iaom
MIDEAST & AFRICA REGION

IAOM MEA

VIRTUAL MILLING FORUM

October 20-22, 2020

Excellence in Grain Processing

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Welcome Message

Dear colleagues and friends,

On behalf of the International Association of Operative Millers MEA Region, I welcome you to the IAOM MEA Virtual Milling Forum 2020!

As the world is facing extremely challenging times, where gathering with peers, colleagues and friends are restricted or even forbidden in some cases, the way events are done have mutated from a strictly live gathering to online experiences.

Therefore, the IAOM MEA forum this year headed towards the virtual experience by bringing together Technical Staff, Head Millers, Production Managers, Machinery Suppliers, and Laboratory equipment suppliers through the online system ZOOM Meetings which provides a secure platform to view and share presentations, interact with the speakers and the rest of participants as well as build your networking.

Following four years of successful gatherings, the main objective of the IAOM MEA forum remains to reach millers and provide intensive technical training and education; addressing challenges, mill operations, consistency and improvement and resolving problems faced by milling companies in the Middle East.

One more time, all thanks go to the IAOM MEA Education Committee, Chairman and organizing team who have brought together this first online edition of the forum and to our valuable speakers and sponsors for their continuous support to the IAOM MEA renewed mission which is to deliver continuing education and training for professionals in the grain milling industries.

I wish you all enjoy, benefit and connect during the 3 days forum and look forward to meeting you again in person next year for the 31st IAOM MEA annual conference & expo 2021!

All the best,

Ali Habaj
IAOM MEA Regional Director

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Forum Program

DAY 1: Tuesday October 20th, 2020

Main Topic:
Consistent Flour Quality Starts With the Wheat Cleaning

Moderator:

MARTIN SCHLAURI
Grain Milling Expert, Bühler AG (Switzerland)

10:45	**Activation of online link to sessions' waiting room**
11:00- 11:10	**Introduction & Instructions**
11:10 - 11:55	**New Improved System for Gluten Testing** **Martin Hallin** Product Manager, PerkinElmer Food (Sweden) Followed by Q&A
11:55 - 12:05	Short Break 1
12:05 - 12:30	**Grain Cleaning and Tempering – Key for Efficiency and Consistent Flour Quality** **Michael Albers** Head of Milling Solutions Training Center, Bühler AG (Switzerland)
12:30 - 12:45	**Effect of Moisture Content on Damaged Starch and Quality Attributes of Wheat Flour** **Hager AlFadl** Quality Control Engineer, Wheata Industrial Company (Sudan) Followed by 10 mins Q&A to each speaker
13:15- 13:25	Short Break 2
13:25 - 14:10	**The Application of Colour Sorting Machines in Wheat Milling** **Gary Falk** Sales Manager, Satake Europe (United Kingdom) Followed by Q&A
14:10 - 14:15	**Closing Remarks**

Forum Program

DAY 2: Wednesday October 21st, 2020

Main Topic:
Mill Performance / Flow Sheet Concepts

Moderator:

MERZAD JAMSHIDI
Chairman, IAOM MEA

10:45	Activation of online link to sessions' waiting room
11:00 - 11:10	Introduction & Instructions
11:10 - 12:05	**The Mill Flowsheet Design – the Base for Milling Efficiency, Flow Yield and Quality** **Martin Schlauri** Grain Milling Expert, Bühler AG (Switzerland) Followed by Q&A
12:05 -12:15	Short Break 1
12:15 - 12:35	**Correct Stretching Solution for Better Yield During Sifting** **Cedric Muller** Global Industry Manager Milling, SEFAR AG (Switzerland)
12:35 - 12:55	**Break Release – Method and Benefit** **Stefan Lutz** Head Of African Milling School, African Milling School (Kenya) Followed by 10 mins Q&A to each speaker
13:15- 13:25	Short Break 2
13:25 - 14:20	**Ash Curves and Understanding the Outcome** **Peter Lloyd** Regional Technical Director, U.S. Wheat Associates, Inc. (Morocco) Followed by Q&A
14:20 - 14:30	Closing Remarks

Forum Program

DAY 3: Thursday October 22nd, 2020

Main Topic:
Mixing Plants for Pre-mixes and Specialty Flours

Moderator:

PETER LLOYD
Regional Technical Director, U.S. Wheat Associates (Morocco)

