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Implementation and Monitoring of Hazard Analysis Critical Control Points In The of *Main Course Chicken Red Curry* For Ek Airline In PT. AID

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Abstract
Food is an important component in maintaining health and meeting energy needs, including in long-haul flight services. One important aspect of aviation is the provision of food through PT AID's *in-flight catering* service. AID is an aviation catering service provider that has been certified with ISO 9001 and ISO 22000 and implements a quality management system and food safety based on GMP, SSOP, and HACCP. This study aims to assess the application of the HACCP system in ensuring the quality and safety of *Chicken Red Curry* products served to economy class airline passengers. The application of HACCP is carried out through the identification of five *Critical Control Points* (CCP), namely CCP 1 (receiving *chilled* and frozen raw materials), CCP 2 (chilled and frozen storage), CCP 3 (cooking process), CCP 4 (*blast chilling*), and CCP 5 (portioning and serving). The production process also includes the stages of *receiving*, *storage*, *thawing*, *cooking*, *blast chilling*, *portioning*, *meal tray set-up*, *final holding*, and delivery to the aircraft. The implementation of a comprehensive HACCP system at every stage of production aims to minimize the risk of physical, chemical, and microbiological contamination and maintain the organoleptic quality of products such as taste, aroma, color, and texture. With strict quality control, PT AID is able to guarantee the safety and quality of food products served on flights, thereby increasing consumer satisfaction and trust.

Keywords: HACCP, in-flight catering, food quality

1. Introduction

Food is one of the necessary components for the body, so the quality of food that enters the body must be considered both in terms of safety and quality. The body also needs food to get energy for daily activities, even in transportation, especially in air transportation such as planes. Long-distance travel requires food service on every domestic and international flight. According to Kharisma [1]*in-flight* catering is a service that serves food and drinks to airplane passengers during their trip. *In-flight* catering services play an important role in aviation, this is because in-flight catering services can certainly meet the logistical needs of food on the plane and also give the impression to passengers if the food is served well and according to consumer needs.

Food providers in *inflight catering* services must pay attention to the quality of the food to be served, because food is an important factor in human health [2][3]. Therefore, PT AID is present

as an inflight food *catering* service provider. PT AID has been standardized ISO 9001 and ISO 22000. ISO 9001 describes the specific requirements of the quality management system as a complement to product and service requirements. Meanwhile, ISO 22000 has a prerequisite that the company has implemented GMP *(Good Manufacturing Practice)*, SSOP *(Sanitation Standard Operational Procedure)*, and HACCP *(Hazard Analyze Critical Control Point*) [4][5][6]. PT AID as an international standard *inflight catering* service is required to have good *food safety* standards to ensure the quality of its products.

In line with this, quality control becomes a crucial aspect to maintain the quality or quality of the products produced, in order to comply with product specifications that have been determined based on company policies. The quality of food products includes food safety and organoleptic quality. The organoleptic quality in question includes taste, aroma, color and texture, while the product in question is safe, namely products that are free from contamination both physical, chemical and biological [7] [8].

One of the quality control processes carried out by PT AID is *Hazard Analysis Critical Control Point* (HACCP) with the aim of identifying and determining a hazard and risk associated with the production, distribution and consumption of a food product to be monitored [9][10]. There are critical control points or CCPs in the HACCP system that need to be considered in each production process. PT AID sets 5 CCPs which include CCP 1 (Receiving chilled and frozen raw materials), CCP 2 (Chilled and frozen storage), CCP 3 (Cooking), CCP 4 (Blast Chilling) and CCP 5 (Dishing and Portioning) [11].

There are two types of main course menus offered on the airline, namely with chicken and beef, the menu will experience a type of cuisine every six months. In February 2025 EK airlines offers two types of main course menus namely Beef malbi and *Chicken Red Curry.* The menu with the highest demand from consumers is *Chicken Red Curry,* is one of the *inflight catering* menus at PT AID served to EK airline economy class consumers who have implemented HACCP in their processing [12] [13]. *Chicken Red Curry* processing requires quality assurance and control, therefore the processing offered by PT AID is by implementing five CCP stages including: *Receiving, Storage, Thawing, Cooking, Blast Chilling, Portioning, Meal Tray Set Up and Final Holding,* delivery to the plane. With these five stages, the safety of food quality will be guaranteed, so that it is free from danger and other threats.

