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Kosher Airline Food: A Logistical Challenge

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Kosher Airline Food: A Logistical Challenge

Abstract

Providing meals to passengers on aircrafts requires a complex logistical system if it is to be done successfully. Variations to that system are required if special meals, such as kosher ones, are to be provided since it entails unique system challenges. The authors discuss service requirements, the challenges they pose to the inflight meal service logistical system, and some of the ways in which these challenges are met.

Keywords

Service Learning, Growth and Developments, Air Crafts, Challenges, Food Science

Kosher airline food: A logistical challenge

by Orit Malka
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Providing meals to passengers on aircraft requires a complex logistical system if it is to be done successfully. Variations to that system are required if special meals, such as kosher ones, are to be provided since it entails unique system challenges. The authors discuss service requirements, the challenges they pose to the inflight meal service logistical system, and some of the ways in which these challenges are met.

Inflight food service for passengers is unique in many ways and requires a more complex logistical support system than most other food services. The separation of the food preparation from the product consumption both in terms of time and location means that careful monitoring of food holding and transfer procedures is required. Also, the selection of food products for these meals requires close attention to ensure that the products are able to withstand the holding and transport procedures, yet be safe and of high quality when served to airline passengers¹.

Because of these requirements, the incorporation of unusual menu items, such as kosher meals, into the complex logistical system required to support inflight food service has significant logistical and cost implications. These implications are significant as the incorporation of meals such as kosher ones requires deviation from the assembly line based mass production system that is the basis of cost effective production and delivery of food and beverages for inflight food services².

Kosher demand grows

While kosher foods have always been in demand by persons who have chosen to observe Jewish religious dietary laws, in recent years these foods, produced under strict processing and preparation standards, have gained increased popularity with non-Jewish consumers. Persons who are vegetarians, lactose intolerant, or simply health conscious may perceive kosher food

products to be purer or safer than other foods because of the strict standards under which they are produced.

Indeed, consumer demand for kosher products has grown in recent years and is expected to continue growing. Kosher food products experienced a 13 percent growth in sales from 1997 to 1998, while overall sales in the food industry grew by only 4.2 percent³. Information from Kashrus agencies, agencies that certify foods as meeting kosher standards, and other kosher experts indicate that 2,500 new kosher products were introduced into the market in 1999 alone. Additionally, kosher meals and food items are being introduced into the gourmet, natural foods, and health specialty markets⁴.

This growth in consumer demand for kosher products is likely to be reflected in a corresponding growth in the demand for kosher meals on board aircraft, particularly on international flights since there is more full meal service on these extended flights in comparison to the current trend for only snack service on shorter domestic flights.

Meals require efficiency

Each airline specifies precisely what will be boarded on their flights for all types of food and beverage services; inflight caterers must meet those specifications precisely. This requirement can be achieved either by using products which the airline purchases directly from product manufacturers and which are deliv-