10:45	Activation of online link to sessions' waiting room
11:00 - 11:10	Introduction & Instructions
11:10 - 11:55	**Innovative Enzymes Technology for Wheat Flour** **Salim Makhoul** Head of Research & Development, Crown Flour Mills SAL (Lebanon) Followed by Q&A
11:55 -12:05	Short Break 1
12:05 - 12:30	**Premixes and Flour Mixing Plants** **Milan Shah** Technical Director, Alapala (Turkey)
12:30 - 12:55	**Flour Blending and Mixing Solution with Online Control and Traceability – Create Value to Your Flour!** **Peter Striegl** Head of Business Development, Bühler AG (Switzerland) Followed by 10 mins Q&A to each speaker
13:15- 13:25	Short Break 2
13:25 - 14:15	**Whole Grain – High Fiber Benefits Under COVID-19** **Walter Von Reding** Director Business Unit Flour Ingredients, Bakels (Switzerland) Followed by Q&A
14:15 - 14:20	Closing Remarks

Forum Moderators

Martin Schlauri
Grain Milling Expert, Buhler AG (Switzerland)

Martin Ellegast
CEO, Wingmen Group (Switzerland)

Peter Lloyd
Regional Technical Director, U.S. Wheat Associates, Inc. (Morocco)

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Speaker Lineup

Martin Hallin
Product Manager, PerkinElmer Food (Sweden)

Biography:

Martin Hallin is a Swedish citizen living in Stockholm, Sweden. Martin is Product Manager for the full Food Rheology range within PerkinElmer Food, formerly Perten Instruments.

Abstract:

The evaluation of the gluten amount and strength is essential for determining the quality of wheat and wheat flour. Gluten is the functional component of protein and determines many dough and processing characteristics of wheat and wheat flour. Measurements of protein content in wheat and wheat flour is today a fast and simple analysis done on wheat grain and on flour, and both on-line and in the laboratory. However, while total protein content is important, if the ability to build a gluten structure of good amount and strength is not controlled, the protein content in itself is of minor value. The measurement of gluten content and strength will make sure the user has control over the influence on the wheat from variable growing conditions, yearly growing variation, varietal variation, heat and bug damage and other sources of variation. PerkinElmer Food has recently launched a new Perten Glutomatic® System for improved gluten testing for the grain and milling industry. The new system is improving well established standard methods used in the milling industry from grain reception to flour supply, as well as by flour purchasers like bakers and pasta manufacturers, and by the academia. The new system is fully revised and modernized, with touch screen interface and is LIMS ready. It is interfaced to the balance and the centrifuge for automated tracking of test progress and automated calculations of results. All Perten Glutomatic® standard methods, like ICC 155 and 158, AACCI 12-38 and ISO 21415 are fully supported. Optional automation steps are also available in the new system.

Michael Albers
Head of Milling Solutions Training Center,
Bühler AG (Switzerland)

Biography:

In 2017, Michael Albers started at Bühler Switzerland as an instructor in milling technologies and since 2019 he is the Head of Milling Solutions Training Center in Bühler, Uzwil.

Abstract:

Grain cleaning and tempering – key for efficiency and consistent flour quality Every kilogram of wheat creates value to your company. The raw wheat delivered to the mills is not a pure grain, but contains impurities, which got mixed into the grain in the field, during harvesting or at handling and storage.
Thus, the first step in processing wheat to flour is cleaning. The term cleaning in the field of grain milling refers on the one hand to the separation and removal of impurities from raw wheat and on the other hand the conditioning of wheat.

Impurities may have a negative effect on the finished products such as:
- Effect on hygiene
- Increase of the mineral content (ash)
- Effect on smell and taste
- Toxicity
- Impairment of the baking quality
- Cause of specks and/or color degradation

Separation of impurities is always based on the differences in characteristics between the raw grain and the impurities and foreign matter it contains.

If flour or semolina of high standards is to be produced, impurities and dust on the grain surface must be removed prior to conditioning. This is the task of the wheat cleaning. Luckily, most of these foreign materials can be differentiated by physical properties from the wheat.

The machines used in cleaning of grain are based on the following differences between grain and impurities:
- Size, thickness
- Magnetic response
- Floating characteristics
- Density, specific weight
- Length and shape
- Color

Efficient grain cleaning is performed with a series of different machines, each of it having a specific task. The entire process is drawn in a cleaning section flow sheet.

