B91WF: Brewery Assignment

Name: Alan Tominey

Student ID: H00040557

Assignment Group: B (team 10)

Brew Sheet

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
|  | Brew No. |  | 205002 Group B | | |  |  |  |  |  |
|  | Date |  | 06/08/2020 | | |  |  |  |  |  |
|  | Target gravity | | 1.052 | | |  |  |  |  |  |
|  | Target volume | | 140L | | |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | **Grist** | | | |  |  | **Mashing** |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | % | Extract (LDK) | Weight (Kg) |  | Strike temperature (°C) | | 80.9 |  |
|  | Extra Pale | | 60.0 | 298 | 15.1 |  | Flow rate (L/hr) | | 456 |  |
|  | Caramalt | | 2.0 | 262 | 0.6 |  | Liquor:Grist Ratio (calculated) | | 2.5:1.0 |  |
|  | Wheat Malt | | 38.0 | 307 | 9.34 |  | Total Liquor (calculated) | | 62.4 |  |
|  |  | |  |  |  |  | Liquor to Use (calculated) | | 47.4 |  |
|  |  | |  |  |  |  | Total Liquor (actual) | | 69.2 |  |
|  |  | |  |  |  |  | Liquor:Grist Ratio (actual) | | 2.8:1.0 |  |
|  | Total Grist | | 25kg | | |  | Start Time | | 09:57:00 |  |
|  | Extract Required | | 7505 | | |  | End Time | | 11:05:00 |  |
|  | Feed Rate | | 4kg/min | | |  | Mash Start pH | | 5.69 |  |
|  | Feed Time | | 6.24min | | |  | Mash off pH | | 5.74 |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | **Mashing Schedule** | | | | | | | | |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  | CC | | | |  |  |  |  |  |
|  |  | Temp °C | Start Time | Hold (min) | Time End |  |  |  |  |  |
|  | Initial | 67.5 | 10.08 | 45 | 10.53 |  |  |  |  |  |
|  | Rise | - | 10.53 | - | 11.00 |  |  |  |  |  |
|  | Mash Off | 76.2 | 11.00 | 5 | 11.05 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | **Milling and Mashing Notes** | | | | | | | | |  |
|  | Mashing in proceeded as expected. Some slight dough balling so the total liquor exceeded the calculated. | | | | | | | | |  |
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|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
|  | | **Wort Production** | | | |  | |  | |  | |  | |  | |  | |  | |  |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
|  | |  | |  | |  | | Time | | Pressure | |  | |  | |  | |  | |  |
|  | | Start filling | | | | | | 11.05 | | 1.0 | |  | |  | |  | |  | |  |
|  | | Mash all-in - Start pre-compression | | | | | | 11.17 | | 0.9 | |  | |  | |  | |  | |  |
|  | | Pre-compression end - Sparge on | | | | | | 11.21 | | 1.0 | |  | |  | |  | |  | |  |
|  | | End sparge - Start final compression | | | | | | 11.39 | | 1.0 | |  | |  | |  | |  | |  |
|  | | End collection | | | | | | 11.44 | | 0.8 | |  | |  | |  | |  | |  |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
|  | | **Mash Filter Run Off** | | | |  | |  | |  | |  | |  | |  | |  | |  |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
|  | | Time | | Volume Collected | | Run-off Rate (l/hr) | | Gravity (SG) | | pH | | Colour (description) | | Inlet Pressure | | Outlet Pressure | | Sparge (L) | |  |
|  | | 11.05 | | 20.6 | | 320 | | 1.093 | | 5.71 | | Dark gold | | 1.0 | | 0.4 | | 0.0 | |  |
|  | | 11.12 | | 40.8 | | 311 | | 1.096 | | 5.68 | | Dark gold | | 0.7 | | 0.2 | | 0.0 | |  |
|  | | 11.21 | | 60.0 | | 164 | | 1.096 | | 5.67 | | Dark gold | | 0.9 | | 0.2 | | 0.0 | |  |
|  | | 11.26 | | 80.2 | | 254 | | 1.047 | | 5.85 | | Copper | | 1.0 | | 0.2 | | 18.3 | |  |
|  | | 11.31 | | 100.1 | | 264 | | 1.023 | | 5.93 | | Golden | | 1.0 | | 0.2 | | 37.4 | |  |
|  | | 11.35 | | 120.1 | | 264 | | 1.009 | | 6.19 | | Golden | | 1.0 | | 0.3 | | 57.4 | |  |
|  | | 11.40 | | 140.2 | | 242 | | 1.004 | | 6.37 | | Light gold | | 1.0 | | 0.2 | | 77.5 | |  |
|  | | 11.44 | | 160.3 | | 207 | | 1.002 | | 6.41 | | Pale gold | | 0.8 | | 0.1 | | 97.6 | |  |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
|  | | **Wort Separation Notes** | | | | | | | | | | | | | | | | | |  |
|  | | Mash separation proceeded as expected. The calandria was turned on when 38L had been collected and the preheating begun. The first compression was at 11.17 when 50L had been collected, the volume collected before sparging was 61.9L. The second compression was at 11.39 when 139L was collected. | | | | | | | | | | | | | | | | | |  |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
|  | | **Wort Boiling** | | | |  | |  | |  | |  | |  | |  | |  | |  |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
|  | |  | |  | | Time | | Gravity (SG) | | pH | |  | |  | |  | |  | |  |
|  | | Boil start | | | | 11.55 | | 1.048 | | 5.68 | |  | | | |  | |  | |  |
|  | | Boil stop | | | | 12.55 | | 1.054 | | 5.54 | |  | | | |  | |  | |  |
|  | | Whirlpool | | | | 13.15 | | - | | - | |  | | | |  | |  | |  |
|  | | Transfer start | | | | 13.30 | | - | | - | |  | | | |  | |  | |  |
|  | | Transfer end | | | | 14.15 | | - | | - | |  | | | |  | |  | |  |
|  | | Target Bitterness (IBU) | | | | 21.9 (calculated) | | | | | |  | | | |  | |  | |  |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
