.29 | 0.1 | 0.11 |
| S39 | Bottom | Lager | 0.01 | 0 | 1.91 | 0.09 | 0.21 | 0.01 | 0.22 | 0.11 | 0.05 | 0.07 | 0.07 | 0.34 | 0.02 | 0.1 | 0.02 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S40 | Bottom | Lager | 0.01 | 0.01 | 1.29 | 0.08 | 0.24 | 0.01 | 0.18 | 0.14 | 0.06 | 0.07 | 0.02 | 0.24 | 0.02 | 0.03 | 0.01 |
| S41 | Bottom | Lager | 0.01 | 0.12 | 0.77 | 0.09 | 0.26 | 0.01 | 0 | 0.13 | 0.04 | 0.39 | 0.25 | 0.18 | 0.2 | 0.12 | 0.07 |
| S42 | Bottom | Lager | 0.04 | 0 | 11.53 | 0.11 | 0.38 | 0 | 0 | 0.16 | 0 | 0.05 | 0.24 | 0 | 0.2 | 0.14 | 0.08 |
| S43 | Bottom | Lager | 0 | 0 | 5.68 | 0.05 | 0.22 | 0.02 | 0 | 0.13 | 0 | 0.12 | 0 | 0 | 0.01 | 0.07 | 0.1 |
| S44 | Bottom | Lager | 0 | 0 | 4.97 | 0.23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| S45 | Bottom | Lager | 0 | 0 | 0.98 | 0.08 | 0.31 | 0 | 0 | 0.13 | 0 | 0.11 | 0.3 | 0 | 0.25 | 0.08 | 0.12 |
| S50 | Bottom | Lager | 0.01 | 0 | 5.175 | 0.105 | 0.375 | 0.01 | 0.015 | 0.14 | 0.04 | 0.095 | 0.095 | 0.07 | 0.16 | 0.08 | 0.09 |
| S51 | Bottom | Lager | 0.01 | 0 | 5.175 | 0.105 | 0.375 | 0.01 | 0.015 | 0.14 | 0.04 | 0.095 | 0.095 | 0.07 | 0.16 | 0.08 | 0.09 |
| S52 | Bottom | Lager | 0.01 | 0 | 5.175 | 0.105 | 0.375 | 0.01 | 0.015 | 0.14 | 0.04 | 0.095 | 0.095 | 0.07 | 0.16 | 0.08 | 0.09 |
| S53 | Bottom | Lager | 0.01 | 0 | 5.175 | 0.105 | 0.375 | 0.01 | 0.015 | 0.14 | 0.04 | 0.095 | 0.095 | 0.07 | 0.16 | 0.08 | 0.09 |
| S54 | Bottom | Lager | 0.01 | 0 | 5.175 | 0.105 | 0.375 | 0.01 | 0.015 | 0.14 | 0.04 | 0.095 | 0.095 | 0.07 | 0.16 | 0.08 | 0.09 |
| S48 | Bottom | Lager | 0.01 | 0.04 | 1.04 | 0.04 | 0.24 | 0.01 | 0.01 | 0.15 | 0.03 | 0.05 | 0.26 | 0.08 | 0.33 | 0.08 | 0.1 |
| S49 | Bottom | Lager | 0 | 0 | 3.73 | 0.12 | 0.39 | 0 | 0 | 0.12 | 0.12 | 0.1 | 0.19 | 0 | 0.2 | 0.08 | 0.09 |
| S55 | Bottom | Lager | 0.005 | 0.02 | 2.385 | 0.08 | 0.315 | 0.005 | 0.005 | 0.135 | 0.075 | 0.075 | 0.225 | 0.04 | 0.265 | 0.08 | 0.095 |
| S56 | Bottom | Lager | 0.005 | 0.02 | 2.385 | 0.08 | 0.315 | 0.005 | 0.005 | 0.135 | 0.075 | 0.075 | 0.225 | 0.04 | 0.265 | 0.08 | 0.095 |