The flow sheet of a cleaning section shows the flow of the grain and removal of the impurities. The key machines in a cleaning section are:
- Separators -> grading by size
- Aspirators -> separation by air
- Dry stoner -> stratification by density
- Magnet -> application of magnetism
- Scourer -> surface cleaning
- Optical sorter -> separation by color
- Indented Cylinder -> separation by shape

The adjustments of each machine require the specific skill of the operators / millers which will be explained in this presentation.

A sub-step in cleaning, but not less important, is the conditioning (dampening and tempering) of wheat. Dampening and tempering grain is done mainly to achieve the following tasks:
- To make the husk (bran) tough and resilient/elastic
- To mellow the endosperm
- To achieve consistent grinding properties
- To reach the target finished product moisture

By adding water and through the tempering time, best flour yield at low ash content can be achieved.

The moisture content of the wheat is not only important for the grinding condition but represents an economical factor as well for the milling company.

The miller is challenged to find the optimum moisture of the wheat at 1 st BK and reaching target moisture at the finished product flour. Depending on the climatic conditions in relation to the relative humidity and temperature, there is an evaporation loss of 3 – 1 % during the grinding process. This is called ‘milling loss’.

Hager AlFadl
Quality Control Engineer, Wheata Industrial Company (Sudan)

Biography:

Hager Ahmed Alfadl, B.Sc. In Biochemistry and Food Science, M.Sc. In Food Science and Technology. Quality Control Engineer previously in Wheata Industry Company Ltd. A Wheat milling factory in Sudan

Abstract:

The objective of this research was to study the effect of moisture content on damaged starch in wheat flour from Canadian (CWRS- hard wheat) and Australian (AH- semi hard wheat) wheat with 13.87 % and 11.31 % protein content, respectively obtained from wheat flour mill in Khartoum north. Canadian wheat was tempered to three moisture contents %15.5 ,%15.0 and %16.0 while Australian wheat was tempered to %15.0 ,%14.5 and %15.5 moisture content. The Canadian and Australian wheat with the three different moisture contents were milled to produce flours with extraction rate of %72. The quality parameters of wheat flours including damaged starch and dough characteristics (determine by farinograph and extensograph test) were determined for each type of wheat flour. The results were subjected to duncan multiple range test (DMRT). Crude protein content was the same at the three tempering levels for Australian wheat flour %12.2 and for Canadian wheat flours %14.10. Wet gluten (%) ranged from 33.41 - 33.08 and 34.51 - 34.22 for Australian and Canadian wheat flours, respectively. Dry gluten (%) ranged from 10.89 – 10.76 and 11.58 – 11.31 for Australian and Canadian wheat flours respectively. Gluten index (%) ranged from 84.84- 83.91 and 92.81- 87.93 for Australian and Canadian wheat flours, respectively. Moisture content (%) ranged from 13.17 – 12.55 and 13.82 – 12.77 for Australian and Canadian wheat flours respectively. For all the above parameters statistical analysis results showed that there was a significant ($p< 0.05$) difference between the means of all the studied quality parameters. The damaged starch (Chopin Duois unit) UCD for Canadian wheat flour with initial wheat grains moisture content %15.5 ,%15.0 and %16.0 were 25.5 ,26.85 and 24.3, respectively and for Australian wheat flour with initial wheat grains moisture content %15.0 ,%14.5 and %15.5 were ,26.5 25.2 and 24.0 respectively. Damaged starch (UCD) was significantly ($p< 0.05$) higher in

Canadian wheat than Australian wheat when comparing the values at the same moisture content. Highest water absorption (%) and degree of softening (FU) were observed for flour from Canadian wheat which was tempered to %15.0 moisture content, this flour also had the highest damaged starch value (26.8UCD). Development time, stability (min.) and farinograph quality number were highest in flour from Canadian wheat tempered to %16.0 moisture content. Correlation between the damaged starch and farinograph results for dough from Canadian wheat flour showed a positive correlation between damaged starch and water absorption, there was a negative correlation between damaged starch with stability and farinograph quality number. For Australian wheat flour, a positive correlation was observed between starch damage and water absorption. Finally damaged starch cannot be avoided during the milling process, the results indicated it's depend on the hardness of the wheat, tempering and the milling process. The difference in tempering produced a difference in the rate of damaged starch which caused significant change in the properties of the dough. Tempering moisture of the wheat should be determined based on the quality of the wheat. Hard wheat requires high moisture content in tempering. Damaged starch improved the flour quality but in excess rate it can be detrimental to quality. To reduce the damaged starch, high moisture content in tempering the wheat is recommended. Damaged starch content should be a parameter of relevance to optimize the milling process.