|  | | **Boil/Whirlpool/FV additions** | | | | | |  | |  | |  | |  | |  | |  | |  |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |
|  | |  | |  | | Time | | Date | | Amount (g) | |  | |  | |  | |  | |  |
|  | | Warrior | | | | 11.54 | | 26/08/2020 | | 24.2g | |  | |  | |  | |  | |  |
|  | | Mosaic | | | | 13.00 | | 26/08/2020 | | 189.0g | |  | |  | |  | |  | |  |
|  | | Cascade | | | | 13.00 | | 26/08/2020 | | 100.1g | |  | |  | |  | |  | |  |
|  | | Chinook | | | | 13.00 | | 26/08/2020 | | 185.4g | |  | |  | |  | |  | |  |
|  | | Dr Rudi | | | | 13.00 | | 26/08/2020 | | 100.2g | |  | |  | |  | |  | |  |
|  | |  | | | |  | |  | |  | |  | |  | |  | |  | |  |
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|  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
|  | **Fermentation** | | | |  | |  | |  | |  | |  | |  | |  | |  | |
|  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
|  | Gravity | | | | 1.053 | | | |  | |  | |  | |  | |  | |  | |
|  | Yeast Type | | | | BRY97 | | | |  | |  | |  | |  | |  | |  | |
|  | Pitching Rate | | | | 0.70g/l | | | |  | |  | |  | |  | |  | |  | |
|  | Quantity | | | | 102.4g | | | |  | |  | |  | |  | |  | |  | |
|  | FV ID | | | | FV05 | | | |  | |  | |  | |  | |  | |  | |
|  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
|  | **Wort Boiling, Cooling and Pitching Notes** | | | | | | | | | | | | | | | | | |  | |
|  | The hop addition point became blocked whilst adding the aroma hops. Some were lost and it took fifteen minutes to add the hops whilst it was unblocked. The whirlpool was then started. Wort chilled in the paraflow and yeast hydrated as the procedure. | | | | | | | | | | | | | | | | | |  | |
|  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
|  | **Fermentation Log** | | | |  | |  | |  | |  | |  | |  | |  | |  | |
|  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
|  | Date | | 26/08/20 | | 27/08/20 | | 28/08/20 | | 29/08/20 | | 30/08/20 | | 31/08/20 | | 01/09/20 | | 02/09/20 | |  | |
|  | Time | | 15.00 | | 15.00 | | 09.00 | | 12.00 | | 10.00 | | 14.00 | | 15.00 | | 13.00 | |  | |
|  | Gravity | | 1.053 | | 1.048 | | 1.020 | | 1.014 | | 1.011 | | 1.011 | | 1.012 | | 1.011 | |  | |
|  | Temp (°C) | | 17.7 | | 17.0 | | 16.5 | | 17.1 | | 17.2 | | 0.0 | | 0.0 | | 0.1 | |  | |
|  | Pressure (psi) | | 0.0 | | 3.0 | | 8.0 | | 8.5 | | 8.0 | | 6.5 | | 5.5 | | 4.5 | |  | |
|  | pH | | 5.51 | | 5.01 | | 4.63 | | 4.58 | | 4.51 | | 4.57 | | 4.53 | | 4.55 | |  | |
|  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
|  | Date | | 03/09/20 | | 04/09/20 | | 05/09/20 | | 06/09/20 | | Fermentation Notes | | | | | | | |  | |
|  | Time | | 12.00 | | 16.00 | | 11.00 | | 10.00 | | Fermentation got out of lag phase quite quickly and fermentation proceeded well. There was evidence of CO2 production and the gravity fell quickly. Due to miscommunication, full chilling was applied on day four. Pressure dropped during extended cold storage. | | | | | | | |  | |
|  | Gravity | | 1.010 | | 1.011 | | 1.011 | | 1.011 | |  | |
|  | Temp (°C) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | |  | |
|  | Pressure (psi) | | 2.0 | | 2.0 | | 1.5 | | 1.5 | |  | |
|  | pH | | 4.48 | | 4.54 | | 4.51 | | 4.51 | |  | |
|  |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |

Fermentation Profile

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Wort Boiling Evaluation

An essential process in the preparation of beer is the boiling carried out on the wort, after it has been steeped and all the sugars and flavour compounds have been removed from the grist. There are numerous reasons for this step: (including but not limited to)

* Sterilization of the wort – there are numerous bacterial species that can spoil a the final product
* Stabilization of the wort – breaking down enzymes that are important for wort generation but can spoil the beer going forward
* Flavour alteration/generation:
  + Removing volatile compounds like DMS and aldehydes
  + Polymerising α-acid resins
  + Facilitating Maillard reactions between sugars and amino acids, providing colour and flavour
* Preparing the wort for the final product, by finding the desired gravity and pH

This template is a catastrophy!

Numerical Profile with Commentary

|  |
| --- |
| Figure - mean sensory scores for each beer overlayed over control sample    Figure - sensory score breakdown per sample for each sensory category - histogram (top left) shows mean score and standard deviation broken down by each sensory category |

(250 words)

Introduction to Beer Profiling

(500 words)

Reflective Commentary on Wort Production and Beer Brewed

(1000 words)

References

You should include an appropriate number of quality references using the Harvard referencing format.

Appendix

For additional information which is not part of the marks scheme