| S57 | Bottom | Lager | 0.005 | 0.02 | 2.385 | 0.08 | 0.315 | 0.005 | 0.005 | 0.135 | 0.075 | 0.075 | 0.225 | 0.04 | 0.265 | 0.08 | 0.095 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S58 | Bottom | Lager | 0.005 | 0.02 | 2.385 | 0.08 | 0.315 | 0.005 | 0.005 | 0.135 | 0.075 | 0.075 | 0.225 | 0.04 | 0.265 | 0.08 | 0.095 |
| S1 | Top | Ale | 0 | 0 | 2.26 | 0.07 | 0.16 | 0.01 | 0 | 0.12 | 0.05 | 0.06 | 0.28 | 0.24 | 0.35 | 0.32 | 0.13 |
| S2 | Top | Ale | 0.01 | 0.04 | 3.88 | 0.07 | 0.18 | 0.01 | 0.01 | 0.13 | 0.02 | 0.15 | 0.28 | 0 | 0.4 | 0.09 | 0.05 |
| S3 | Top | Ale | 0.01 | 0 | 7.86 | 0.06 | 0.27 | 0.02 | 0.01 | 0.12 | 0 | 0.07 | 0.14 | 0.08 | 0.18 | 0.07 | 0.07 |
| S4 | Top | Ale | 0.02 | 0.05 | 2.81 | 0.04 | 0.31 | 0.01 | 0.01 | 0.14 | 0.04 | 0.08 | 0.37 | 0.1 | 0.34 | 0.08 | 0.13 |
| S5 | Top | Ale | 0 | 0.19 | 1.74 | 0.1 | 0.4 | 0 | 0.01 | 0.2 | 0.03 | 0.08 | 0.39 | 0 | 0.43 | 0.07 | 0.09 |
| S6 | Top | Ale | 0.09 | 0 | 6.44 | 0.08 | 0.3 | 0.01 | 0 | 0.05 | 0 | 0.06 | 0.17 | 0 | 0.13 | 0.03 | 0.05 |
| S7 | Top | Ale | 0.02 | 0.05 | 2.04 | 0.04 | 0.22 | 0 | 0 | 0.08 | 0 | 0.13 | 0.23 | 0 | 0.28 | 0.13 | 0.1 |
| S8 | Top | Ale | 0.03 | 0.04 | 1.38 | 0.07 | 0.27 | 0.01 | 0 | 0.13 | 0 | 0.09 | 0.12 | 22.85 | 0.14 | 0.11 | 0.14 |
| S9 | Top | Ale | 0.04 | 0.04 | 0.97 | 0.09 | 0.27 | 0.01 | 0.04 | 0.15 | 0 | 0.11 | 0.34 | 0.27 | 0.29 | 0.12 | 0.17 |
| S12 | Top | Ale | 0.01 | 0 | 0.98 | 0.05 | 0.28 | 0 | 0 | 0.17 | 0 | 0.1 | 0.8 | 0 | 0.62 | 0.24 | 0.23 |
| S13 | Top | Ale | 0.02 | 0.01 | 1.27 | 0.05 | 0.25 | 0 | 0 | 0.16 | 0.03 | 3.03 | 0.2 | 0 | 0.23 | 0.07 | 0.1 |
| S14 | Top | Ale | 0 | 0.04 | 0.87 | 0.04 | 0.14 | 0.01 | 0 | 0.18 | 0.01 | 0.08 | 0.13 | 0 | 0.26 | 0.02 | 0.09 |
| S15 | Top | Ale | 0.01 | 0.02 | 1.46 | 0.08 | 0.19 | 0 | 0.01 | 0.18 | 0.02 | 0.22 | 0.14 | 0 | 0.21 | 0.04 | 0.12 |
| S16 | Top | Ale | 0.02 | 0.03 | 2.5 | 0.06 | 0.19 | 0.01 | 0.01 | 0.17 | 0.04 | 0.08 | 0.14 | 0.05 | 0.21 | 0.06 | 0.07 |
