MBAA-Rocky Mountain District
Technical Summit

Friday June 25, 2010
08:00-17:30
Northside Aztlan Community Center
112 E. Willow Street, Fort Collins, Colorado 80524
(Directions: www.fcgov.com/recreation/north-aztlan.php)
Hosted
by
New Belgium Brewing Company

Sponsors:

PLATINUM:

Barry-Wehmiller Design Group, Inc.

New Belgium Brewing Co.

GOLD:

Birko Corporation

Brewers Supply Group Denver

Malteurope North America, Inc.

SILVER: -

BRONZE -

Donated beers from: *New Belgium, Odell,*
Raffle Gifts: *New Belgium*

Program

and

Technical Presentations

Program for the Day

8:00 - 8:30	Breakfast and social
8:30 - 8:35	Welcome and opening of the meeting
8:35 – 9:15	Session I – 100% Barley brewing made possible
9:15 – 10:00	Session II – Optimal control of beer fermentation
10:00 - 10:15	Coffee, short break
10:15 - 11:50	Session III – Everything's Better in Glass
10:50 – 11:30	Session IV – The Story of our Sustainability
11:30 - 12:30	Lunch
12:30 - 13:15	Session V - Measuring dissolved oxygen with optical technology
13:15 - 14:00	Session VI – Antimicrobial Control and Silver Ion
14:00 - 14:20	Break – Coffee/Beer
14:20 - 15:00	Session VII – Drinkability: A two edged sword
15:00 - 15:30	Brewers Forum
15:30 - 15:30	Closing of the Meeting
15:30 - 16:00	Transfer to New Belgium (Walking distance)
16:00 - 17:30	New Belgium Brewery Tour, snacks and raffle/door prices

Selected Posters
from
the 2010 MBAA National Meeting
will be on display during this meeting

Presentations 1 through 7

#	Title	Page
I	100% Barley Brewing Made Possible	4
II	Optimal Control of Beer Fermentation	5
III	Everything's Better in Glass	6
IV	The Story of our Sustainability	7
V	Measuring Dissolved Oxygen with Optical Technology	8
VI	Antimicrobial Control and Silver Ion	9
VII	Drinkability: A Two-edged Sword	10

Author/Presenter:

David Maradyn
Senior Scientist, Customer Solutions - Brewing
Novozymes North America Inc., Franklinton, North Carolina 27525
E-mail: dvmy@novozymes.com ; www.novozymes.com

Title:

100% Barley Brewing Made Possible

Abstract:

To face the current global trends in the industry, brewers need solutions in hand that either increase cash flow, are beneficial to the environment, enhance corporate social responsibility, or bring new and innovative products to the market. Launched in late 2009, Novozymes Ondea Pro offers a unique solution to address all of the above global trends. Ondea Pro makes brewing 100% barley brewing feasible, and in doing so, gives the brewer the ability to transition from using malt to un-malted barley, resulting in significant cost savings in raw materials in the process. For example, it is estimated that a 1 million hL brewery can realize a cost savings of almost $ 3 million per year by switching from malt to un-malted barley. Ondea Pro use is good for the environment. Utilization of Ondea Pro by brewers can result in an 8% reduction in the carbon footprint of their brewery operations through elimination of the malting process. It is estimated that a 1 million hL brewery could save up to 3000 tons of CO_2 per year from entering the environment. Ondea Pro opens the door to innovative new product development. New products could be 100% barley beers, adding new and exotic flavors to 100% barley beers or creating new products based on late customization of barley-based beer and malt-based beer streams in the brewery. Novozymes Ondea Pro 100% barley beer solution yields an excellent quality lager beer. Consumer testing in Denmark and Germany has indicated that the majority of respondents found the un-malted barley beer similar to, if not as good as, traditional all-malt beer. Internal studies have shown that beer made from 100% un-malted barley has superior flavor stability compared to beer made from 100% malted barley, considering attributes such as aroma, taste, and bitterness. From a processing point of view, 100% un-malted barley beer can be produced using Ondea Pro and current brewing equipment. Novozymes Ondea Pro is the only enzyme solution that makes brewing with 100% un-malted barley possible, and is truly a revolutionary step-change in the future of brewing.

