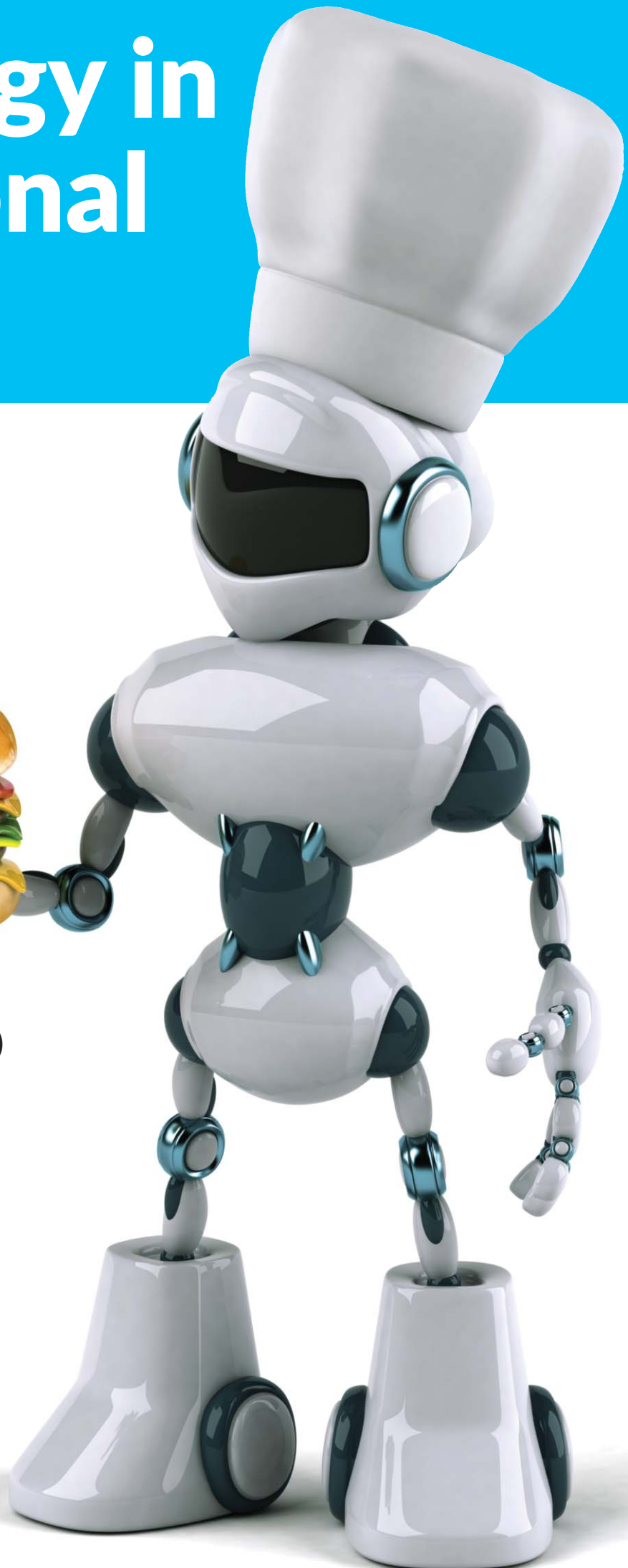


Technology in Professional Kitchens

Volume 1



Cook&serve, cook&hold (& serve) were the common production processes in gastronomy in the past. Today, modern kitchen equipment makes it possible to cook, for instance, time-delayed, to regenerate mobilized, and/or to portion decentralized at stations, in hospitals, or in homes for the aged. Mobile kitchens, sometimes installed in food trucks, form the prerequisite to spoil guests by offering a meal at any place and at any time.

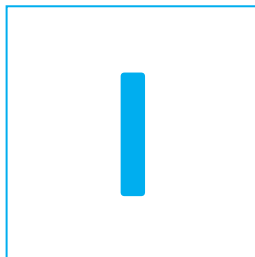




Solutions for Every Type of Catering Operations

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In the past, everything was very simple. In order to cook, the chef needed a stove that was large (more or less), a tilting frying pan, and a deep-fat fryer - then he was already able to get started. In gastronomy, he cooked in the past the same way that is still common today - "à la minute", thus direct per order; the guest received his ordered meal freshly prepared. On the other hand, one usually still produces in large-scale catering establishments today in accordance with the system "cook & hold" i.e. one cooks the food, keeps it warm for a few hours, and then serves it. Perhaps the kitchen professionals in the old days registered that the temperature, color and consistence of the food changed during this time, or that the dishes often lost a part of their nutritional value, especially vitamins and micronutrients, by the often long holding times. Possibly they even suspected that harmful microorganisms form, when the temperature drops, but they didn't know precisely about these processes and often ignored them. Today, one knows these degradation processes quite precisely and looks, where applicable, for an alternative.