Gary Folk
Sales Manager, Satake Europe
(United Kingdom)

Biography:

Sales Manager for Africa & Middle East, Satake & Henry Simon after earning his degree in Business Management, Gary has spent the last 21 years working in the Middle East and has been involved in many development projects in countries across the MENA region. He is now based at the Henry Simon head office in Manchester where he is focused on providing his clients with innovative and more intelligent milling solutions. At Henry Simon we see great potential in technological development and we have a clear vision of making our customers business smarter and more efficient.

Abstract:

Colour sorters have been used in rice milling for almost half a century and over the last few years these machines have proven that they can be an integral part of the wheat milling process. Colour sorters can be used to replace traditional disc and indented separators in the cleaning process, they are easier to maintain, require less space and more importantly require less power than traditional cleaning machines. Colour sorters such as the Satake 'Nirami' are ideally suited to Wheat milling and can be used in wheat cleaning to detect and remove inner contaminants and to remove ergot wheat, burnt, fusarium, black tip and any discoloured grains. Colour sorters are already well established in Durum wheat milling where the objective is to produce quality semolina for pasta or couscous, colour sorters will improve the quality of the semolina by removing black seeds and discoloured kernels. Colour sorters inspect grains by way of digital cameras and remove contaminants by short sharp precise bursts of compressed air. Satake uses the latest advancement in technology, with high resolution full colour RGB cameras that have a wider colour spectrum and infrared capabilities. The use of LED lighting, reliable high-speed ejectors and precise feeders ensure that Satake colour sorters offer a higher operating capacity and an extremely consistent performance.

Martin Schlauri
Grain Milling Expert, Bühler AG (Switzerland)

Biography:

In 1980, Martin Schlauri joined Bühler as milling technologist. In 2015, he developed the African Milling School. Since 2020, he is back at headquarters in his role as senior grain milling expert.

Abstract:

The mill flowsheet specifies the milling process from the clean and conditioned wheat to flour. Through the industrialization of grain milling and due to the demand for achieving higher plant efficiency with lower operation costs, a trend to specific flow sheets is to be noted. The following factors influence the milling flowsheet and design of a mill:
- Type of raw wheat to be processed
- Desired flour quality and yield
- Is semolina extraction demanded
- Climatic conditions

In order to understand the milling process, it is necessary to know the names which the millers give to the different milling process steps. Common names for the different milling steps and milling processes are:
- Break system
- Grading/Diviseur
- Purifying semolina and middling
- Reduction passages
- Collecting passages
- Bran finishing

The grinding from wheat to flour is done in a 'selective grinding process'. The endosperm of a wheat kernel is first classified into different quality levels (center or outer layer) for further grinding it down to flour. The purpose of such selective grinding is to achieve the highest yield of white (low ash) flour. The modern milling technology comprises different machines from wheat to flour. The main machines are;

- Roller mill
- Plansifter
- Purifiers
- Roller mill and impact detacher
- Bran finisher
- Break system
- Grading and sifting
- Purifying semolina and middling
- Grinding semolina and middling to flour
- Removing the remaining endosperm

The presentation will explore the key parameters and settings on each main machine, in particular:
- Roller mill -> Specification of fluted and smooth rolls
- Plansifter -> Sieve arrangements, plansifter scheme and sieve types
- Purifier -> Air balance, sieve arrangements and regulation

Specific demands on flour properties such as low ash flour (<%0.5 ash), flour with high water absorption, high semolina extraction, whole wheat flour, etc. require specific flow sheets. The presentation will give an insight on flow sheet design for different application and demands.
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absorption, high semolina extraction, whole wheat flour, etc. require specific flow sheets. The presentation will give an insight on flow sheet design for different application and demands.

