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## First Brew Syndrome

Do your brewery's start up brews behave differently than the other brews made during the Brewing cycle? Do you have problems with balling, attenuation, pH, color, fermentability and/or taste of the first brews made during the cycle? This can be quite frustrating and hard to understand. If you are experiencing what we refer to as "First Brew Syndrome" there may be some comfort in knowing that improvements can be made, often with simple changes in process and procedures!

**We find "First Brew Syndrome" occurring in over half of the breweries we visit!** Sometimes the brewer is aware of the issue and at other times, we discover the problem through organoleptic sampling (see PRO Tech Notes, Issue 2, Vol.1): In other words, during plant visits, we taste the raw materials, we smell and taste the Brewing water and we smell and taste the wort as a matter of course. Brewers are aware that frequently, the analytical results are not as they should be, on some brews. The balling may be low for example, indicative of poor yield. Often this type of first brew problem has a simple explanation: Cold mash water and sparge water compounded by Brewing into cold vessels. Problems found through organoleptic sensing are usually of greater magnitude, influencing wort and beer flavors! Off-notes on affected production are "harsh and astringent", as opposed to the expected "sweet and malty" characters. **Off-notes like this can persist all through the process into packaged beer, affecting drinkability and consistency.** This is a good reason for having a solid tasting program for waters, materials and wort!

These off-notes usually appear to be water or CIP (clean-in-place) related. Waters develop off-taste notes for a variety of organic and inorganic reasons. This can directly affect wort taste. Brewing water pH and Na<sup>+</sup> levels may be analytically satisfactory for Brewing, but it is essential to taste the Brewing waters before using them. This develops your senses and allows you to be confident the water meets your Brewing standards in every way. If the water for all brews has the same proper taste, and if the wort flavor improves over each succeeding brew in the cycle, CIP efficacy may be at the heart of the

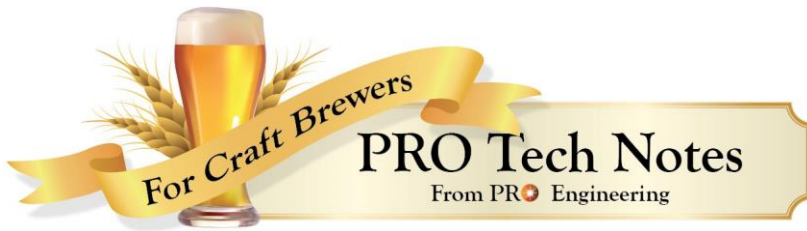


problem. We suggest there are situations where **proteinaceous materials, underdough or spent grain** may be left behind during the shutdown period between the last and the first brew of the next Brewing day. This can allow the materials to oxidize and potentially sour. When the first brew of the new cycle is mashed in, it can pick up the off-notes of harshness, astringency and possibly, sour characters. When this happens between days and happens regularly, it is what we call First Brew Syndrome.

Where does the problem come from? Our work in helping solve “First Brew Syndrome” problems at breweries has indicated considerable procedural variance in **shutdown, CIP** and **start-up** procedures. Some brewers have reported doing “no more than a good water flush” at shutdown. Some have reported they remove the plates and high-pressure spray them and the tub’s “true bottom” to remove underdough. Others report that they soak the Lauter Tub bottom with a caustic solution ‘overnight’ in the hope that it will dissolve underdough sufficiently to flush it to drain before Brewing. Wort line CIPs have been reported as being done “infrequently”. Temperatures, pressures, caustic concentration and flow rates are sometimes uncertain parameters.

Does YOUR brewery have a problem with “First Brew Syndrome”? If so, eliminating typical first brew syndrome problems can help make repeatable, higher quality beer, having higher quality with fewer off-notes.

Determination of whether a brewery is experiencing the problem begins with tasting the waters, materials and wort across the Brewing day, beginning with the start-up brew. The water used for mash and sparge should meet your quantitative and qualitative parameters, and you should be able to decide whether you would want a particular water to be used to make your beer! For the grain, taste determines its character. It should be “crisp, flavorful and malty” as a basic description. “Oxidized and dull” are two undesirable characteristics.



Once the first brew is mashed in, taste it as it is running to the Kettle, and do this several times. (USE CAUTION, IT IS HOT) The wort should be sweet and malty, not harsh, astringent or sour. Compare this to the second and third brews made on the brew line on the given day. If the wort flavor improves over each brew, the plant may have an issue in need of correction. If there are notable changes across the brews made on a given day, it is a sign of a problem. Ideally, the flavor of a particular brand's wort should be the same for each brew.

If taste problems are found during tasting efforts, consider making a **water brew** prior to Brewing a real brew. Taste the water before it is mashed in to assure its normality. After the water brew is mashed in, begin to evaluate its quality as you would wort during the Brewing process. If the water brew develops harshness and astringency, has excessive particles, off-taste or off-aromas it may be a further indication of problems within the shutdown and CIP procedures. Consider running the water brew through the kettle and through the process, up to the Fermenter, where it can go to drain after performing a final evaluation. Without hops, it is easier to evaluate whether the water brew picks up further additive changes to flavor, aroma, and appearance as it passes through the process.

If you have found unacceptable variations in the flavor of your start-up brews, how can the situation be corrected? The steps to eliminate "First Brew Syndrome" at each plant will vary with the exact causes for the phenomenon. However, there are some general rules:

- Develop specific shutdown and start-up procedures that leave your equipment "Brewing clean" and free of proteinaceous and sugary materials such as underdough, spent grain and trub that will oxidize or potentially foster bacterial growth.
- CIP equipment and lines should use the proper strength, temperatures, flow rates, cycle times and frequencies that are adequate to clean systems down to the metal surfaces without leaving a biofilm. Equipment manufacturers and suppliers often provide specific recommendations. **Brewing Consulting Services** can also assist with an evaluation and make recommendations.
- Taste and evaluate waters, materials and product frequently, looking for cause and effect.
- Get help when needed to evaluate and solve difficult process and procedural problems such as "First Brew Syndrome". It can be a very worthwhile investment in your process, your product and for your peace of mind.



If you would like to discuss any aspect of this article or if you would like to engage the assistance of David Kapral of Brewing Consulting Services, LLC or Edward Michalski of PRO Engineering and Manufacturing, Inc., please contact either or both gentlemen using the contact information listed below.

**David Kapral, Founder  
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The author, David Kapral, has over thirty years of Brewing experience. Some of his credentials are:

- Experienced Brewmaster, with 8 years consulting experience to craft brewers across the U.S.
- Beer Steward Certification Trainer for the MBAA
- Practical Brewing lecturer at MBAA's annual Brewing course in Madison, WI
- Member of the InTota Expert network
- Received the "Inge Russell Best Paper Award" for a complex fermentation topic

Additionally, Mr. Kapral founded Brewing Consulting Services, LLC.

The company provides a wide range of practical operational advice and solutions to clients in the craft Brewing industry. The group includes the David Kapral and Associates Mark Sammartino and Pat Frost. Collectively this group has about 100 years of experience in the industry.

Contact David Kapral if you would like to discuss the issues raised in the article or if you want to explore further assistance from his firm.

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