



Making sponge cake; from right, Bon Lee measuring batter; Lab Technologist Paige Craig folding in the flour; Technical Director Jayne Bock explaining the process.

WMC Research Aims to Support Customer Needs

In February 2020, shortly before COVID-19 shuttered international travel, Wheat Marketing Center (WMC) Managing Director Janice Cooper and Technical Director Dr. Jayne Bock spent a week in the Philippines talking with customers about research and technical issues. Traveling at the invitation of the local U.S. Wheat Associates (USW) office in Manila, they spent three days visiting major mills in the sprawling capital city and then two days at a joint USW conference for Philippine and Korean customers. Many of the people with whom they met had visited the Wheat Marketing Center in Portland, either for technical training or as part of the annual crop survey teams organized by USW. For those of you unfamiliar with the Wheat Marketing Center, it is a research and education non-profit created in the late 1980's by the Oregon Wheat Commission and six other state wheat commissions, all of which export their wheat

through the Columbia River system. WMC plays a key role in the industry's wheat promotion effort by utilizing training and research to demonstrate the value of the quality wheat produced in Oregon and the United States.

As Dr. Bock and Ms. Cooper visited each mill and met with research and development and quality assurance specialists, a common question was raised. Many of the Philippine mills currently use chlorination to improve the functionality of soft wheat flours intended for cakes. In recent years, however, their bakery customers have asked about alternatives to chlorination that could be used without changing the cake results. "This is an issue that keeps popping up in markets where chlorinated flour is still used for high ratio cakes. The challenge is that few flour treatments provide all of the functional improvements to cake flour that are imparted by chlorination," says Dr. Bock. This trend for "clean label"



Operations Manager Bon Lee preparing sponge cakes for evaluation.

products, i.e., reducing the number and type of ingredients, is gaining popularity among consumers and is driving the wheat industry to reconsider treatments or ingredients that have the perception of being unnecessary or unnatural. This trend has spread to many countries, including the United States and Canada, and is increasingly being voiced in several important wheat export markets such as the Philippines and Latin America.

Project Proposal and Execution

Upon returning to Portland, Dr. Bock put together a research proposal focused on chlorination alternatives and presented it to the PNW wheat commissions for funding consideration. The Philippines is one of the top buyers of PNW soft white wheat; their request for information received a positive response from Oregon, Washington and Idaho. Dr. Bock and newly hired Food Scientist Dr. Andrew Mense spent close to a year sourcing flours, making and evaluating over a hundred Japanese-style sponge cakes and layer cakes, and writing the report. The team focused primarily on ozonated flours, with ozonation applied at multiple levels for comparison, as reports have previously identified ozonation as a potential chlorination replacement that utilizes the same application process and equipment, requiring few capital investments or reformulation requirements on the parts of millers and bakers. They worked with Kansas State University

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to produce ozonated flours for testing against untreated and chlorinated flours. Heat-treated flours were also part of the original flour treatment comparison plan, but COVID-related restrictions made treatment coordination challenging as many facilities were closed. However, WMC stayed open, and work progressed through 2020 and the first half of 2021.

Results

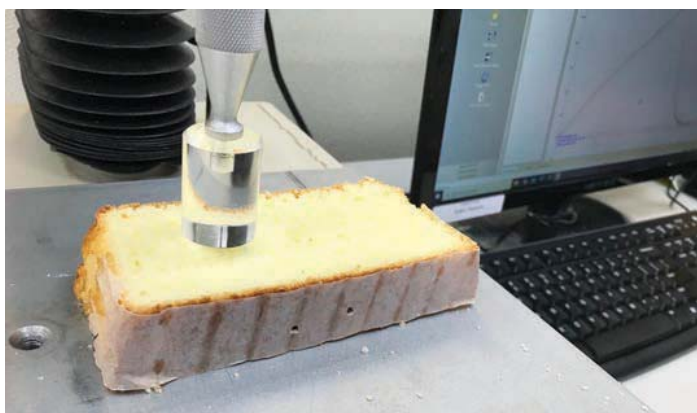
After extensive testing of flour, batter and cakes, WMC confirmed that high-ratio layer cakes, formulated with more sugar than flour, rely on chlorination to improve cake volume, crumb structure and texture. The study also demonstrated that ozonation is not a viable alternative to chlorination, especially with the addition of emulsifiers which are often used to improve cake quality, despite reports that ozonation imparts similar improvements as chlorination. The study also confirmed that Japanese-style sponge cakes do not benefit from chlorination or ozonation. Japanese millers do not generally treat their flour as part of the milling process. The full report is available on the WMC website: www.wmcinc.org. The results were shared with customers in the Philippines by the local USW office.

Heat-treated flour was not available at the time of the study, but the WMC team will circle back and test this alternative in 2022. The report will be updated with additional findings once this work is completed.

Related Projects

WMC researchers are also involved in related studies that will be of interest to major customers of PNW soft white wheat as well as PNW wheat breeders.

- The effect of emulsifiers on Japanese sponge cake quality and the impact on PNW WQC cooperator results (*Tri-State project in cooperation with the PNW Wheat Quality Council*)
- The effect of elevation on the baking of Japanese sponge cakes and their quality (*PNW WQC project in collaboration with the USDA Western Wheat Quality Lab*)




Testing for texture, a very important quality factor.



Bon Lee evaluating sponge cake quality; Managing Director Janice Cooper noting the scores.

Given the results of the 2021 harvest, as detailed in the recently published Soft White Wheat Quality Report, the technical team is also developing a project to explore end-use applications for high protein soft white and club wheats in high protein years.

Conclusion

“The Oregon Wheat Commission values its partnership with the Wheat Marketing Center and its dedicated technical expertise, which not only helps us retain, but also helps us expand, our markets. The study on alternatives to chlorination is just one of the responsive technical services the Center is delivering to assure that PNW wheat continues to provide our millers with the highest functioning flour,” stated Amanda Hoey, CEO of Oregon Wheat Commission. The Wheat Marketing Center provides multiple services to the wheat industry including technical training, crop quality testing and annual workshops for Oregon producers. Research projects are developed to help meet challenges and take advantage of new opportunities. WMC appreciates Oregon’s long and steady support and looks forward to ongoing cooperation. 

Grower Workshop Returns in March 2022

Tentatively scheduled for March 1-2, 2022, the Oregon Wheat Commission is accepting interest from Oregon wheat producers for the 2022 ‘Grower Workshop.’ “This educational tour is for our growers to further their knowledge of the supply chain. We were unable to host the tour and workshop in 2021 due to event restrictions. We are excited for the workshop to return in 2022 and are working with our partners to ensure we can provide the high-quality experience our growers deserve,” stated OWC CEO Amanda Hoey.

The workshop provides an opportunity for growers to see first-hand the shipping, grading, product development and customer relations including topics on transportation, Sanitary/Phyto-Sanitary concerns and global conditions affecting the price of wheat. It features a variety of tours, including the Wheat Marketing Center, a wheat foods manufacturing facility, and a local grain export facility. Participants are provided updates on OSU wheat research, highlights from U.S. Wheat Associates and more. Interested to participate? Contact Corey Shrader, Oregon Wheat Commission at projectadmin@oregonwheat.org or (503) 467-2161. 



Participants in the 2020 Grower Workshop receive first-hand experience on the movement of grain along the river system with Shaver Transportation.

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