Cedric Muller
Global Industry Manager Milling, SEFAR AG (Switzerland)

Biography:

Mr. Cédric Anil Muller joined Buhler in 2000 after graduating as a milling technologist SMS. After several years of commissioning, he was made responsible for the milling technology in Buhler South America from 2005 to 2010. Back to the headquarter in Switzerland, Cédric Anil Muller was working for the technology department of the Bakery / Mixing, Brewing and Specialty Milling in Uzwil, Switzerland. From 2012 to 2016, he was responsible for the technology of Bakery / Mixing, Brewing and Specialty Milling in Buhler China .In 2016 Cédric Anil Muller left Buhlergroup and joined Sefar AG in Heiden, Switzerland. In Sefar AG, Cédric Anil Muller has the responsibility for Milling worldwide.

Abstract:

Most of flour Mills are doing the stretching of the sieves themselves in-house. Some of them are providing the frames to a machine builder to do the Re-screening. Stretching a sieves need a lot of experience and knowledge. Correct stretching will increase your yield during sifting and will increase the lifetime of your sieve. The key machine in a flour Mills plant to stretch the sieves is a Stretching unit device.

With my education presentation, I would like to show the Millers following:

What are the main points they have to consider before and during stretching?

Selection of the right Polymer? (Polyester or Polyamide)

How to choose the right sieves (GG, Milling XX / N, Milling forte, XXX / HD)?

The hardness of the wheat and the constitution of the endosperm requires to choose the correct sieve fabrics

The two crucial decision factors are high sieving efficiency or long lifetime

Set-up and preparation of the stretching device
- https://www.sefar.com/en/573/News-Detail.htm?Article=2281593
- According to frame size to choose the right guide bar

Sifter frame cleaning und preparing before stretching
- https://www.sefar.com/en/573/News-Detail.htm?Article=2281595
- What is important to be done before stretching
- Correct handling of the frames before stretching
- How to increase the lifetime of the frames

Preparation and gluing
- https://www.sefar.com/en/573/News-Detail.htm?Article=2281594
- Polyamide absorbs up to %4.4 – 3.5 humidity. What can be done to counteractive?
- Correct selection of glue (high viscosity or low viscosity glue) and correct handling of the glue
- Use an electronic meter for measuring the tension of sieve during stretching

Why the flour sieves has to be change approximately once in a year?
- The surface of the sieves will become smooth
- Increase energy consumption (Milling pneumatic) because the product is moving to the next passages (over sifting) instead is going to the end product
- The flour Mills are losing yield of 1st quality flour
- Losing capacity t/h

Why the tension is very important during sifting
- Correct tension that's mean more yield of 1st quality flour
- Increase lifetime of the sieve
- Save energy
- Reduce downtime

Benefit of this education session for the Millers are:
1. Understanding about different kind of fabric types for the Milling Industry
2. Understanding how do the correct stretching (preparation and gluing) with the right chosen sieves according to his final product
3. How he can increase lifetime of the sieves and frames
4. How to reduce downtime
5. How to reduce energy consumption
6. How to increase the yield of 1st quality flour
7. Relationship between long lifetime and sieving efficiency / capacity

Stefan Lutz
Head Of African Milling School, African Milling School (Kenya)

Biography:

Stefan Lutz has over 20 years of experience in the grain industry, he joined Bühler AG, Uzwil, Switzerland in 2007. After several assignments to commission mills around the world, Stefan relocated to South Africa in 2010 and worked as a Head Miller for Sub-Saharan Africa. In 2014 he relocated to Nairobi and was the Technical Instructor at the African Milling School. At the end of 2016 Stefan went to Brazil and led the technology department of Buhler South America. He returned to the African Milling School in January 2020.

Abstract:

Milling from wheat to flour is a gradual and selective process. The ultimate purpose is to separate the endosperm from the bran. This is done by the break rolls in different steps. Each break roll (break passage) is producing a specific amount of semolina and flour in different granulation. The product after the break rolls is classified in the break sifter and the semolina thereafter purified with the purifier and reduced to flour by the reduction rolls.

The amount of semolina at a specific granulation is key for the performance of a mill. It has an
impact on:
- Balancing the load at the subsequent machines (purifiers, reduction rolls)
- Pure separation of semolina with low ash content
- Maximum yield of flour extraction

The setting of the break rolls can be checked by hand (feeling) and visual inspection. A more accurate, reproducible and comparable is the break release method with the laboratory sifter. For this purpose, a mesh with a mesh size of 1120 My is used. That means e.g. number 20 wire mesh.