| S17 | Top | Ale | 0.02 | 0.08 | 2.41 | 0.06 | 0.21 | 0 | 0 | 0.16 | 0 | 6.98 | 0.2 | 0 | 0.27 | 0.05 | 0.06 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S18 | Top | Ale | 0.04 | 0.07 | 3.16 | 0.07 | 0.22 | 0.01 | 0.01 | 0.24 | 0.02 | 0.07 | 0.25 | 0 | 0.47 | 0.04 | 0.07 |
| S19 | Top | Ale | 0.01 | 0.02 | 5.28 | 0.15 | 0.56 | 0.02 | 0.02 | 0.13 | 0.03 | 0.05 | 0.47 | 0.13 | 0.43 | 0.18 | 0.14 |
| S20 | Top | Ale | 0 | 0 | 4.34 | 0.08 | 0.36 | 0 | 0 | 0.11 | 0 | 0 | 0.18 | 0 | 0.2 | 0.11 | 0.08 |
| S21 | Top | Ale | 0 | 0 | 5.68 | 0.06 | 0.37 | 0 | 0 | 0.13 | 0 | 0.07 | 0 | 0 | 0.1 | 0.26 | 0.11 |
| S22 | Top | Ale | 0 | 0 | 4.72 | 0.14 | 0.24 | 0 | 0 | 0.09 | 0 | 0 | 0.19 | 0 | 0.1 | 0 | 0 |
| S23 | Top | Ale | 0.01 | 0 | 7.37 | 0.44 | 0.69 | 0.02 | 0.05 | 0.23 | 0.1 | 0.12 | 0.23 | 0.24 | 0.35 | 0.12 | 0.12 |
| S24 | Top | Ale | 0.04 | 0.1 | 1.1 | 0.09 | 0.24 | 0.02 | 0 | 0.18 | 0 | 0.34 | 0.29 | 0 | 0.34 | 0.15 | 0.16 |
| S25 | Top | Ale | 0.02 | 0.1 | 0.9 | 0.09 | 0.29 | 0.02 | 0.08 | 0.15 | 0 | 0.09 | 0.46 | 0.37 | 0.43 | 0.13 | 0.17 |
| S26 | Top | Ale | 0.02 | 0.04 | 2.87 | 0.08 | 0.26 | 0.02 | 0.03 | 0.2 | 0.08 | 0.11 | 0.76 | 0.27 | 0.75 | 0.33 | 0.22 |
| S27 | Top | Ale | 0 | 0 | 3.59 | 0.09 | 0.37 | 0 | 0 | 0.16 | 0 | 0.08 | 0.18 | 0 | 0.35 | 0.15 | 0.21 |
| S28 | Top | Ale | 0 | 0 | 1.03 | 0.09 | 0.25 | 0 | 0 | 0.15 | 0 | 0.08 | 0.23 | 0 | 0.31 | 0.08 | 0.14 |
| S29 | Top | Ale | 0 | 0 | 0.48 | 0.06 | 0.25 | 0 | 0 | 0.1 | 0 | 0.09 | 0.19 | 0 | 0.28 | 0.12 | 0.17 |
| S10 | | Hybrid | 0.01 | 0.005 | 2.84 | 0.085 | 0.305 | 0.01 | 0.0075 | 0.14 | 0.03 | 0.09 | 0.19 | 0.04 | 0.24 | 0.08 | 0.095 |
| S11 | | Hybrid | 0.01 | 0.005 | 2.84 | 0.085 | 0.305 | 0.01 | 0.0075 | 0.14 | 0.03 | 0.09 | 0.19 | 0.04 | 0.24 | 0.08 | 0.095 |
| S46 | | Hybrid | 0.01 | 0.005 | 2.84 | 0.085 | 0.305 | 0.01 | 0.0075 | 0.14 | 0.03 | 0.09 | 0.19 | 0.04 | 0.24 | 0.08 | 0.095 |
| S47 | | Hybrid | 0.01 | 0.005 | 2.84 | 0.085 | 0.305 | 0.01 | 0.0075 | 0.14 | 0.03 | 0.09 | 0.19 | 0.04 | 0.24 | 0.08 | 0.095 |