C.V. - Brief:

David joined Novozymes North America in February 2010. Previously, he worked for 15 years at Anheuser-Busch InBev in progressive positions as Research Scientist, Senior Research Scientist and Head, Global Chemistry Development Laboratory, starting at the Advanced Development Laboratory of Labatt Breweries of Canada in London, Canada and most recently at the Innovation and Technology Development Center at ABInBev's global headquarters in Leuven, Belgium. David is a member of both the ASBC and MBAA, and has served on various committees such as Chairman, ASBC Technical Committee and Member, ASBC Board of Directors. Currently, he is Editor, ASBC Methods of Analysis.

David received his Ph.D in organic chemistry from the University of Western Ontario, in London Canada in 1996. He completed his Post-Doctoral Fellowship at Labatt Breweries of Canada.

Author/Presenter:

W. Fred Ramirez, Professor Emeritus
Department of Chemical and Biological Engineering
University of Colorado, Boulder CO 80308-0424
fred.ramirez@colorado.edu

Title:

Optimal Control of Beer Fermentation

Abstract:

This paper discusses a general approach to determine optimal temperature control strategies for beer fermentation. The method requires a mathematical model of the fermentation process which needs to be experimentally verified for the beer under consideration. Optimal control strategies are obtained using the optimization technique of sequential quadratic programming. This optimization method is known to be very effective and efficient for systems with constraints. The model used in this work is that of Gee and Ramirez (1994) which includes a growth model for the sugars glucose, maltose and maltotriose, the biomass yeast amount, the ethanol produced and the process temperature. The nutrient model considers the amino acids leucine, isoleucine and valine. Three categories of flavor compounds are considered. These are fusel alcohols, esters, and vicinal diketones. Two different optimization criteria are considered. The first is to maximize the ethanol produced while minimizing the production of fusel alcohols. Optimal control results are compared to the best constant temperature condition. Optimal control strategies resulted in a beer with 4.8% increase in alcohol production while maintaining fusel alcohol levels. In addition the optimized beer resulted in an increase in ester production of 3.8% which should increase the flavor of the beer. The second criterion considers minimizing fermentation time while maximizing ethanol production and minimizing fusel alcohol production. Again the optimal control results are compared to the best constant temperature case. Optimal control strategies result in a decrease in batch fermentation time of 5.8% or 8.7 hours while maintaining the alcohol levels and fusel alcohol concentrations. The optimal results show that it is feasible to increase the productivity of beer fermentation by employing a time varying temperature strategy. These results show the power and potential importance of determining optimal time varying temperature strategies for beer fermentation

C.V. - Brief:

W. Fred Ramirez is Professor Emeritus of Chemical and Biological Engineering, University of Colorado. He was with the University of Colorado for forty two years and his service included being Chair of the Department of Chemical and Biological Engineering for thirteen years during four different decades. He was a Fulbright Research Scholar to France and held three Faculty Fellowships that allowed him to conduct research at MIT, Cambridge University and the University of Newcastle in Australia. His area of research is mathematical modeling and control of chemical and biological processes including the process of beer fermentation.

Author/Presenter:

Connie Maxwell, O-I Plant, Quality Manager
O-I, 11133 Eastman Park Dr., Windsor, CO 80550
E-mail: connie.maxwell@o-i.com; www.o-i.com

Title:

"Everything's Better in Glass"

Abstract:

Founded in 1903 as the Owens Bottle Company, Owens-Illinois' roots are directly linked to the invention of the automatic bottle-making machine by Michael J. Owens. The early company was among the first to manufacture glass bottles and jars of uniform height, shape and capacity.

In 1929, the Owens Bottle Company merged with Illinois Glass Company to form what is today Owens-Illinois, Inc. In the decades since, O-I has grown to become the world's leading glass container maker with more than 22,000 employees in 21 countries. The company is headquartered in Perrysburg, Ohio, U.S.A., and holds market leadership positions in each of the four regions in which it operates - Asia Pacific, Europe, Latin America and North America.