2. Material and Methods

This research was conducted in the inflight catering section of PT AID with the obesrvation method of the Chicken Red Curry menu production process. the results of the observations are described in the form of narratives and tables. Analysis of EK airline food products is carried out by identifying potential hazards and applying Hazard Analysis Critical Control Point (HACCP) determined by PT AID.

3. Results and Discussion

3.1 Raw Material Receipt

All incoming goods will be checked by QC *(Quality Control)* where this check includes the quality and quantity of raw materials. This stage of receiving raw materials has CCP 1, where raw materials are controlled by temperature and texture, namely cold and frozen raw materials. For freeze-dried ingredients there is no CCP but they are still seen and checked for quality such as

including production date, expiration date, halal logo. The results of the inspection of raw materials are then recorded in the *incoming material* form according to the type of goods received, namely *dry goods, chilled food, frozen food, fruit and vegetables.* Receipt of raw materials is generally carried out every day, namely on Monday-Sunday. The schedule for receiving raw materials varies depending on the type of raw material. For the schedule of receiving raw materials can be seen in Table 1.

Table 1
Raw Material Receiving Schedule

No.	Item	Time
1.	Vegetables and Fruits	08.00-11.00 AM
2.	Chilled products and frozen products	11.00-14.00 AM
3.	Other items	14.00-16.00 WITA

Raw materials are put into a basket that is adjusted to the category of raw materials by the vendor. The division of basket color categories can be seen in Table 2.

Table 2
Raw Material Receiving Basket Category

No.	Basket Color	Product Type
1	Green	Vegetable and fruit
2	Yellow	Meat
3	Blue	*Ready to eat food*
4	Gray	*Equipment*

3.2 Cold and Raw Material Receiving

The standard of acceptance of cold raw materials is CCP level 1, namely using surface temperature inspection. The standard for receiving frozen raw materials at PT AID is currently only seen from the appearance of the texture, which includes the texture of the raw material remaining hard and there are no signs of *thawing* or watery [14]. For temperature standards in the acceptance of raw materials is no longer valid. This is because the standards from IFSA *(International Standards* for *inflight catering)* have changed. If the raw material has shown signs of *thawing* or watery, the raw material is not accepted and will be returned to the supplier.

Table 3
CCP 1 Receiving Chilled and Frozen Raw Materials

Steps	*Frozen* products: Frozen chicken
Hazard	Biological: Pathogenic microbial growth on potentially hazardous food that renders the product unfit. consumed
Critical Limit	The product is firm and there are no signs of *thawing* or watery. Product has signs of *thawing* or watering
Actual	Chicken meat is frozen, firm and no signs of *thawing* or watery and the product is acceptable
Action	Products accepted Product rejected

3.2.1 Vegetable and Raw Material Receipt

The process of receiving vegetable and fruit raw materials carried out at PT AID begins with sorting raw materials. The sorting process is carried out with the aim of getting raw materials with

good quality and free from worms, dirt and other foreign objects. Sorting is done by grouping raw materials according to appearance and size. Furthermore, the raw materials that have been sorted are then labeled which contains information on the name of the material or item, weight, date of receipt, expiration date and supplier [15] [16]. Fruits and vegetables that have been received and labeled are then stored in a *chiller* with a temperature of ≤ 5^{o}C.

3.2.2 Acceptance of Dry Good Products

Receipt of dry raw materials at PT AID is also always checked and checked by *Quality Control*. Receipt of dry raw materials is not included in CCP 1 because there is no certain temperature during reception but this reception is still checked for quality which includes the appearance of the raw material, its expiration date, the condition of the raw material where the condition must be clean and free of physical contamination, and not physically damaged. The process of receiving *dry good* products is generally carried out every day at 14.00-16.00 WITA after receiving vegetable and fruit raw materials by the supplier, if it passes the specified time then the goods are not accepted that day and will be resent on the following day [17].