The following throughs can serve as guidelines:

For a 4 passage break system:

B35 - 30	1 %
B55 - 50	2 %
B60 - 55	3 %
B4	clean bran

For a 5 passage break system:

B32 - 28	1 %
B52 - 48	2 %
B58 - 52	3 %
B4	ca 60 %
B5	clean bran

The final break passage is adjusted in such a way that the bran is clean i.e. without endosperm,
but not reducing the size of the bran flake considerably.

These result can be achieved with properly fluted break rolls. Increased wear of the flutes leads to a tighter roll setting and a greater exposure of energy use for the rolls. The proper grinding action of the break rolls can no longer meet the requirements with flutes that are worn.
For the miller it is of great importance to constantly keep an eye on the condition of his fluted
rolls.

Peter Lloyd
Regional Technical Director, U.S. Wheat Associates, Inc. (Morocco)

Biography:

Principally a technical miller, but also experienced in quality control and training, Lloyd currently looks after a wide array of technical promotions throughout the Middle East and North African Region, and across the world for USW. Lloyd has an extensive experience in milling and related research fields. He has designed, commissioned, run and managed flour milling operations and has a sound background in the wheat business, research and development and quality control areas of flour milling.

Abstract:

The paper will examine the process of preparation of ash curves from the collection of streams in the mill, through to the laboratory analyses, data table preparation, process of accumulation of ash and extraction, and production of curves at different moisture bases.

The presenter will then go on to look at the production of a regression that best fits the ash curve, and will examine the degree of confidence of this regression to the curve.

Finally the presenter will look at the use of this data to predict extraction levels at differing ash levels and whole wheat ash values. The presenter will share some of the exciting work that has been done on flour streaming in recent times.

Desired Results:

Following this presentation it is hoped that millers and QC personnel will better understand the utility of the ash curve, and how and why it is made. They will understand the importance of repeating ash curves on an annual basis to monitor the health of the mill, and will be better acquainted with the use of regressions and levels of confidence in understanding ash curves.
Finally it is hoped that the audience will better understand the utility of stream analysis and how this can be used to optimize products in the mill.

Salim Makhoul
Head of Research & Development, Crown Flour Mills SAL (Lebanon)

Biography:
A vivid professional with more than 22 years of experience in the flour and milling industry, Salim has been part of various business lines, ranging from milling engineering, lab and quality control.

Abstract:
Innovative Technology to improve wheat flour.

-1 Bread improver objective: why do we use bread improver and what is the impact in Arabic bread, hearth bread, and soft bread.

-2 Flour corrector: Explain about the enzymes used in the mill and their rheological impact in the lab and in the bakeries.

-3 The reaction of Individual components: know how the synergetic effect of the enzymes

Milan Shah
Technical Director, Alapala (Turkey)

Biography:

Milan Shah was graduated from mechanical engineering in Bristol, and he has over 20 years experience in milling sector. Originally from Kenya, he has been residing in Turkey and serving for Alapala.

Abstract:

Not only wheat flour, many other cereals and seeds like rye, oats, buckwheat, soy, and sunflower etc are widely used in the formula of baked goods. Industrially, they are added into base flour as 'premixes' for the production of a wide range of bakery and pastry products, and traditional and artisan types of breads as well. As being concentrated on baking technology; baking improvers, emulsifiers, colorants, enzymes etc are also added into flour during the mixing operation. Premix is literatually defined as ''mixtures of foods, including additives, intended to facilitate or simplify the production of baked goods, compensate for the fluctuating processing properties of the raw materials and influence the quality of the finished products.''

Packaged bakery premixes provide variety, convenience, and consistent quality advantages for industrial-scale bakeries, food service operations and even consumers today. Not only saving from preparation time, these ready mixes have the advantage of eliminating ingredient-selection hassles for bakers. Flour mixing plants should be designed according to the specific requirements of the miller and baker for the production of bakery premixes. The right method for mixing operation is very important to get a homogenous and consistent flour quality.

The mixing process can be carried out by two different methods:

Batch (volumetric) systems - using paddle mixers, and micro dosers for additives and micro-nutrients

Continious (gravimetric systems) - using in-line screw type feeders with continious weighing units Depending on the type of bakery product, these components are mixed with base flour in different percentages.