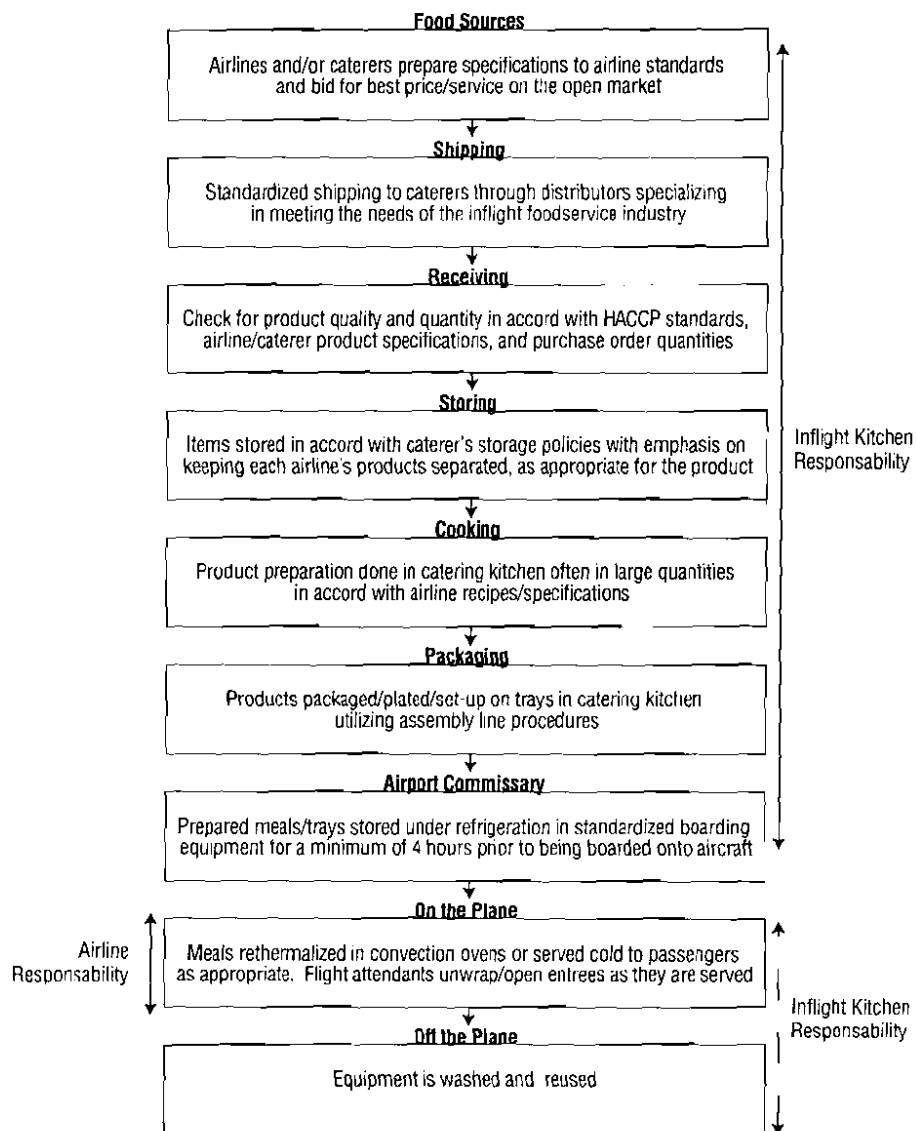
ered to the caterer for use in preparing meals or snacks for the airline or by using products which the inflight kitchen itself purchases from national or local suppliers⁵. In all cases, regardless of the purchasing process, all supplies received by the inflight kitchen must meet the U.S. Food and Drug Administration (FDA) and the Hazard Analysis of Critical Control Point (HACCP) specified minimum hygiene conditions, temperatures, quality, weight, and grade⁶. Once accepted, delivered supplies must be stored in space allocated specifically to each airline. This space allocation is required in all types of storage, refrigerated, frozen, and dry stores⁷.

Because of the time difference between product production in the inflight kitchen and the consumption of the food products in the air, cook-chill or cook-freeze methodologies have been adopted and must be monitored carefully to prevent excess exposure of cooked items to temperatures where food-borne pathogens can survive and grow, potentially causing food-borne illness⁸. Once prepared, the hot foods for traditional meals are portioned onto individual plates or casseroles, chilled, and rethermalized on board the aircraft prior to service to the passengers. Cold food items, along with eating utensils and condiments, are placed on the meal service trays and stored under refrigeration until meal or snack service is initiated on board the aircraft. The number of meals boarded on a flight can be adjusted as passenger counts change up until

the last passenger is seated aboard the aircraft. During onboard meal service, the heated hot food containers are placed onto the pre-set trays and then served to passengers. Flight attendants can check the hot foods as they are heating to

verify temperature, and they can see and check the cold food items that have been pre-set on the trays⁹. Figure 1 illustrates the logistical flow of products for the preparation and service of conventional meals on board aircraft.

Figure 1
Logistical system for producing and serving conventional meals on board aircraft



Kosher meals are categorized as "special meals" by the airlines. Thus they have to be ordered 24 hours ahead of the scheduled flight departure time. Even though the inflight kitchen may have a meal count for kosher meals for a flight 24 hours ahead of the scheduled flight time, they still have to estimate the number of frozen kosher meals that they will maintain in storage since most inflight kitchens are not able to produce kosher meals. Their supply must consist of varied kosher meals so that they can meet the specifications of the several airlines served by the kitchen. Also, because the inflight kitchen does not prepare the kosher meals onsite, they must forecast demand to have an adequate supply on hand, but not so many that they cannot be completely utilized before they deteriorate in quality and cannot be used to service flights.