Throughout its history, O-I has made glass containers that have become icons in packaging, ranging from perfume bottles to soda bottles. Today, the company focuses exclusively on containers for the food and beverage industries, including beer, wine, spirits and non-alcoholic drinks. The company serves some of the world's best-known brands.

The Windsor, Colorado Plant opened in August of 2005 and has since supplied approximately 6.75 billion 12 ounce amber bottles to 7 Anheuser-Busch-InBev breweries and 3 Miller-Coors breweries as well as New Belgium Brewing and Odell Brewing in Fort Collins, Colorado; Lefthand Brewing in Longmont, Colorado; Great Divide Brewing in Denver, Colorado; and Grand Teton Brewing in Victor, Idaho. The Windsor Plant was recognized as O-I's Plant of the Year in 2006 and 2007.

C.V. - Brief:

Connie brings to the glass packaging business over 25 years of customer service experience in automotive sales and service, retail, medical/dental and hospitality. In 1996, she and her family relocated from west-central Indiana to Windsor, Colorado. With her children in school, she desired a greater challenge in her career and began working for RR Donnelley Printing in 1999 as the ISO Document Controller. While at RR Donnelley, she participated on a multi-company team in Washington, DC, to write a bid for to obtain government's printing business, helped drive the effort to transition the company from individual plant ISO registration to company registration and led the effort to convert the internal documentation systems from hard copy to electronic. She began her career with O-I in 2005 as the Assistant Quality Manager of the newly opened Windsor, Colorado plant and was named Quality Manager in 2008. Her role at O-I includes internal quality management, auditing, and vendor and customer relationships.

Author/Presenter:

Katie Wallace, Sustainability Specialist
New Belgium Brewing Company, Fort Collins, Colorado, 80524
Ph: 970.494.7826; E-mail: kwallace@newbelgium.com; www.newbelgium.com

Title:

The Story of our Sustainability

Abstract:

New Belgium Brewing Company and the Triple Bottom Line:

Why should a brewery be concerned about the planet and its people in addition to the company's profits? Sustainability Specialist, Katie Wallace, will talk about the drivers behind New Belgium's environmentally & socially responsible corporate philosophy.

We will also gain insight into the latest sustainability projects at NBB.

C.V. - Brief:

Katie Wallace is the Sustainability Specialist at New Belgium Brewing Company. She is one of two full time coworkers dedicated solely to sustainability. Rather than thinking of this two-person team as a "Sustainability Department", they like to consider themselves facilitators of the brewery-wide conversation around sustainability.

Katie's formal education in Economics and Finance prepared her for her first role at the brewery, in 2004, analyzing beer trends and forecasting beer sales. Her passion for cultural innovation, environmental sustainability and life-long learning helped her to move into the role of Sustainability Specialist, which she has held since 2008.

Author/Presenter:

Jim A. Cairns, Product Manager
Mettler-Toledo Ingold, Inc., 26 Middlesex Turnpike, Bedford, MA 01730
Ph: 781.201.8830, Fx. 781.271.0881, E-Mail: jim.cairns@mt.com; www.mtpro.com

Title:

Measuring Dissolved Oxygen with Optical Technology

Abstract:

In today's competitive environment quality of your product is paramount. Even a small change in your product can impact sales especially if your customers not only expect, but demand, the highest quality product.
One of the most important quality parameters is dissolved oxygen. It doesn't take much dissolved oxygen in your product to change its flavor profile and shorten shelf-life. How this measurement is made has not changed much over the past 50 years but recently a new method has been taking the industry by storm. This new method is Optical Oxygen Measurement Sensors.
Optical oxygen sensors are setting a new standard for operational availability and measurement quality of oxygen loops, especially in the filler line. These new optical oxygen sensors are easy and fast to maintain, leading to enhanced process safety and low cost of ownership. Reduced signal drift and faster response time compared to Amperometric sensors are leading to a higher accuracy of the oxygen measurement and allowing for enhanced process control.
These new optical measurement style sensors are based on "fluorescence quenching". Fluorescence quenching is when the signal of the fluorescence is compared with a reference signal and the oxygen concentration is calculated from the time shift between these two signals. This value is then correlated to oxygen concentration and is displayed on a transmitter. Now that this measurement is done with light there is no need for liquid electrolytes or changing of membranes do to damage from mechanical fatigue.
Optical measurement of dissolved oxygen is truly a new method in analytical technology and because of higher accuracy, lower maintenance, and reduced cost of ownership it's no surprise that optical O2 measurement is quickly becoming the system of choice.