3.3 Storage

This storage stage is included in CCP 2. The type of storage included in CCP 2 is *cold storage. Cold storage* is divided into 2 types, namely cold storage *(chiller)* and frozen storage *(freezer)*. There is a critical limit of storage temperature to keep the quality of raw materials safe and undamaged. For chicken meat that will be used as raw material in making *Chicken Red Curry*, it is stored in the *freezer* with beef, fish and other types of poultry arranged on shelves according to the type of meat. Chicken meat storage in this freezer uses a temperature of ≤ -18 ° C in accordance with the CCP 2 standard applied by PT Aerofood Indonesia Denpasar Unit. The use of temperatures ≤ -18°C aims to prevent microbiological damage and cross-contamination so that the stored food becomes more durable [18].

Table 4
CCP 2 Chilled and Freezed Storage

Steps	Cold Storage *(chilled)*
Hazard	Biological: The presence of pathogenic microbial growth (in potentially hazardous food and ready to eat food)
Critical Limit	Refrigerator temperature chilled food products (Cold storage) and products ≤ 5^{o}C (chilled food)
Actual	*Chiller* temperature in accordance with the standard of 4.1°C
Action	If the room temperature is ≥8^{o}C, the person in charge of the section immediately moves the product into a storage area that is safe for the product. accordingly then immediately contact engineering
Monitoring	Checking and supervision by officers *engineering*.
Steps	*Freezed* storage
Hazard	Biological: The presence of pathogenic microbial growth that can reduce product quality
Critical Limit	Storage room temperature≤ -18°C product in hard (frozen) state
Actual	*The freezer* temperature is -19.9°C
Action	Product is retained because the temperature is within the standard
Monitoring	Checking and supervision by *engineering* officers.

3.4 Cooking

This cooking process is included in CCP 3 where this process can determine the quality and quality of the products produced. The temperature of the final product in this stage is always checked by QC *(Quality Control*) where each cooked raw material has different critical temperature limits [19]. The critical temperature limits used by PT AID for each raw material can be seen in Table 5.

Table 5
Critical Limit of Cooking Temperature

No.	Type of Foodstuff	Critical Cooking Temperature
1.	Meat (beef, mutton), whole shellfish, whole prawns	Minimum 65℃
2.	Milk, coconut milk and its preparations	Minimum 72℃
3.	Eggs and preparations	Minimum 74℃
4.	Meat cuts, shellfish and their preparations	Minimum 74℃
5.	Poultry and its preparations	Minimum 74℃
6.	*Beef steak/grill*	Minimum 65℃

Table 6
CCP 3 Chicken Red Curry Cooking Temperature

Steps	Cooking *Chicken Red Curry*
Hazard	Possible biological hazards: bacteria, pathogens, such as *Salmonella, E. coli, Listeria monocytogenes*
Critical Limit	Minimum chicken cooking and final product temperature 74℃
Actual	Final product temperature 117℃
Action	The product is maintained due to the temperature of the final product is up to standard
Monitoring	Checking and supervision by QC officers.

There is a significant potential hazard during the cooking process of raw materials so that it is designated as a CCP, the cooking temperature for processed chicken meat is at least 74℃ and there is no time limit if the product does not reach the specified CCP standard then the product is still cooking, this aims to prevent contamination of pathogenic bacteria [20] [14].

3.5 Blast Chilling

This *blast chilling* process is CCP 4 because this process is important to keep the food produced safe and this process is prone to microbiological hazards. *Blast chilling* is a process of rapid cooling by inserting food that is cooked and the temperature is still high into the *blast chiller. Blast chilling* is carried out with the aim of reducing the temperature of the food so that it reaches the specified standard, which is to reduce the temperature of the food from 60 ° C to 10 ° C for a maximum of 4 hours, if the temperature has not reached 10 ° C then the storage in the blast chiller is added 2 hours [22]. After the *blast chilling* process, the product is stored in a *chiller* with a temperature of 0°C - 5°C and can be stored for 72 hours or 3 days. CCP 4 can be seen in Table 7.