Kosher adds challenges

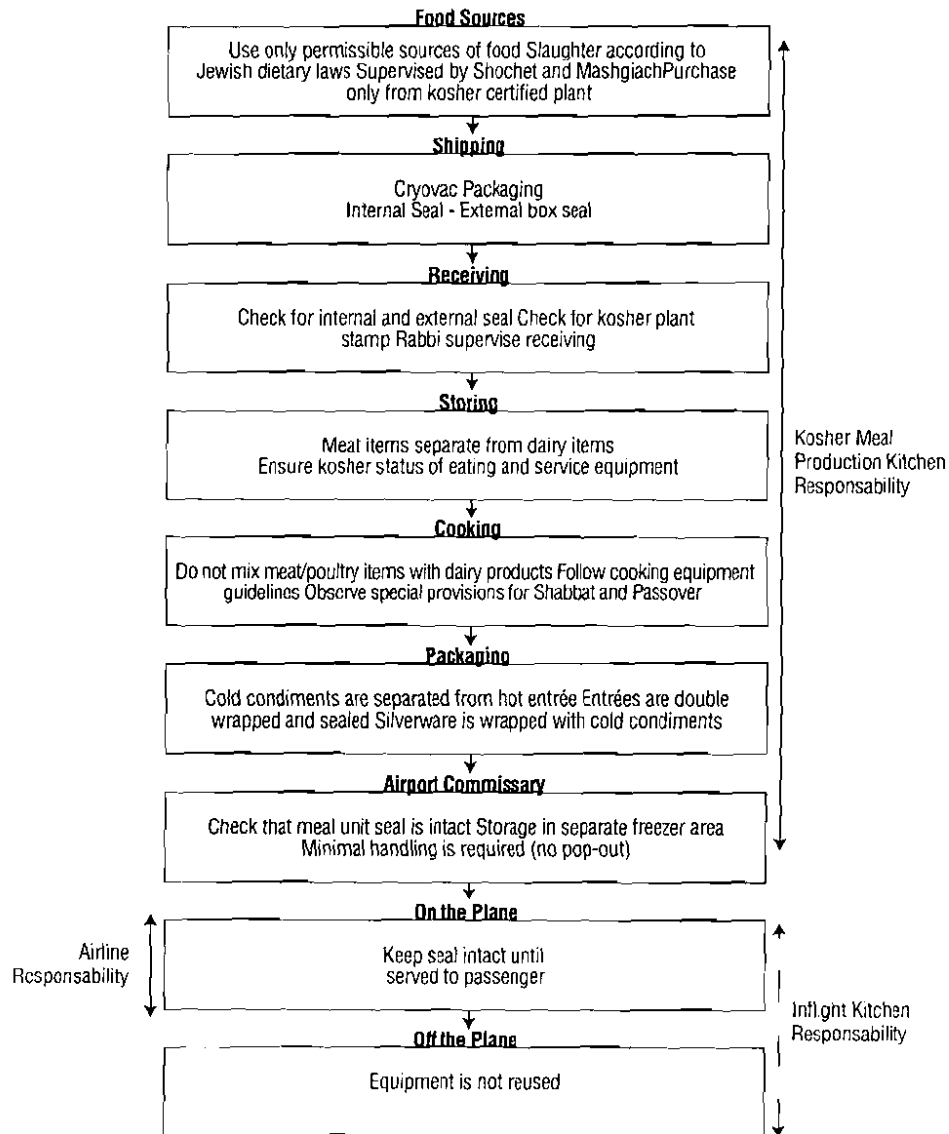
Another difficulty encountered is the communication gaps within the information flow, beginning with the placement of the meal request to the actual meal service. Flight delays, unpredicted flight schedule modifications, and passengers changing flight reservations (often to a different flight very close to their originally scheduled flight) contribute to problems in the information flow to inflight kitchens. Thus a

passenger who ordered a kosher meal for one flight may actually be on a different flight. Unless great care is taken with special meal communications and the inflight caterer has a sufficient stock of tempered (or partially thawed) kosher meals acceptable to the airline on hand and available to be boarded onto a flight at the last minute, it is likely that the kosher meal would not follow the passenger to the new flight. It is also likely that the kosher meal originally ordered may be boarded onto the original flight and be wasted.

Meals prepared off site

The word "kosher" is an adjective meaning "fit or proper." Food is considered kosher if it is prepared in accordance with Jewish dietary laws¹⁰. The difficulty of producing kosher meals within conventional inflight kitchens is due to the complexity of these dietary laws. To prepare meals onsite, an inflight kitchen would have to be customized to meet all the proscriptions and prescriptions of these laws. Further, FDA Food Codes and HACCP rules mandated for conventional inflight catering kitchens are insufficient to fulfill the food handling and processing requirements defined in the complex kosher dietary laws. Figure 2 summarizes the process of producing and maintaining products as kosher throughout the complex logistical system required for onboard meal service.