C.V. - Brief:

Jim started at Mettler-Toledo in 1996 as an electronics engineer to support new technology development for dissolved oxygen. Since 2000 Jim has been an expert of dissolved oxygen theory and applications, particularly in the brewing industry.
Jim holds an associates in Computer Science and a bachelors in Business. He also has completed courses on barley and malting science, fermentation science, brewing technology and packaging.
Jim is also an active member of the Master Brewers Association of America, The American Society of Brewing Chemists, and the Brewers Association.

Author/Presenter:

William Jacoby, President
PurClean, LLC, 2521 Lake Drive, Loveland, Colorado 80538
E-mail: Wmj1@aol.com

Title:

"Antimicrobial Control and Silver Ion"

Abstract:

Silver used as an antimicrobial dates back hundreds of years. The technology has been used extensively in many parts of the world for the last 25-30 years. However, silver ion has been used very little in the USA, particularly in the beverage industry. In this presentation, we will define silver ion properties and how it works as an antimicrobial, the history, benefits, uses and applications for the food and beverage industry. This presentation is focused on how to use this technology in the packaging operations, such as on the conveyors, filler, and all equipment in contact with the beverage being packaged.

Due to the beneficial properties of silver ion, PurClean has developed an environmentally friendly, green cleaner. It is a colorless, odorless, liquid cleaner that is non-toxic and bio-degradable. We will discuss the trial testing and results, as well as the numerous uses in beverage plants and other areas where sanitation is paramount.

C.V. - Brief:

William has forty years of manufacturing, sales, engineering and management experience in can and plastic bottle manufacturing/packaging and filling operations; including food, beverage, water and pharmaceuticals. William has worked for several large equipment and packaging manufactures, including Nestle, Silgan Containers, Sentry Equipment and Goldco Industries in sales and engineering. He helped develop unique (patented) process and packaging systems for applications where existing technology is not available.

William started Convergent Packaging, LLC, Loveland, Colorado in 2000 as an engineering consulting company specializing in line efficiency, equipment operation and operator training. He works with a team of companies with expertise in all areas of beverage filling operations. In June 2009 PurClean, LLC was established to market silver ion and PurClean cleaner technology in the USA, Canada and the Caribbean.

William earned his Bachelor of Science degree in Food Science and Technology from Purdue University. Additional education including process evaluation and numerous management courses was obtained from the University of Wisconsin and University of Michigan. He is an active professional member of the Packaging Committee of the Institute of Food Technology, Society of Manufacturing Engineers and the Society of Plastics Engineers, Can Manufacturing Institute, Science/Technology Committee and Research Committee and the International Bottled Water Association- past member.

Author/Presenter:

Michael J. Lewis, Professor Emeritus
University of California Extension, Research Park Drive. Davis California 95616
Phone 530-756-4302; e-mail mjlewis@ucdavis

Title:

Drinkability: A Two-edged Sword

Abstract:

Drinkability is the brewer's mantra and Holy Grail: a beer should not be satiating or filling, it should be more-ish, crisp not heavy, tasty but not fatiguing and should leave the consumer satisfied but willing and able to have another. The reason is simple: (a) the profit is somewhere in the last bottle of the six-pack and (b) the sooner that is gone the sooner it must be replaced. And therein lies something of a dilemma for an industry that preaches moderation: drinkability is a trait that is intended to encourage consumption.
For craft brewers however, the issue is somewhat different, because they may parse the word drinkability in a different way from my definition. They may equate drinkability with preference or liking or distinction or even with inventiveness, rarity, and cutting edge uniqueness. There is therefore a trend within the domestic and craft segments to move to the extremes, one in the lighter direction and the other heavier. While heavier beers are fascinating avenues of brewing arts and science to explore, there is some danger of leaving the consumer far behind.
The astonishing success of lime flavored light beers does nothing to convince me that the American consumer in general is starved of Russian Imperial Stouts, for example, and is clamoring for them, interesting though such beers are. The craft beer segments of the industry as well as the large domestic brewers need to think about drinkability in different ways. For both segments the old idea of flavor balance, distinction and deliciousness might provide a clue to the future.

C.V. - Brief:

Michael J. Lewis conducted the program in Brewing Science at the University of California, Davis for 40 years and is now emeritus professor. He is a Fellow of the Institute of Brewing and Distilling and a Life Member of the American Society of Brewing Chemists and the Master Brewers Association of the Americas. He received the prestigious Award-of-Merit of the MBAA in 1986. In 1990 he won the esteemed Distinguished Teaching Award of the University of California, and in 2008 the Brewers Association Recognition Award. Dr. Lewis is the Academic Director of Brewing Programs in University of California Extension and teaches several specialized courses at UNEX, including the accredited four-month Master Brewers Program leading to a professional qualification in brewing science and engineering (the Diploma in Brewing Examination of IBD), and an eight-week form of this program called the Professional Brewers Certificate Program. Graduates of Dr. Lewis' programs are well represented in large and small North American breweries as well as abroad. Dr. Lewis earned his Ph.D. degree in microbiology and biochemistry at the University of Birmingham (England) and the British School of Malting and Brewing. Dr. Lewis has also served the University as Assistant Vice-Chancellor of Academic Affairs and Associate Dean of the College of Agriculture. He is the author of several books.

MBAA 2010 National Convention Posters 1 through 8

#	Title
1	Determining malt formula from beer color and predicting beer color from malt from malt formula
2	"A Flush a Day" as an improvement for Tap Hygiene and Draught Beer Quality
3	The use of dry yeast for bottle conditioning
4	Stainless steel passivation and its importance for the brewery with respect to equipment maintenance and sanitation??
5	Traditional and novel tools for sizing and specification of beer tanks
6	Using antifoams in fermentation
7	Marketing, uses, and distribution of spent grain for large and small breweries
8	Taking the technical to the consumer: The development of a consumer beer lexicon.

MBAA-Rocky Mountain District
Officers 2010

District President Jeff C. Biegert New Belgium Brewing Co 500 Linden Street Fort Collins, CO 80524 PHONE: (970) 221-0524 FAX: (970) 221-0535 E-MAIL: jbiegert@newbelgium.com		District Membership Chair Dana J. Johnson Birko Corp 9152 Yosemite St Henderson, CO 80640-8027 PHONE: (303) 289-1090 FAX: (303) 289-1190 E-MAIL: djohnson@birkocorp.com
District Board of Governors Representative and Vice President Gary L. Dick 3102 Lower Loop Dr Fort Collins, CO 80524-1267 PHONE: (970) 217-2856 E-MAIL: gdick@newbelgium.com		District Technical Co-Chair Tobin L. Eppard MillerCoors PO Box 4030 BC600 Golden, CO 80401-0030 PHONE: (303) 277-3938 FAX: (303) 277-6834 E-MAIL: tobin.eppard@coors.com
District Past President Douglas F. Odell Odell Brewing Co 800 E Lincoln Ave Fort Collins, CO 80524-2507 PHONE: (970) 498-9070 FAX: (970) 498-0706 E-MAIL: dougodell@odellbrewing.com		District Technical Co-Chair Finn B. Knudsen Beverage Consult Intl Inc PO Box 1089 Evergreen, CO 80437-1089 PHONE: (303) 674-2251 FAX: (303) 674-8323 E-MAIL: finn@ebcii.com
District Secretary Jonathan E. Kemp Anheuser-Busch Companies Inc 3819 Granite Ct Fort Collins, CO 80526-3154 PHONE: (970) 490-4500 E-MAIL: jonathan.kemp@anheuser-busch.com		District Entertainment Chair Stephen J. Woodward Fort Collins Feed 1020 NE Frontage Rd Fort Collins, CO 80524-9218 PHONE: (970) 482-8001 FAX: (970) 482-8609 E-MAIL: steve.woodward@fortcollinsfeed.com
District Treasurer and Publicity Chair James R. Canary 1638 Haywood Pl Fort Collins, CO 80526-2289 PHONE: (970) 229-9082 E-MAIL: james_canary@comcast.net		District Packaging Chair Susan Pawlak Fort Collins, Colorado PHONE: (970) 481-7096 E-MAIL: susan.pawlak@q.com
District Scholarship Chair Steve Presley 1164 Pinewood Dr Napa, CA 94558-4357 PHONE: (970) 223-6761 E-MAIL: sppresley@comcast.net		