DIFFERENT PRODUCTION PROCESSES

In gastronomy, cook&serve is presumably still the most used process for preparing meals in many European countries. However, with this process, the cook can only serve a relatively small number of guests gradually. For the large number of daily meals served in hypermarkets, schools, universities, hospitals, homes for the aged, or companies, this procedure is unsuitable. That's why cooks there frequently use "cook & hold", keep the food warm right up to consumption respectively keep it cool as long as antipasti, salads, desserts and other cold dishes. This system is a good culinary solution as long as there is a maximum of 90 minutes between the end of the production and serving the food to the guests. But quite often, the process takes about three hours, which is barely accepted in countries such as Germany, for example, according to the so-called "good hygiene practices". But even this time interval is exceeded quite often. Whoever doesn't accept this, cooks his food "decoupled" i.e. time-delayed to the distribution up to a cooking point of 80%. Afterwards, they cool it (cook & chill) in 90 minutes down to 3°C in a blast chiller and then can store it up to



three days at this temperature. As an alternative, they can flash freeze the food (cook & freeze) down to -18°C and can keep it for up to 12 months. Sous-vide is a very special process with which raw ingredients can be cooked carefully at low temperatures in plastic wrap under vacuum or in a controlled atmosphere and can be stored afterwards for up to 21 days. Some chefs cook at 60°C or just a bit over, but hygienic experts require a core temperature of more than 65°C (better 72°C), with which the cooked food is supposed to be kept at least two minutes. With this process, meat needs just under twice the cooking time. Due to the fact that it is hygienically difficult, this process should only be used by experts, who have special knowledge in the field of foodstuffs, cooking technology, hygiene, and microbiology. Because the capacity of the equipment is



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indeed growing, but is currently still relatively small, sous-vide is only used supplementary to other systems in large-scale catering establishments.

FREE-FLOW - THE POPULAR SERVING SYSTEM WITH FLAWS

The reason why free-flow is a very popular serving system is because it offers the guest a large selection of food. But some nutritionists criticize the often long holding times of the food of over several hours. One of their points of criticism is that the humidity in the room, oxygen, and light would cause, above all, sensitive nutrients like vitamin C or folic acid to decompose relatively fast. It is important that the temperatures of the serving counter and buffet trolleys are controlled precisely. If one would like to work in such a precise manner, one has to measure the core temperature of the food continuously. If the temperature drops under 65°C , there is a risk, from the critics' point of view, that pathogenic germs are able to proliferate and cause health problems. That's why they advocate a small selection of food to be freshly produced over and over again and changed quickly without long holding times.

MOBILE REGENERATION - MOBILE FOOD DISTRIBUTION

Mobile serving respectively cooking equipment is required for all kinds of events. This applies to the Formula 1 race just as to conferences and congresses in hospitals or to cultural events in homes for the aged. Depending on the catering concept, pre-produced food is regenerated on site or freshly cooked. In the first case, the caterer needs mobile units, which also, when applicable, regenerate and keep the food warm without an electrical connection, but are also able to cool it down. Manufacturers like Iseco, Electro-Calorique, Stierlen, temperite, Menü-Mobil, Blanco, Hupfer, or Socamel equip them for this purpose with different types of technologies such as for instance thermocontact

regeneration and heat holding, induction or hot air. Highly innovative systems offer up to five different temperature ranges in a trolley so that individual regeneration is possible for each component. Such a solution primarily makes sense if a distribution trolley is equipped with gastronomic containers from which the food can be portioned individually.

MOBILE CATERING WITH MOBILE KITCHENS

If it is supposed to be cooked at events on site, a special type of equipment is mandatory, which has to fulfill the basic functions “storing, cooking, suctioning, lighting up”. Then the front cooker has to be able to store raw ingredients cooled or uncooled as well as prepared hot components. It has to be able to cook classically, but also have the possibility to broil, barbecue, or only keep the food warm. Therefore, flexibility is the ace because one time the front cooker has to produce components another time it has to produce completely stir-fried or pasta

dishes. Because the last one mentioned is booming continuously all over Europe, a pasta cooker can also be integrated into the mobile station. In addition to cooking and storage modules, an effective air extraction, is mandatory, at least to the right and left of the cooking surface, but also preferably in front of it, because the unpleasant smells run off guests quickly and permanently. Blanco, Rieber, Ubert, or Scholl are suppliers of such systems.

THE DIGITAL EVOLUTION IS NOT A VISION, BUT REALITY

Industry 4.0, kitchen 4.0 – this is how one describes the evolutionary merging of mechanical engineering, electrical engineering, and information technology to an intelligently linked production, even in large-scale kitchens. Up until now, many processes with the preparation, distribution, and serving meals are decoupled time-wise and spatially. In the kitchen 4.0, they are brought together in order to optimize procedures, take the load off the staff, and reduce costs. The Era of Digitalization has begun in the professional kitchen too. What is behind this term? Without being able to claim to define this term correctly from a scientific point of view and comprehensively, one can sum it up in the colloquial: in a narrow context, digitalization is a process in most different economic and social areas, in which information, instructions and the like are transferred into an artificial language which is understood by the programs of computers, technical systems, machines and equipment. In a broader context, it is about linking this equipment with each other in order to optimize procedures, deployment of staff and costs.