Figure 2
Producing and maintaining food products as kosher
throughout the logistical system for inflight food services



Examples of challenges that would have to be overcome within conventional inflight kitchens include the need to separate the production of products containing meat, fish, or poultry from dairy products or foods that contain dairy products; the need to have separate cooking, eating, cleaning, and service utensils for meat/fish/poultry and for dairy products or foods containing any dairy products; and the need to prepare cooking utensils and kitchen equipment prior to their use in the preparation of kosher food products. This last challenge is made more difficult in modern inflight kitchens since utensils made of porcelain, enamel, and plastic are considered to be porous; therefore, such utensils can never be completely cleaned as the koshering process requires⁶.

Ingredients are complicated

In addition to the need to modify the structure and production flow, there are several other factors that inhibit the production of kosher meals onsite in an inflight kitchen. Some of these factors include the difficulty of obtaining kosher meat since there are only a very few slaughter houses or meat packing plants that produce or process kosher meat and poultry in the U.S. today. Thus, for example, if an inflight kitchen was required to provide a certain amount of kosher beef stew for an airline's flights, that kitchen would need to estimate the amount of beef required to make that stew very

accurately. Then an order for that beef has to be placed well ahead of the date that it was needed since the order would be received from a slaughter house or packing company that was likely to be a thousand or more miles away from the inflight kitchen. Because of the perishability of the meat, unusual shipping costs would be incurred for express delivery of what would probably be a small amount of meat relative to the kitchen's usual non-kosher production quantities.

Further, no work can be done on the Sabbath; thus, no foods can be prepared during that day. Foods for meals for flights scheduled to depart from an airport on the Sabbath would have to be prepared at least one day prior to the flight's departure. During Passover, the dietary laws are even more strict; thus meals that would meet the standards for kosher during the rest of the year may not meet the standards for Passover, necessitating the preparation and holding of an additional stock of meals, all of which would need to be used by the close of Passover to prevent waste, and excessive costs due to waste. Finally, all preparation of kosher foods must be done under the direct supervision of a trained rabbi⁷, and the cost of the rabbi's salary would become yet another operating expense of the inflight kitchen.

Modifications assessed

In order to learn more about the logistical system modifications that are needed to provide quality

kosher meals on board aircraft, the structured interview methodology was utilized. Representatives from three different stages in the logistical system were selected, kosher production kitchens, inflight catering firms, and airlines. The representatives selected for interviews from these three stages were purposely chosen in order to gather significant and varied information and to assure data quality and the credibility of the findings¹³.

From the production kitchen group, three kitchens were selected that were different in size, production volume, production circumstances (i.e., such as production in a non-kosher environment), and geographic location. Since there are only a limited number of large inflight catering firms that provide food and beverage services to a majority of the airlines today, both in the U.S. and worldwide¹⁴, the two major flight catering firms in the U.S. were chosen. However, key personnel interviewed from these firms were from different airport locations in order to gain information reflecting different airport circumstances. Finally, the three major U.S. airlines with both domestic and international flights were selected for interviews.

A combination of personal, telephone, and e-mail interviews was completed, guided by the structured interview questions developed for each of the three stages within the system. Each interview ranged from 30 to 60 minutes, and all personal and telephone interviews were tape recorded with the permission of the interviewees to

increase the accuracy of the data collection and to maintain the flow of the conversation¹⁵. Following each interview, the conversation was transcribed and labeled with the date, place, time, name, and title of the person interviewed. When interviews were completed, data were analyzed by means of content analysis¹⁶.

Two types available

Two types of kosher meals are available in the market for the airlines to choose from, fresh and frozen. While any kosher production kitchen has the capability of providing either fresh or frozen meals, the type of meal that the production kitchen would contract to make for an individual airline depends on that airline's specifications, which are primarily based on the shipping time and distance to get the meal from the production kitchen to the inflight caterer servicing the airline at a particular airport.

Most kosher meals served by U.S. airlines to passengers are produced as frozen meals by a limited number of production kitchens, which also supply kosher meals in other sectors of the food service industry (i.e., prisons, hotels, etc.) The kitchens vary from very small, producing fewer than 2000 frozen kosher airline meals per month, to very large, producing more than 20,000 such meals per month. Since these kitchens service airlines throughout the U.S., the shipping time and distance generally mandate the use of frozen, rather than fresh, meals.

