Figure 4: 1x5 tons Schulz malting system with the possibility of extension; installed at Wabro Kvarn, Skoeldinge (Sweden)

Craft Malt

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FROM BEER TO BREAD

The needs of consumers and thus also the interest of the processing food industry in innovative products do not stop at the malt industry.

No matter in which aspect: naturalness, aroma, colour or other functionality – malt is in greater demand than ever before, both for use in breweries and in bakeries. The idea of own malted cereals to expand the product portfolio in the direction of baking mixes and "convenience products", however, seems to be in the starting blocks at the flour mills.

It would be precisely now – at the beginning of this trend – the right moment to secure a competitive edge in the market and to think about the right investments for the future direction based on the consumer's wishes.

Functionality in all areas

The market development of innovative products in various malt producing and processing industries, undoubtedly also creates new needs in terms of know-how and technology for production. The batches are getting smaller, the product variety is increasing, the quantities produced are more flexible and more emphasis is put on a user-friendly application, since not all operators are technologists.

In the following, the Schulz malting system of Kaspar Schulz in Bamberg will be examined in more detail and presented on the basis of examples of how it copes with the fulfilment of these new requirements.

Best technology for your malt

The Schulz malting system consists of an external cylindro conical steeping vessel and a germination kilning combo drum with connected ventilation technology.The switch is designed as a closed vessel with a hood (Figure 1 - overleaf).

This protects against foreign contamination, keeps the dust back and allows automated cleaning of the vessel thanks to built-in spray heads. The removal of the floating barley takes place completely automatically by air being blown in centrally and thus the barley floating on the water surface and a wave motion in a cirCraft Maltumferential overflow channel transports goods.

The mixing or circulation of the softened material can be accomplished both by pumping and a return via a distribution screen in the vessel, as well as parallel to the ventilation during the wet switch on screen basket in the cone or through a centered ventilation.

Above this there is a Wild's pipe through which the soft material rises from the bottom of the vessel together with the air. The CO2 extraction takes place via the screen basket installed in the cone by means of a fan.

Germination kilning combo drum

The insulated germination kilning drum rests on wheels and inside there is a false floor. To turn the green malt, the drum can be rotated in both directions by a frequency-controlled motor (Figure 2).

Eliminating additional installations or turning devices, which can injure or squeeze the green malt, the malting system guarantees homogenety and at the same time a gentle distribution on the false floor for best malt quality.

For spraying during germination, a humidification bar with several nozzles is installed inside. This operation is possible with a permanent water connection to the drum even with simultaneous rotation, whereby a uniform humidification of all areas is guaranteed.

Through a fully automated coupling and disconnection system

of the air ducts they are separated from the drum before the turning operations. A special air flow profile directs the incoming air, so that it flows through the tray plate and thus the heap evenly from below and is blown out through a perforated plate in the upper half of the drum interior again.

During germination, the air passes through an air-cooling coil fed with ice water with a downstream humidifying nozzle. The ratio of fresh and re-circulated air can be precisely defined by means of three butterfly valves.

Heating during drying is done by means of an indirect air heater powered by natural gas or LPG (Figure 3). An additional glass tube heat exchanger for energy recovery with an efficiency of 80 percent ensures best energy results. With existing overcapacities of a steam generator, the air heating can also be done on this. The cooling of the malt after completion of the process is done by means of fresh air.

Subsequently, the drum is positioned upside down and the malt is conveyed with a discharge screw into a prefabricated gutter, from where it can be transported by a freely selectable transport system for malt cleaning.

Production meets design

With temperatures up to 130°C in a closed system, a wide variety of malt varieties can be produced, whether caramel, standard malts or malt cereals or different pseudo grain types, in the drum is much possible. Various malts have already been produced from numerous raw materials, such as barley, millet, rice or soya, and colour intensities of up to 300 EBC have been achieved.

For the production of smoke or peat malt, it is possible to integrate a smoke generator in the existing ventilation system, or to couple an Lactobacteria acid tank to the spray bar of the green malt drum for the production of sour malt. This opportunity not only provides a basis for start-ups, but also for existing businesses. Thus, new product lines, capacity expansions and, above all, an expansion of the product portfolio can be realised.

Constructed according to the latest standards in the food industry in terms of hygienic design, this method of malting removes the mould from the germ buds and not only provides the best foundation for certification requirements in the food sector, but also saves cleaning agents and cleaning time.