Peter Striegl
Head of Business Development, Bühler AG (Switzerland)

Biography:

Peter Striegl joined Bühler in 1998 after graduating from the Swiss Milling School as a milling technologist. Since 2015, he is Head of Business Development in the Business Unit Wheat & Rye at Headquarters

Abstract:

Mills in most cases produce few standard flours. The market however requires specific flours and a variety of specialty flour. A flour silo allows to check the quality of each flour produced and blend the different flour types to specific flours as per the market demand.

Specific flour in most cases are higher priced and thus generate a higher margin to the milling company. To produce such specific flours, it requires the appropriate flour handling, blending and mixing plant.
Millers differentiate in flour blending and flour mixing. Flour blending is applied if different kinds of flour are produced with few minor and micro ingredients. Flour blending is done by continuous blending, either volumetric or gravimetric and is usually applied for big quantities of same kind of flour.

The advantages of blending are:
- Lower space requirement
- Continuous operation
- Ideal for flours with few minor and micro ingredients

The disadvantages of blending are:
- Not ideal for small batches
- Less flexibility in minor and micro ingredients
- No possibility of manual addition of ingredients

With flour weighing and batch mixing systems all the components such as flour improvers or ingredients are precisely weighed by batch weighers and homogeneously mixed. Batch mixing is recommended in the production of special flour such as cake mixes (ready-to-use flour mixtures), multi grain bread and high ratio ready-mixers.

In case of special flour with ingredients are produced, the purpose of mixing plants are;
- Production of homogenous flour mixes with specific properties
- Admixing of additives (vitamins, flour improvers, flavorings, etc.) in various areas of pre-mix or ready mix flours.

The key machine in a flour batch mixing plant is the batch mixer.

The requirements of a mixer are;
- The mixing accuracy must be guaranteed for a mixing ratio of 000'100 :1.
- Homogeneity must be achieved within the shortest time possible.
- The material being mixed must be handled gently, i.e. low friction, no kneading, no size reduction, etc.
- When the machine is discharged, as little residues as possible must be left over.

The mixing quality and stability essentially depend on the properties of the individual components. The individual components may have widely varying physical properties with negative effects on the mixing accuracy, for example:
- Particle size
- Product density
- Particle shape
- Hygroscopicity

This applies mainly for the flour additives such as vitamins, iron as well as for soy-flour, flakes or other admixes for special flour.

To reach high accuracy in a batch mixing plant, the flours and ingredients are clustered into three groups of products, namely:
- Main components: different kinds of flour
- Minor ingredients: vital gluten, starch, malt flour, etc.
- Micro ingredients: vitamins, improvers, flavors, etc.

The presentation will explore different flour mixing concepts with pros and cons.

Ingredients, mainly minor and micro components, are delicate products with high value. Thus, monitoring and traceability are essential. The latest technologies available such as online NIR-measuring as well as tracing tools and recipe management are applied. Last but not least "Food Safety" is key. This requires elements such as magnet, metal detectors, control sifters and speck monitoring.

Walter Von Reding
Director Business Unit Flour Ingredients, Bakels (Switzerland)

Biography:

Walter von Reding, male, has extensive international experience in grain-based research projects and grain processing technologies. He has been associated with the Bühler Group for over 15 years, he developed and successfully rolled-out new innovative solutions for the grain and food processing industry. Since April 2020 he is responsible for the Flour Ingredient Business of the Bakels Group in collaboration with Bühler. He is a trusted person in the grain and food processing industry and within the academic community. He received a Master in Food Engineering and holds a Bachelor in Economics and an MBA with focus on strategic innovations with new technologies. He is an active member of international organizations like Whole Grain Initiative, HealthGrain Forum and Food Fortification Initiative.

Abstract:

Western lifestyle, driven mainly by convenience, with high consumption of fast and ready to prepare foods, with plenty calories and related less physical movement of the people, has left in many countries a tremendous burden of obesity and related diseases like cardiovascular diseases, type 2 diabetes, large colon or breast cancer. It is critical to consider the impact of lifestyle habits, such as consumption of unhealthy diets, on the susceptibility to COVID19- and recovery. Furthermore, the large number of people that will recover from COVID19- may lead to a spike in chronic medical conditions that could be further exacerbated by unhealthy diets or in vulnerable populations. Therefore, it is recommended that individuals refrain from eating foods high in saturated fats and sugar and instead **consume high amounts of fiber, whole grains, unsaturated fats and antioxidants to boost the immune system function.**

Dietary fibers are present in the whole grains together with micronutrients and phytochemicals. Cereal fibers have proven to have stronger health impact as a result of synergistic effects with phytochemicals and micronutrients in whole grains.