A limited number of inflight kitchens have the capability of producing kosher meals. These are primarily located at large airports on the east or west coast of the U.S. which service a large number of international flights, flights that have a higher demand for kosher meals because of the higher number of meals served per passenger per flight and the increased numbers of passengers who request kosher meals. A very limited number of caterers at these airports maintain a kosher production kitchen, which is completely separate from their primary production kitchen, which reflects airline preferences for serving fresh kosher meals on international flights. Generally, the airlines perceive fresh meals to be of a higher quality than the frozen meals; thus they want to serve the best quality possible to their international passengers, particularly their first class passengers.

Kosher ingredients necessary

There are now greater amounts of kosher items widely available because of the overall increase in the demand for kosher foods. This is particularly true for kosher certified items such as rice, pasta, or frozen vegetables. However, the availability of the protein portion of the meal, especially beef or poultry, is extremely limited because of the strict kosher dietary laws regarding ritual slaughter. Since a slaughterhouse incurs additional costs and the loss of production efficiencies when they produce kosher beef or poultry, many have chosen to not

produce any kosher products. As a result, there are currently only a very limited number of kosher slaughterhouses in the U.S. Thus, kosher production kitchens must anticipate their protein product needs well in advance and work cooperatively with the slaughterhouses and the distributors of the kosher protein products at all times in order to maintain an adequate supply of beef or poultry to accommodate the kitchen's production schedule. An additional consideration is the increase in shipping costs for raw protein products which today's production kitchens incur since these kitchens are generally not located in close proximity to the few remaining kosher slaughterhouses.

Even though products may be certified as kosher at the slaughterhouse, they must still be kosher on arrival at the production kitchen. Distributors frequently load both kosher and non-kosher protein products onto the same delivery trucks, and the kosher status of a product could be compromised if a package seal is broken. Thus, at the production kitchen, the supervising rabbi inspects all deliveries carefully to verify that there are two sets of seals present: an external seal on the outside of the boxes and internal seals on the individual meat or poultry units inside the box. If a seal on an individual unit is broken, the product is refused and returned to the distributor. The rabbi also checks to verify that the deliveries carry the kosher meat plant stamp. However, as important as the kosher aspects of

the products are, it is equally important that the reliability of the meat supplier be verified from the perspective of USDA inspections and compliance with food safety and sanitation codes.

Products need separation

According to kosher dietary laws, meat and poultry products have to be stored separately from dairy products; thus at least two distinct storage areas are required in a kosher production kitchen. Some kitchens resolve this issue by designating their plants as "meat only" plants, and allow no items containing any type of dairy products into the kitchen, or by establishing two completely separate production units, each with their own storerooms, freezers, and refrigerators.

The kosher status of the products must also be maintained during the cooking process. Doing so involves the choice of not only the proper ingredients, but also the appropriate use of equipment and the development of appropriate cooking schedules. The entire cooking process must be supervised by a rabbi, and there must be at least one Jewish person in the production kitchen contributing to the cooking process.

If both meat or poultry and dairy products are to be prepared in the same production kitchen, contact between the two groups of products can be prevented by preparing all of the meat or poultry products first. Then after thoroughly cleaning all equipment and work surfaces, the dairy products

can be processed. Separate "meat" and "dairy" designated sets of small equipment, such as knives or cutting boards, can be maintained and completely wrapped at all times unless they are needed for a particularly production task.

Menu planning can also be done to facilitate product preparation by incorporating more pareve items (neutral foods which are of neither meat nor milk derivative) into the menu or planning menus which utilize ovens or other large pieces of equipment for only one type of product, either meat or poultry, or milk, but not both. Having only one type of product prepared in certain large pieces of equipment eliminates the need to kosher (or sanitize) the equipment between the two production cycles.

Components of the breads and desserts used for kosher meals are also important. If the breads and desserts contain no dairy products, they can be used with any meal, contributing to a kitchen's production efficiency. However, because few such breads can be purchased on the market and pareve kosher rolls from kosher food plants are very expensive to purchase pre-made, production kitchens serving the inflight industry frequently make their own breads and rolls. An additional modification often made to the bread or roll recipe is the addition of orange juice. This addition changes the status of the roll or bread from that of a "bread" to a mezonot (a "general" food or provision, as opposed to a specific category, such as "bread"). This change is very important on board

an aircraft, since Jewish dietary laws require that persons engage in a specified hand washing ritual prior to eating a "bread." However, the laws require only a prayer and not the complete hand washing ritual when a person is eating bread in the mezonot status. Without this modification, Jewish persons eating kosher meals on aircraft would all have to leave their seats to perform the necessary hand washing ritual prior to consuming their meal.