It is also the design that makes the Schulz malting system not just any old production facility, but an aesthetic demonstration system. Visitor groups and customers are becoming ever more open-minded about the production processes, the products consumed and processed by them, and they want absolute transparency: It can therefore happen that the germination kilning combo drum finds itself positioned between the sales and the tasting room instead of behind it closed doors.

Figure 3 – Ventitlation technology of a 10 ton Schulz malting system; installed at Mastri Birrai Umbri Coop. ARLI Umbria (Italy)

Figure 1: 2x10 to steeping vessels

Figure 2: Germination-kilning drums

Absolute flexibility

The Schulz malting system is available in sizes of two, five, 10 and, more recently, 25 tons of barley per batch and one batch per week can be produced.

To increase the annual production, the plant can be subsequently extended to up to three Germination kilning drums. Components of the existing system can also be used for the new drums (switch, ventilation technology, glass tube heat exchanger, automatic), thus keeping additional investment costs low.

The single batch quantity can be reduced up to 20 percent of the maximum load. With water consumption of approx. 4.3 - 4.8 m^3/to malt and a heat energy consumption of 560-680 kWh/to malt, the Schulz malting system for a small malting plant achieves absolute top values. Gas consumption can be further reduced by insulating the air ducts.

Due to the extremely high level of automation of the system, the personnel costs and thus the costs for operating the system are kept low. The automation is based on the tried-and-tested Braumatik process control system from Pfenning Elektroanlagen, which has also been used at Kaspar Schulz's brewhouse systems since 2006, has been continuously further developed and is already being used by more than 190 customers worldwide.

The system offers a simple and clear adjustment of the process steps, parameters and recipes - without any programming knowledge.

Contrary to the trend: Career changes and start-ups

The customer base in which the germination kilning combo drum already rotates could not be more different: From farmers from the USA, to millers in Sweden, to Italian brewers and absolute cross-country skiers, who perceive the potential of malt for a wide range of industries.

Increase in the value chain

An example of the steady increase in the value chain in the grain sector is the Swedish family business Wabro Kvarn, which this year became the first organic malting plant in Sweden with the installation of a Schulz malting system (Figure 4).

The company originally came from agriculture and operates successfully with the organic cultivation of old cereals. The company continued to develop and increased the product value of its grain by acquiring a flourmill, which mainly processes emmer, einkorn, spelled and special wheat and barley varieties.

In the summer of this year, Wabro Kvarn put a five-ton Schulz malting system into operation to turn the old grains into malts for the surrounding breweries, becoming Sweden's first organic malting plant. Despite new fields of expertise for the owner Thomas Björklund, he is certain that the lack of know-how will be compensated for by good plant technology and a developing production experience.

He is also convinced that the general trend towards higher quality regional products will also prevail in the Swedish brewing scene. Wabro Kvarn always keeps its eyes open to the bakery market and is sure that it will soon be able to supply bakeries with custom-made baking mixes.

It would also be conceivable to supply bakers with sour meal flour as a starter culture for sourdoughs. Already the owner of the malting company speaks of desired capacity expansions in the near future.

Direct marketing

The most exciting thing to watch right now is a number of exciting malthouse start-ups. The first Schulz facility in the land of opportunity opened in August 2016 at Root Shoot Malting near Denver, Colorado.

The fourth-generation farm owned by the Olander family has been producing barley for well-known American breweries and malting plants since the 1980s. Since last year Steve Olander and his son Todd now produce their own malt with a Schulz malting system. The steadily growing customer base is currently made up mainly of the large number of local Craft Breweries Colorado, which appreciates the quality in relation to the regional malt.

With an annual capacity of approximately 400 tonnes of finished malt, Root Shoot Malting was already listed among the five largest craft malting plants in the United States at the time of opening. In September 2018, the first expansion step will be realised with the installation of a second drum, thus increasing the malting capacity to 800 ton / year.

The malt market is rotating

More and more alternative cereals are finding their way into the food market and cereals are now being bred and used whose main characteristics are not extract, solubility or yield per hectare, but instead generate flavour components in malt.

A development, which offers the market everything to the manufacturers and the customers, but above all the chance to include other malt-processing industries and passionate producers. The malting technology from Bamberg developed for this purpose can meet the manifold requirements and will support this trend in 2018 with 20 drums.

It remains to be seen how the mill industry reacts to this trend - the chance of securing a unique selling proposition with regard to products through its own malting would certainly be given with this resurgent system technology.

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