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In a Recognized Fisheries Managing and Advertising Region, Fresh Air Microorganisms

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Abstract

Fish is sold as food and consumed worldwide. During food production, microbial contamination can occur through air, soil, water, surfaces, and food handling. Although air does not have a natural microbial composition, it is a vector for microbial transmission of economic and health interest because it is implicated in food spoilage and human disease. It was a microbiological analysis of the air in Tepic Nayarit city, a popular area for processing and selling fish products. Proportions of aerobic mesophilic bacteria, coliforms, fungi, and yeasts were measured at various points in the field of fish processing and marketing using passive or sedimentation methods to collect airborne microorganisms. Results showed that aerobic mesophiles had the highest numbers among all microbial groups analyzed at 12 different sampling sites during the 4-week study. Their numbers ranged from 2.44 to 2.95 logs CFU/m3/h, followed by molds with values from 1.44 to 2.75 log CFU/m3/h, yeast with values from. We determined the percentage of viable microbial populations in the air at different sampling sites in the study area. Several of these sampling sites exceeded levels recommended by various authorities around the world. Knowledge of airborne biological hazards is used to identify and mitigate risks to resident health and contamination pathways in processed and sold seafood that may be associated with spoilage and foodborne illness. It is important.

Keywords: Food safety; Food quality; Air pollution; Airborne biohazard; Environmental monitoring

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Introduction

Any food intended for human or animal consumption that is extracted from oceanic or continental waters is referred to as "fish" in general. Fish, shellfish, mollusks, green growth, etc are instances of fish. Fish raised for human consumption through hydroponics and fishing techniques are expected to produce 178.5 million tons of live weight worldwide in 2018, with Asian nations like China among the primary producers. Fish is regarded as a food that is produced and sold frequently [1]. Because it contains lipids, minerals, and vitamins, as well as proteins that are biologically valuable and simple to digest, it is also an important part of the human diet. Every person in the world consumes 20.5 kilograms of fish annually, according to estimates. Fish are profoundly defenceless to pollution and disintegration all through the different phases of the human pecking order, which can think twice about quality, wellbeing, and dietary benefit. In addition to their intrinsic characteristics, which include a pH close to neutral, high water content, and the quantity of nutrients available for microbial growth, oxidation, and autolysis, these characteristics are related to species, age, environmental conditions, feeding, capture conditions, handling conditions, processing, transportation, distribution, storage, and marketing [2].

Fish can be tainted physically, chemically, or biologically throughout the food chain; The latter frequently involves a variety of bacteria, such as Campylobacter jejuni, Escherichia coli, Listeria monocytogenes, Salmonella species, and Species Vibrio; parasites, viruses, and fungi, such as Giardia lamblia, Anisakis simplex, and Cryptosporidium parvum, that compromise fish quality and safety and cause cases or outbreaks of foodborne illnesses, are regarded as a major global public [3].

The analysis of microbiological risk in various aspects of food

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safety in the fishery products industry, taking into account storage, handling, and hygiene conditions, highlights the post-capture stages, from processing to marketing. Among the food industry's identified routes of contamination are natural sources or reservoirs through the air, dust or soil, utensils, surfaces, water or other contaminated food, handlers, insects, rodents, and so on. The air (atmosphere) is made up of gases with varying concentrations, including nitrogen, oxygen, inert gases like argon, and traces of carbon dioxide. Particles that are suspended in the air and can be either liquids or solids are known as aerosols. Bioaerosols are living substances like pollen, plant debris, insect excrement, algae, viruses, spores, toxins, peptidoglycans, parasites, and vegetative cells of bacteria, mold, and yeast that fall under the category of aerosols. The food business is especially applicable to microorganisms [4].

Instead of native microorganisms, airborne spores, bacteria, parasites, viruses, and fungi found in soil, water, plants, animals, and people are collected. Bioaerosols carry these microorganisms through the air, allowing them to survive in this environment. Food contamination, food deterioration, and diseases in humans, animals, and plants are often the result of many of these microorganisms. In the Earth's atmosphere, bioaerosols and aerosols can originate from natural or man-made sources like rain, rivers, and oceans. The latter comes from human-caused pollution that is released into the atmosphere. Polluting bioaerosols and aerosols from industries, livestock, food processing, agricultural dust, combustion of fossil fuels, waste sorting, and composting, among other activities, have increased people's exposure [5].

Through ventilation and the people who live in buildings, microorganisms can be carried inside buildings by the outside air. These biological agents have an impact on the air quality in industrial and manufacturing areas as well as on the health of those who live there, the activities they engage in, and the hygienic conditions there.