Other modifications needed

No cooking is allowed to take place on the Sabbath under any circumstances. If the kosher production kitchen produces frozen meals, then this production restriction is not an issue since all meals are cooked in advance, frozen, and then tempered and rethermalized for service on board aircraft, as needed. However, if the kitchen is producing fresh kosher meals, any meals for a flight scheduled to depart on the Sabbath (usually in the evening) must be completely prepared, plated, and/or packaged for boarding, packed into trolleys, properly chilled and ready for boarding two hours prior to the beginning of the Sabbath (Friday afternoon). When it is close to the time of the flight's departure on Saturday evening, the trolleys are simply pulled out of refrigeration and loaded onto the plane.

The observance of Passover involves both menu item modification and the koshering of all equipment that will be used only during the holiday. While airlines try to keep kosher menus during

Passover as close to what they are during the rest of the year, certain ingredients have to be changed. Rice and pasta are not acceptable as kosher items during Passover, thus the starch component of a hot kosher meal would only be potatoes. The bread or roll portion of the meal would be replaced by matzo, the traditional unleavened bread required during Passover, according to the Jewish dietary laws.

All products prepared for use during Passover must be prepared as kosher for Passover, a higher than usual level of kosher. To achieve this kosher status, all grain and bread products have to be removed from the production kitchen, and all the cooking equipment in the entire kitchen must be cleaned and koshered according to Passover laws, all under the supervision of a rabbi. Once this cleansing and koshering has been completed, nothing that is unacceptable during Passover can be brought into the production kitchen.

When a kitchen prepares fresh kosher meals, timing the transition between the production of regular kosher meals and kosher meals for Passover can be very difficult because of the airlines' flight schedule demands. The koshering process for the production kitchen can take from one to three days; it can be partially simplified by having a complete wrapped and sealed set of koshered cooking equipment, such as sheet pans, ladles, and pots, which is reserved only for Passover use. Since the koshering of the kitchen and all the

equipment must be completed before Passover begins, the procedure generally implemented to ensure the proper preparation of the kitchen is that passengers are served kosher meals that are kosher for Passover a day or two before Passover actually begins.

A further challenge in regard to the production of kosher meals for Passover is the need for the airlines or the production kitchen to purchase a complete set of eating and serving equipment used for Passover meals only. Items such as entree casseroles, eating utensils, and even plastic trays that plates are placed on all have to be new. This new equipment has to be ordered in appropriate amounts well before the time of the Passover to be sure that it will be available for use when needed. After Passover, this equipment can be placed in general circulation or discarded, depending on whether the equipment chosen by the airline is disposable or airline customized.

Kitchen may be selected

An airline may require an inflight kitchen to board "airline specific" kosher meals on its flights or the airline may only require "generic" kosher meals for its flights. Generic meals can be obtained from any kosher production kitchen and contain no logo components. Airline specific meals are prepared by a specific production kitchen especially for that airline, and include trays, cups, and utensils with the airline logo. When airline specific kosher meals

are required by an airline, the inflight caterers at the airports to which that airline flies encounter additional costs for long distance meal shipment and the storage of meals in sufficient quantity to avoid stock outages for the airline's flights. Sometimes a distribution center closer to the inflight kitchens with a regular demand for these airline specific meals will be established to help alleviate the shipping and stockage difficulties.

Regardless of whether generic or airline specific meals are specified, generally the utensils packaged with the meals cannot be reused for the production of new kosher meals since there is no way to know if the utensil was used to consume a meat or a dairy product. In addition, when the soiled trays and utensils are off-loaded from the aircraft at the flight's destination, there is no way of knowing whether the utensils were used for a kosher meal or a regular meal. Thus, unless the utensils can be koshered, new ones must be used each time a kosher meal is produced.

Special packaging needed

Packaging the meals is the last step performed by the production kitchen. The primary purpose of the special measures required is to provide isolation of the completed kosher meals in the presence of non-kosher meals. This isolation must be such that the integrity of the kosher meals is not compromised in the latter stages of the logistical flow where rabbinical supervision is not available.

Unless the meal is cold, it is packaged in two parts. This separation is required to prevent compromising the kosher status of the entree as a result of breaking the seal of an entire meal in order to access the entree for rethermalization on board the aircraft. All items that do not require rethermalization on board the aircraft, i.e., juice, bread, eating utensils, etc., are placed on a plastic tray, packaged, and sealed separately from the main entree. This cold portion of the meal can be packaged either in a shrink-wrap/plastic-wrap that is heat-sealed or in a transparent plastic box that is sealed with adhesive stickers. Either sealing method has to be done in such a way that any attempt to break the seal will be visible. If a seal is tampered with or broken, that meal must be discarded.