2010 Technical Summit
Program

MBAA - Rocky Moutain District

Northside Aztlan Community Center
and
New Belgium Brewing Company
Fort Collins, Colorado
June 25, 2010

Moderator	Time	Session	Speaker/Author	Organization	Title
	08:00-08:30	Coffee and Social			
Jeff	08:30-08:35	Welcome and opening of the meeting	Jeff Biegert	New Belgium Brewing Co.	Welcome and program for the day
Finn	08:35-09:15	I	David Maradyn, Ph.D.	Novozymes North America	100% Barley Brewing Made Possible
Finn	09:15-10:00	II	Prof. Fred Ramirez, Ph.D.	Dept. Chem. Eng. & Biotechn., C.U.	Optimal Control of Beer Fermentation
	10:00-10:15	Coffee and Social	Coffee, Short break	`	
Gary	10:15-10:50	III	Connie Maxwell	O-I Plant, Windsor, Colorado	Everything's Better in Glass
Gary	10:50-11:30	IV	Katie Wallace	New Belgium Brewing Co.	The Story of our Sustainability
	11:30-12:30	Lunch and Posters			
Toby	12:30-13:15	V	Jim A. Cairns	Mettler-Toledo Ingold	Measuring Dissolved Oxygen with Optical Technology
Toby	13:15-14:00	VI	William Jacoby	PurClean	Antimicrobial Control and Silver Ion
	14:00-14:20	Break-Coffee/Beer			
Jim	14:20-15:00	VII	Prof. Mike Lewis, Ph.D.	Univ. of California Extension	Drinkability: A Two-edged Sword
Toby/Finn	15:00-15:30	Brewers Forum	All		
Jeff	15:30-15:35	Closing the meeting			
Jeff	15:35-16:00	Transfer to New Belgium Brewery	All		
Jeff	16:00-17:30	New Belgium Brewery	New Belgium Brewery staff	New Belgium Brewing Co.	Brewery Tours, followed by snacks and raffle
Proposed					
MBAA Posters	08:30-16:00	Poster 1	Bies and Hansen	MBAA - P #56	Determining malt formula from beer color
		Poster 2	Dauth, Tippmann and Voigt	MBAA - P #61	"A Flush a day" as an improvement for Tap Hygiene and Draught Beer Quality
		Poster 3	Van Zandycke and Fischborn	MBAA - P #75	The use of dry yeast for bottle conditioning
		Poster 4	Loeffler	MBAA - P #42	Stainless steel passivation and its importance for the brewery
		Poster 5	Jurado	MBAA - P #47	Traditional and novel tools for sizing and specification of beer tanks
		Poster 6	Johnson	MBAA - P #44	Using antifoams in fermentation
		Poster 7	Godinho	MBAA - P #58	Marketing, uses, and distribution of spent grain for large and small breweries
		Poster 8	Johnsen	MBAA - P-#62	Taking the technical to the consumer