Cereal-based food products have been the basis of the human diet since ancient times. Dietary guidelines all over the world are recommending the inclusion of whole grains because of the increasing evidence that whole grains and whole-grain-based products have the ability, to enhance health beyond the simple provision of energy and nutrients. The presenter will explain the main chemical components present in whole grains that have health enhancing properties (dietary fiber, arabinoxylans, beta-glucan, bioactive components, etc.) and the role that whole grains may play in prevention of diseases. The knowledge derived from the functional properties of the different chemical components present in whole grains will aid in the formulation and development of new food products with health enhancing characteristics.

In the past decade, consumers have been rediscovering whole grain-based and fiber rich products and the number of whole grain products has increased rapidly. Most modern milling technologies allow to produce efficiently whole grain flours and flours with healthier components like dietary fibers, bioactive compounds and micronutrients like vitamin and minerals with health benefits and excellent functional properties in different food applications.

Key words:
Lifestyle, convenience, empty calories, obesity, disease, wheat kernels composition, grain outer layers, healthier components, whole grain, dietary fiber, Covid19-, health benefits, immune systems, modern milling technology, functional properties in food applications.

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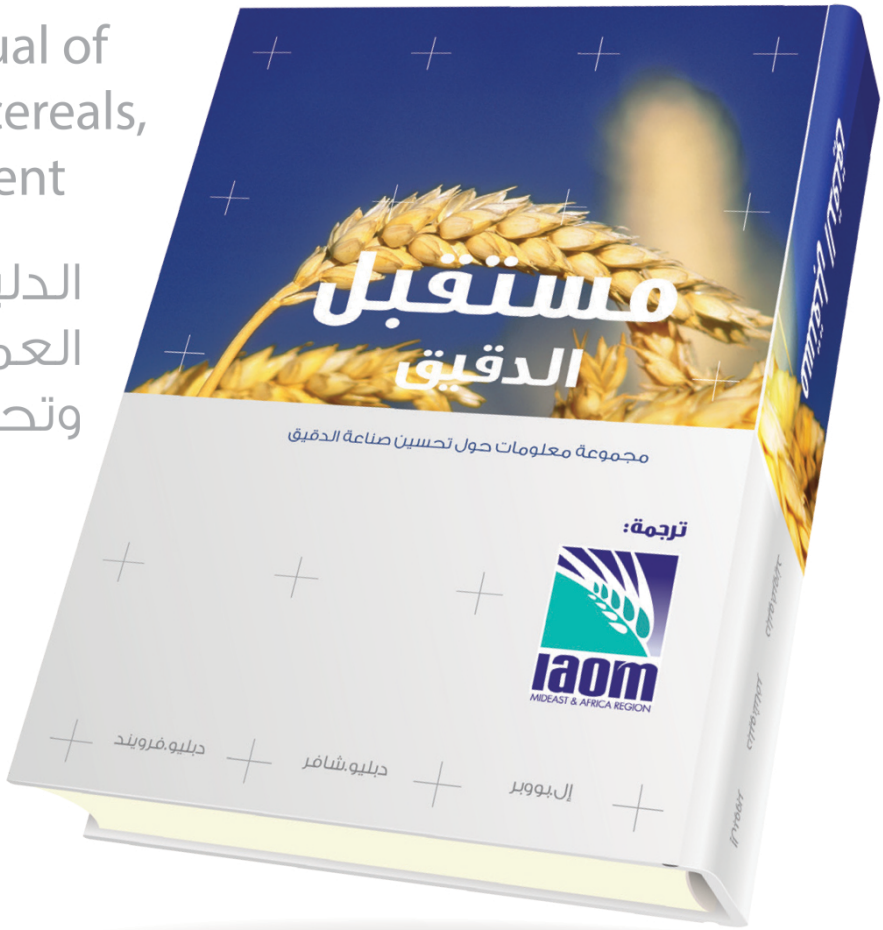

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