Hot entrees, whether shipped to the inflight kitchen frozen or fresh, have to be double wrapped, first with regular aluminum foil, then with a tear resistant aluminum bag. The entrees are then sealed because dietary laws say that if a meal is going to be heated in an oven that is not strictly kosher, such as the convection ovens on board aircraft, this meal has to be wrapped twice to prevent contamination. The only exception to this double wrapping process is for flights where all the meals served are kosher, and the ovens on these planes are used to rethermalize only kosher meals. In this case, the fresh entree will be served

in its casserole, and the casserole will be covered with only one layer of aluminum foil, similar to the way that entrees for conventional airline meals are packaged, avoiding the extra requirements of double wrapping and sealing.

In preparation for shipping, stickers that carry the kosher production kitchen and the certifying agency names are placed on the cold item units. The entree unit stamps consist of ingredient information, the production kitchen name, certifying agency identification, and a USDA stamp. After the main entree is packaged, it will be positioned on top of the cold item unit or in an indentation in the cold items tray which is especially made for airline use. Each such unit that contains both the cold portion and the hot portion of a meal is inserted in a separate box and sealed. The sealed boxes are packed into cases, usually 12 meals per case, for shipping to inflight caterers.

Standards are set

When the packaged frozen or fresh kosher meals are received in the inflight caterer's kitchen, the individual meals have to be checked for the completeness of the seals that have been placed on them during the packaging process in the production kitchens. If any of the individual meal unit seals are broken, the meal has to be discarded or returned to the production kitchen as unacceptable. Once inspected, the cases of meals (if frozen) are stored in a separate section in the general

freezer storage area; individual frozen meal units are removed from the cases as needed, depending on passenger requests for kosher meals and the number of meals to be served on a flight. Special attention is given to the requirement for special meals that are kosher for Passover during the Passover period.

Frozen meals must be tempered under refrigeration for 24 hours prior to their being boarded onto an aircraft. This tempering is necessary in order for the entree to be properly heated during the heating time available on the aircraft and for the cold food items to be completely defrosted prior to service. Thus, no last minute requests for kosher meals can be accepted, as there is no suitable method for rapid thawing of the meal components. Use of a microwave oven for thawing is unacceptable as all seals have to remain intact, and microwaving a kosher meal can cause the plastic wrapping to tear, resulting in the integrity of that meal being compromised.

Overall, kosher meal handling in an inflight kitchen is minimal and does not require any additional assembly of items by the inflight kitchen staff since all preparation and packaging is done by the kosher production kitchen. Even fresh meals are completely prepared, packaged, and chilled prior to boarding on the aircraft in accord with the U.S. FDA Food Code standards by the kosher production kitchen.

The wrapped and sealed kosher meal entrees are loaded onto oven racks with other regular meal entrees for aircraft boarding and for the heating process. Thus it is essential that the seal on both the cold tray and the hot entree remain intact. Flight attendants take the trays to the passengers while they are still completely wrapped and sealed. Passengers break the seal and open the cold tray packages. After the cold trays are served, hot entrees are brought to passengers in the foil bags in which they were heated. Passengers, again, open the sealed bags. Throughout this service procedure, it is clear to the passengers who ordered kosher meals that the integrity of their meals was not compromised once the meal left the production kitchen, the last location where a rabbi's supervision is required and guaranteed.

Special handling needed

Once the flight reaches its destination, dirty service equipment and eating utensils that were part of the kosher meals are off-loaded from the plane and transferred to the destination inflight kitchen together with the other utensils and service equipment used for the traditional meals. Deplaned kosher equipment cannot be used for future kosher meal service as it has been exposed to non-kosher equipment and non-kosher food remains. However, if an airline uses logo eating utensils and equipment for its kosher meal service, the used kosher equipment

can still be used in the inflight kitchen for further non-kosher meal assembly and service for that airline.

There is an exception to this constant need for new eating utensils and equipment. If the quantity of eating utensils and equipment is sufficient to make the process cost effective, this equipment can be cleaned and sanitized to kosher standards and reused for future kosher meals. However, only a limited number of airlines have that quantity level and only a limited number of kitchens are capable of sanitizing the equipment to meet kosher standards. Today, because of the cost associated with utensil and equipment replacement, most of the eating utensils packed with kosher meals are plastic. Thus, they are simply discarded after the flight is completed.

