



The Food Test Center is equipped with various test dryers. Fabian Baur is testing grape pomace in a barrel at 40 °C.

Test Series in the Test Center

Reasonable approach to designing bespoke solutions for food dryers

Heat pump based condensation drying is capable of drying food in a defined, gentle and energy-saving manner. Tests are performed and viable solutions worked out in the Test Center of German drying system manufacturer Harter.

The Harter company launched their heat pump based drying systems on the market more than 30 years ago. Heat pumps played a rather insignificant role at that time. This has changed dramatically as everyone knows. Energy-saving and efficiency have become criteria that are critical for making buying decisions. Harter's Test Center, however, attracted customers' interest from the very beginning. The opportunity to have one's product tested for drying feasibility and drying properties soon turned out to be a major advantage when it came to finding a viable drying solution.

Food technologist Fabian Baur is responsible for the Food Test Center. He conducts series of tests, and defines the relevant processing parameters on which the suitable drying solution is based. "Our test equipment includes a chamber dryer, a belt dryer, and a barrel dryer," explains Baur. "You should know that the heat pump integrated in all our dryers may be used for any technique." Some examples shall illustrate what is currently possible.

Belt Dryer for Grating Cheese: One of the test jobs was to dry grating cheese for subsequent grinding powder. The prospective customer already has a drying system in operation.

The system is gas-operated and consumes too much energy. The much bigger problem, however, is that the product is deposited unevenly so that the grating cheese does not become uniformly dry. Various tests were conducted on about 15 kg of several types of cheese. The cheese manufacturer's specification for dry matter content was 90 percent. Baur managed to meet this requirement within six hours at only 25 °C. The 25 °C requirement was another specified requirement because cheese would melt at higher temperatures. Low temperatures are also easy on the product while being dried. They ensure that the valuable ingredients are retained. Plus, low temperature drying has a positive effect on aroma and appearance. These essential aspects of food drying are further facilitated – by the closed air system. Many projects demonstrated its tremendous edge on dehumidification systems that require fresh ambient air and emit exhaust air.



Tests of grating cheese and turmeric demonstrate how Harter manages to exactly achieve defined residual humidities. The heat pump technology may be used for any drying technique.

In the case at hand, the prospective customer took the opportunity to lend a test system. They used this system to perform their own tests with varying parameters at their premises. Harter is currently working out a solution using a four-belt dryer.

Barrel Dryer for Grape Marc: Harter entered the food market many years ago with a pioneer project that involved the barrel drying of apple pomace to be ground to apple pomace flour subsequently. Baur reports: "As far as bulk material drying is concerned, we draw on experience gathered in hundreds of projects in various market segments." So, the test series on grape pomace was rather routine for him. The pomace shall subsequently be processed to become a quality food supplement and is a novel product.

Barrel dryers are suited for products that rather resist the passage of air through them. The barrel is rotated at a specific speed throughout the drying process. In this case,

the speed was five rpm. Baur tested a total of 61 kg of grape marc. He managed to achieve the specified more than 90 percent dry matter content within seven hours. The drying temperature was 40 °C. The low temperature was vital for this product because the manufacturer places greatest importance on the retention of the ingredients. Now that the pomace has passed quality tests in the manufacturer's laboratory, barrel dryer design may be started.

Chamber Dryer for Turmeric: Another application concerning the subsequent grinding to powder was inquired by a manufacturer who wants to dry turmeric and needs a new drying system for the specific purpose. Their planned throughput is 200 kg per hour. They provided 9.3 kg of turmeric for testing in the Harter Test Center. Baur managed to achieve the specified 95 percent dry matter within four hours at a temperature of 70 °C. In the absence of a temperature specification the

food technologist selects higher temperatures, which may be 75 °C maximum.

"Each customer has specific requirements because customers pursue different goals. We accept the specified requirements and find a solution to meet them," explains Baur. In view of the planned production quantity and the other parameters, Harter offers the manufacturer a chamber dryer with three drying chambers. The chambers accommodate multifunctional trolleys. Multifunctional means that the trolleys may be loaded with pans and trays. The manufacturer is thus given maximum flexibility and may also dry other products in this drying system. By the way, Harter's heat pump assisted drying technique is energy-saving enough to be eligible for government subsidy in Germany, Austria and Switzerland as of 2017. **St. ■**

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