

## **The Oregon Barley Project roasted barley tea initiative - Phase II**

### **Exploring the effects of variety and method of preparation on roasted barley tea flavor**

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#### **Background:**

- Our first report described preliminary results from making roasted barley tea with grain of OSU barley varieties/selections.  
[http://eorganic.info/sites/eorganic.info/files/u461/Roasted%20Barley%20Tea\\_1\\_8\\_2018.pdf](http://eorganic.info/sites/eorganic.info/files/u461/Roasted%20Barley%20Tea_1_8_2018.pdf)
- This second report builds on that foundation – a key element of Phase II is a new roasting system.
  - In order to achieve greater control and consistency, we purchased a Dainichi MR-101 coffee bean-roasting machine, based on the recommendation of roasted barley tea experts in Japan.
  - This device provides 12 roast options: acidic shallow, acidic slightly shallow, acidic slightly deep, acidic deep, standard shallow, standard slightly shallow, standard slightly deep, standard deep, bitter shallow, bitter slightly shallow, bitter slightly deep and bitter deep.
  - The temperature and time profiles of selected roast options are shown in Table 1.

#### **Methods:**

##### ***Sensory assessments:***

- Exploratory sensory assessments were conducted by Barley Project members focusing on preference and using free choice descriptors.
- All teas were assessed cold (4°C).
- The initial assessments were conducted to choose the optimum roast combination for each of the three barley genotypes (Table 1).
- The final assessment compared the three varieties at optimum roasts, using the ballot shown in Table 2.

##### ***The effect of barley genotype:***

- Barley varieties are reported to have differential effects on roasted barley tea flavor (1).
  - We therefore compared teas made from three different barleys from our research project: principal attributes are shown in Table 1.
- Grain protein is reported to affect flavor (1): comparison of the three barleys described in Table 1 is therefore confounded by different grain protein levels.
  - We assessed three grain protein levels for one variety: Buck at 9.0%, 7.5%, and 6.7%.

### ***Method of tea preparation:***

- Commercial products have instructions for boiling, hot steep in a tea bag and cold steep in a tea bag (2).
- We added a third method – cold brew, using commercial cold brew makers (3)(4).
  - Cold brews were prepared by adding 30 g of roasted, ground tea (in a tea bag) to the cold brew device and steeping for 24 hours.

### **Conclusions – Phase II:**

#### ***Sensory assessments:***

- Panelists were able to identify differences between teas and often had unique preferences.
- Teas prepared from the three test varieties were universally preferred over the commercial product.

#### ***The effect of barley genotype:***

- Tea brewed from the variety Buck was generally preferred by a majority of panelists.
- For each of the three varieties, a different roast was preferred by a majority of panelists.
- Dark grain did not lead to dark tea: BB99 has black seed and produced the lightest tea whereas Buck has white seed and produced the darkest tea.
  - This effect is potentially confounded by grain protein level, kernel hardness, and terroir.
- The 7.5% grain protein was preferred for the variety Buck: however, this preference is potentially confounded by year, location, and production system.

#### ***Method of tea preparation:***

- The cold brew method was preferred for the three test varieties: most panelists found it to give mellower flavors.
  - Cold brew of the commercial product led to an unacceptably strong tea.
- During boiling of all teas, some panelists experienced unpleasant aromas.

### **Phase III**

We are interested in exploring three principal aspects of our barley teas, based on reports in the literature:

- Chemical composition and health-promoting qualities (5)(6):
- Effects of roasting temperature on flavor (7)(8):
- Effects of roasting temperature and method of preparation on acrylamide levels (9)(10):

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Table 1. Naked barleys used for exploratory sensory research on roasted barley tea

Variety/selection	Type	Grain color	Grain protein	Optimum roast option	Notes
BB99	6-row, spring pure line	black	13.0	Acidic deep (173°C for 16 mins)	The sample used was a composite of three sister lines, harvested at Lebanon, Oregon in 2017. One of the sister lines will be selected and proposed for release as a variety.
Buck	6-row, winter pure line	white	9.0	Standard deep (187°C for 16 mins)	Released as a variety in 2015. The sample used for most assessments was the 8.9 % protein sample, harvested at Lebanon, Oregon in 2017. The samples used for the protein study were from Peoria/Corvallis, 2018 (7.5%) and Hyslop/Corvallis, 2018 (6.7%).
#STRKR	6-row, winter/facultative, 3-way composite	Brown, white, blue	8.3	Bitter shallow (189.4°C for 16 mins)	Released as a germplasm in 2014. The sample used was harvested at Hyslop farm, 2018.

Table 2. Ballot used for exploratory sensory assessment of roasted barley tea

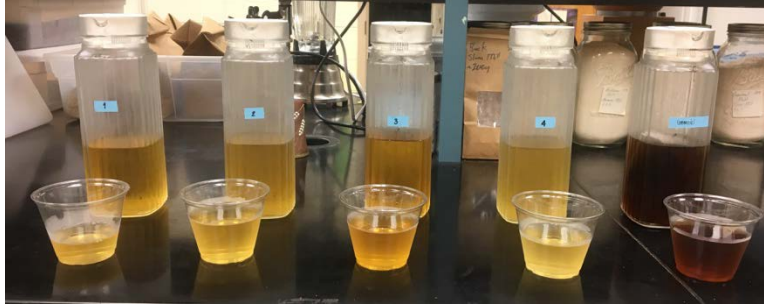
Sample 1	Sample 2	Sample 3	Sample 4	Descriptor	Assessment
				Preference	Rank in order of preference
				Acidic	Check if applicable
				Astringent	Check if applicable
				Bitter	Check if applicable
				Roasted	Check if applicable
				Chocolate	Check if applicable
				Nutty	Check if applicable
				Sweet	Check if applicable
				Free choice	Describe



Raw grains and roasted grains of the three barleys described in Table 1. From left to right: Buck, #STRKR and BB99.



BB99 roasted grains from different roasting options and the commercial product. From left to right: BB99 Acidic deep, BB99 Bitter shallow, BB99 Slightly deep and commercial. Cold brew systems are in the background.



Roasted barley teas grains of the three barleys described in Table 1 and the commercial product  
From left to right: BB99, Buck, #STRKR, BB99 and commercial.

### Tasting sessions