Certifying adds complexity

Even though airlines may make a conscientious effort to plan and serve kosher menus that they feel will appeal to their passengers, they are still faced with another dilemma regarding their kosher meal service, which kosher approval (or certifying agency) to accept for their meals. As the complexity of the manufacturing processes for food items and the need for kosher certification has increased as demand for these products has increased, so too has the number of certifying agencies increased. This increase has led to a great deal of consumer confusion

regarding which agency to rely upon so that their personal desired level of adherence to kosher standards is met by the products they consume¹⁶.

Because consumers have highly varied opinions regarding the many certifying agencies, the airlines face a difficult decision in their determination of which kosher approval to select since there is a chance that not all of their passengers will be satisfied with their selection. Furthermore, there is a possibility that some of their passengers will not even consider products certified by their selected agency to be kosher. Although an airline may survey the opinions of their passengers and that of the Jewish community in the areas most frequently served by their flights, there is still no "correct" solution to this dilemma, as even passengers residing in different geographical areas within the U.S. will have differing opinions. Thus, airlines generally select the certifying agency(ies) that they feel the majority of their passengers want and which selected suppliers can provide.

Systems are varied

The logistical system required to place high quality meals on board aircraft is a complex one, even for routine meal service. When special meals are required, additional factors that must be considered add complexity to the meal service system. Kosher meals have unique, highly specific requirements if they are to maintain their kosher status

until they are served to airline passengers. Challenges exist throughout the logistical system required for the preparation, boarding, and serving of inflight meals. These challenges begin with the food sources where there are limitations on the meat/poultry supply, for example, and end with issues concerned with the service of the kosher meals on the aircraft. Thus, a variety of modifications to the traditional system, such as koshering for Passover, separating equipment used for meat/poultry and dairy cooking, and sealing the meals to prevent contamination from non-kosher foods, have to be implemented throughout the logistical system in order to provide solutions to these challenges.

In addition, these modifications have to be reinforced by precautionary measures, such as production and service guidelines and product handling instructions, in order to guarantee that the kosher meals will keep their kosher status, especially during the portions of the logistical support system where there is no immediate rabbinical supervision present (i.e., in the inflight kitchen and on the aircraft). However, these modifications, as important as they may be, are always secondary to the essential food safety and sanitation codes which guarantee the food, whether traditional or kosher, as fit for human consumption.

While logistical system modifications are necessary to successfully service kosher meals on board aircraft, there is no one set of modi-

fications that applies to all operations of the same type - whether the operation is a production kitchen, inflight kitchen, or an airline. Variations in effective system modifications might result from variances in factors such as the size of the production kitchen and the volume of meals produced by the kitchen, the size of the market for kosher meals at a particular airport facility, differing flight origins and destinations (domestic or international), or specific airline specifications. No matter what approach is taken with regard to system modifications, to be successful all operations throughout the logistical system have to follow the essential, complex Jewish dietary laws and the food sanitation and safety codes of the FDA, which include the development and implementation of an effective HACCP system. Thus the ability of inflight caterers to provide the airlines with kosher meals which can maintain their kosher status until they are served to the airline passengers represents a significant logistical achievement for both caterers and airlines¹⁷.

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²⁰M. Desser, *The history and origin of kosher catering and its application to the hospitality industry* (Ithaca, NY: Cornell University Photo Services, 1979).

²¹Ibid.

²²B. Wohlschlegel, "Gate Gourmet Directives for Special Meal Production," Gate Gourmet International, 1999.

²³S. Kvale, *Interviews: An Introduction to Qualitative Research Interviewing* (Thousand Oaks, Calif.: Sage Publications, 1996).

²⁴McCool.

²⁵M. Q. Patton, *Qualitative Evaluation Methods* (Beverly Hills, Calif.: Sage Publications, 1980).

²⁶"History of kosher supervision," retrieved August 27, 2001, from http://www.kosherquest.org/html/Reliable_Kosher_Symbols.htm.

²⁷Note: The following persons were interviewed: Inflight kitchens, David Smith, personal interview, May 23, 2001; Dale Reighter, personal interview, June 5, 2001; Saville Levy, personal interview, July 12, 2001; John Birkhead, e-mail interview, August 2, 2001; Kosher meal production kitchens, Rabbi Weiner, personal interview, June 5, 2001, Samuel Weiss, personal interview, August 6, 2001. Airlines, Siegfried Lang, phone interview, July 17, 2001; Andrea Pratt, phone interview, August 3, 2001; Hannelore Perez, e-mail interview, August 13, 2001. Airline flight attendants, Maria Colafella, personal interview, June 14, 2001. Kosher certifying agencies, Rabbi Leonard Steinberg, phone interview, July 17, 2001.

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