The majority of what causes bioaerosols in indoor environments is human activity. It is estimated that humans release between 1000 and 10,000 microorganisms into the atmosphere every minute, with significant variation based on conditions and activity (such as the type of clothing worn, skin hygiene, sneezing, coughing, washing, cleaning, combing hair, walking, talking, etc.); Skin, feces, and hair are home to the microorganisms found here. In the food industry, microorganisms in the air have the potential to settle and colonize food products, furniture, equipment, containers, and other surfaces that come into contact with food while it is being handled. These microorganisms are a source of air pollution in the home. As a method for monitoring the total number of viable microorganisms, bioaerosols control is becoming common practice due to their significance to the food industry. In the food industry, air monitoring can also be incorporated into a hazard analysis and critical control point (HACCP) system [6].

The primary purpose of microbiological air analysis is to estimate the risk of contamination by determining the microbiological conditions of processing areas that must be kept clean. It is essential to ensure the quality of the environment and manufactured goods as well as an indicator of the hygienic state surrounding the facilities to evaluate and maintain the microbiological control of the air. This study aimed to examine the air's microbiological quality in a popular part of Tepic, Nayarit, where fish processing and marketing are done for the general public. There is a lack of information about the microbiological air conditions in fishery product processing and marketing areas worldwide. In this well-known part of the city of Tepic, in the state of Nayarit, there haven't been any known studies of the microbiome in the air. As a result, we will be able to evaluate the microbiological conditions of the air and determine whether they pose a threat to the food quality or the health of customers and occupants [7].

Results and Discussion

Relative humidity and temperature in the fish processing and marketing areas

During the a month of the review, the temperature and relative stickiness of the fishery item handling and promoting region were surveyed at each examining point, with the accompanying outcomes: In the first week, the relative humidity was 39.5 1.6%, and the average temperature was 26.8 0.8 °C. In week 2, the temperature was 30.8 0.5 °C, and there was 38.6 0.8 % relative humidity; The temperature was 29.4 °C in week three, and the relative humidity was 30.6 %; In addition, the relative humidity was 27.7 0.7% and the temperature was 0.6 0.7 °C in week 4. The first week of the study saw the lowest average environmental temperature and the highest average relative humidity. In the first week, the relative humidity was at its highest at Point E6; In week 3, the PA and PB values fell to 29 and 27%, respectively. In week 3, point E6 recorded the highest environmental temperature, which was 33.3 °C, while sampling points PA, PB, and PC recorded the lowest temperature, 23 °C [8].

The climate in the state of Nayarit is typically warm and humid, with an average annual temperature of 25 °C, a minimum average temperature of 12 °C in January, and average maximum temperatures slightly above 35 °C in May and June. Seasonality, temperature, humidity, oxygen, organic matter, radiation (from sunlight), ions, pressure, and other environmental factors, influence the number, viability, and distribution of microorganisms; It is a result of the local activities (industrial, agricultural, or livestock) as well as the presence of living organisms and dust that the number of microorganisms in the air in inhabited areas is greater than in less populated areas [9].

Molds and Yeast

During the four weeks of the study, the analysis of molds in the air at various sampling points revealed a maximum value of 2.75 logs CFU/m3/h and a minimum value of 1.42 log CFU/m3/h. Among the 12 sampling points, point PC had the highest count (2.75 log CFU/m3/h), followed by point E4 in week 2 (2.65 log CFU/m3/h). At point E7 in week one, the lowest counts among all sampling points were obtained (1.42 logs CFU/m3/h). At all sampling points, the lowest counts occurred in Week 4 [10].

Conclusions

Mesospheric aerobes, coliforms, fungi, and yeast were found in the air in a well-known area for fish processing and marketing, and their microbiological indicators were measured. Aerobic mesophiles had the highest counts across all sampling points during the study period (between 2.95 and 2.44 log CFU/m3/h), followed by molds (between 2.75 and 1.42 log CFU/m3/h), yeasts (between 2.11 and 0.7 log CFU/m3/h), and coliforms (between 1.80 and 0.7 log CFU/m3/h). At some sample points, aerobic mesophiles and molds exceeded the recommended microbiological limits, indicating air contamination in the fish processing and marketing area. The qualities got show the openness to the microbiological heap of the air in the fish handling and promoting region, and this might be viewed as a gamble to the strength of tenants and for food defilement.

In order to control and reduce microbial populations in the air, which lead to health risks for occupants and food contamination, it is recommended to implement regular pest and animal control measures, cleaning, disinfection, maintenance of premises and facilities, and adequate ventilation systems (avoiding high relative humidity and condensation). As a result, in a total management system focused on product quality and safety, the analysis and regular monitoring of the microbiological quality of the air in the food industry must focus on identifying, controlling, and reducing contamination and health risks for users and consumers through inhalation and food consumption.

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