Digitalization has been visible in professional kitchens as well. Combisteamers, for instance, have a vast number of programs, with which totally different types of cooking processes can be controlled. Whoever would like to



Modern kitchen equipment makes it possible to cook, for instance, in a time-delayed manner, to regenerate in a mobilized fashion, and/or to decentralize portioning at workstations, in hospitals, or in homes for the aged.





control his equipment independently of the actual site, can transfer the relevant data to a so-called “cloud”. Then these will not be saved on one’s own server anymore, but be transferred over the internet to gigantic server parks, which are situated in various places around the world. Companies rent a specific memory capacity there, which they can fill with their data and call it up from anywhere. The US American company “Dropbox”, for instance, is a worldwide active and well-known provider. Being that the US intelligence agencies are known to be able to have access to these memory capacities, European providers like Strato have developed alternative solutions.

WEB-BASED E - PROCUREMENT

The so-called “purchasing platforms” work according to this principle. Their important attribute is that kitchen professionals outsource their shopping activities (web-based e-procurement) to a specialized contractor, and access to their IT structure (software, server, data processing, data memory, and backups). This way, they save expensive investments in hardware and software, but nonetheless are able to have access to their own data without any problem, from any standard computer that has internet access.

Which functions do they offer? One of the most important is that the provider bundles a range of products of several hundred delivery partners on platforms: wholesalers, manufacturers of food and

nonfood articles, operations of craft-based food industry, etc. New customers are allowed to be linked to their former suppliers, and therefore don’t have to be limited to the existing providers of the platform. However, the prerequisite is that the company agrees with the providers about the system conditions, which are frequently in the lower single figure percentile range. Producers, for instance, of deep-frozen foodstuffs, who reach contribution margins of 10 to 15%, often just simply can’t cope with such additional conditions arithmetically, particularly because their sales volume doesn’t rise in the first step. Another important function is that all of the relevant production information (from ingredients, nutritional values up to allergens and additives) are deposited into the system and are updated continually. If one considers all of the parameters together, the entire food flow can be managed. That’s why one also talks about food management. Menus, for instance, can also be generated directly from the system. By way of multifunctional interfaces, they can also be connected with administrative accounting or point of sale systems.

Another example for digitalization of kitchen technology is remote maintenance of kitchen technology equipment. Service employees of a manufacturer or dealer can be linked to a piece of equipment in order to carry out the removal of defects or preventative measures for the upkeep.

Augmented Reality means extended or enhanced reality. Large concerns are doing research on data glasses, with which can show its users individually customizable information about their jobs. For example, there is the possibility to send a maintenance worker in the future the blueprints of the piece of kitchen equipment, which has to be repaired, directly in their field of vision. Similarly, Building Integrated Modeling (BIM) is terminology used in project planning. With special software



programs, complex projects like the new construction of a large-scale kitchen, can be summarized in single, but very complicated 3D file. In the planning phase, alternatives can be visualized and procedures simulated. Thereby, planning security increases, but at the cost of clearly higher expenses.

A DARING LOOK INTO THE FUTURE

Let's imagine that we are in a fantasy kitchen. In it, all of the raw materials and



Mobile serving and cooking equipment is required for a variety of events, from conferences and congresses in hospitals to cultural events in homes for the aged. Depending on the catering concept, food is either regenerated or cooked on site.

ingredients will be delivered in a storage unit, which is dispensable and will be stored according to the temperature requirements. When the kitchen chef activates a recipe with his computer, the containers release the required amounts and dispense them into the unmanned transport units. These transport them with a special technology to multifunctional hybrid production units, which are operated alternatively with electricity or gas. Parallel to this process, the cooking system activates the appropriate cooking program. The piece of equipment checks whether the recipe components are available, starts the cooking process, controls and ends it. The resource management system controls, among other things, the energy and water consumption of the equipment with regards to the amount and costs; furthermore, it optimizes the pollutant emission. If the food to be cooked should be blast chilled or flash frozen, it will be taken from the mobile cooking insert, forwarded to refrigeration unit and set into the chiller or flash freezer. It also starts the appropriate program independently. If the food is supposed to be portioned, it will be steered, for instance by RFID (radio frequency identification) and brought to the appropriate place on the plate with the correct portion, by a fully automatic system. If the meals are served in the restaurant, they will be brought automatically to the counter and served by robot units at the push of a button, for hygienic reasons. If a guest would like a larger portion, he or she pushes the button twice. Each visitor has his personal QR code (quick response), which determines the payment procedure (for instance Paypal, EC, credit card), which allows them to scan it at the payment unit, thus completing the process. Is such a dehumanized kitchen desirable? No! Will it come in this form? Most likely. Will it be implemented in sub-areas? More than likely!

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