Table 7
CCP 4 Temperature after Blast Chilling

Steps	*Blast chilling Chicken Red Curry*
Hazard	Biological: Possible microbial growth pathogens
Critical Limit	Food temperature must be able to be reduced from 60°C to 10°C for a maximum of 4 hours
Actual	Final product temperature 7.8℃ for 6 hours
Action	The product is retained because the final product temperature is within the standard and the food is put into the *blast chiller* before shortening.
Monitoring	Checking and supervision by the *quality control* (QC) officer.

3.6 Dishing and Potioning

The process of *dishing and portioning* is included in CCP 5. The food portioning process is carried out in two different places, namely, the *hot dishing* room and the *cold kitchen*. *The hot dishing* room is a special room for portioning *hot meals* and the *cold kitchen* room is a special room for portioning cold foods such as salads and fruit. Before the portioning process is carried out, officers from the QC team will first carry out the process of rechecking and sorting the final product.

The check is carried out to ensure that there is no foreign object contamination that may be present in the final product of *Chicken Red Curry.* After checking, the QC team will prepare one sample that will be used as an example of a menu *set up* layout that will be adjusted to the standards applied. *The Chicken Red Curry* menu is served together with *steamed jasmine rice, and sauteed broccoli.* The portioning time is strictly limited to a maximum of 45 minutes with room temperature ranging from 15-21°C and food temperature should not exceed 15°C[23]. This is done to avoid contamination by air when food comes out of the blast chiller [24]. The workers who do the portioning must also use special kitchen clothes, aprons, arm and head covers, and special gloves and must comply with standards to avoid cross-contamination between workers and food. After the portioning is complete, the food is placed in a basket that has been labeled daily according to the day of the portioning.

Table 8
CCP 5 Process of Chicken Red Curry Menu Portioning

Steps	*Hot dishing* and *meal tray set up*
Hazard	Biological: Possible presence of microbes that are still growing. Physical: The presence of physical hazards such as hair, rocks, insects, etc.
Critical Limit	The final curing temperature is a maximum of 15°C with a maximum time of 45 minutes and the room temperature is kept > 15°C and smaller than 21°C.
Actual	The final temperature after portioning was 13.3°C and the temperature of 21°C room with a 21-minute portioning time.
Action	The product is retained due to the temperature of the final product, the length of the portioning time, and the room temperature are in accordance with the standard.
Monitoring	Checking and supervision by officers *Quality Control* (QC)

3.7 Meal Tray Set Up

After the portioning process is complete, the next *set up* menu is carried out in the *Meal Tray Set Up* (MTSU) room. The activity carried out in the MTSU room is the arrangement of food according to the order and there are 2 ways to arrange food, namely, manually or by using tools in

the form of *belt conveyers*. Food arrangement must be in accordance with the *food order sheet* (FOS) or must be in accordance with the *full set menu* image that has been ordered and agreed with the airline. MTSU is also included in CCP 5.

The temperature of the MTSU room must range from 15-21 ° C for a maximum of 45 minutes with food temperatures not exceeding 15 ° C, if the room exceeds the specified temperature then the product cannot be processed and wait for the air conditioner to be repaired by the engineering staff [25]. After all the food has been arranged according to the standard, then the next *tray set* will be put into a closed *trolley* and checked again all the completeness of the order. The contents of the complete *trolley* are then put into the *final holding* or last *chiller* before being transported to the aircraft. The temperature of the food in the *holding room* is around 0-5°C.

4. Conclusion

The implementation of the HACCP system at PT AID is aimed at determining the critical control points (CCP) in each production process. In the *Chicken Red Curry* production process at PT AID, it is divided into 5 critical points, namely, CCP 1 in the process of receiving frozen and chilled raw materials *(Receiving)*, CCP 2 in the raw material storage process (*Chiller and Frezeer Storage*), CCP 3 in the *cooking process (Cooking*), CCP 4 in the *blast chilling* process and CCP 5 at the time of portioning. Based on the data obtained, the implementation of quality control aspects of the production process at PT AID has been running well. For further research, it is recommended to further examine HACCP supervision on side dish products found on EK airlines.

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