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IMPORTANCE OF EFFECTS OF GLOBAL CLİMATE CHANGE ON MİCROBİAL POPULATİON OF LETTUCE *(LACTUCA SATİVA*) İN TERMS OF AGRİCULTURAL AND FOOD SECURİTY

Demet ÇELEBİ [1], Kağan Tolga CİNİSLİ[2] [3]Nesrin YILDIZ

[1] Department of Microbiology, Faculty of Veterinary, Ataturk University, Erzurum, Turkey

[2] Department of Medical Microbiology, Faculty of Medical, Ataturk University, Erzurum, Turkey

[3] Department of Soil and Plant Nutrition, Faculty of Agriculture, Ataturk University, Erzurum, Turkey

Correspounding A: celebiidil@atauni.edu.tr

Abstract

Various factors resulting from global climate change (temperature, radiation, wind, rain and relative humidity, etc.(aerobic bacteria, Pseudomonas and coliforms, etc.) October-planting of plants from the point of view of agricultural aquaculture and residence on the plant during the period leading up to harvest.) acts on groups of bacteria. In this way, it directly or indirectly affects the yield and quality of the plant and leads to the formation of microbial disease factors in terms of food safety. Cases of acute gastroenteritis are among the most common diseases in the world population after respiratory infections. In countries located on the Asian continent, one billion cases are observed annually as a result of contaminated food consumption, especially in children under the age of 5. The mortality rate in these cases is estimated at close to five million. Cases of acute gastroenteritis in European countries account for 20% of the total population. In America, however, it is observed at much higher rates. Although diseases caused in developed countries have a lower course, they are the basis for diseases such as hemolytic uremic syndromes and nutritional absorption problems. Including lettuce, especially in the growing of crops that humans eat the plants and bacteria that live on epiphyte populations affected by this situation on a daily basis effects of climatic changes on agricultural production, food security and indicate the seriousness of the potential risks that may pose to public health. As a result of these changes, there is an increase in the course and number of viral drum and parasitic diseases. Considering the decrease in antimicrobial compounds obtained from nature as a result of the development of famine in parallel with climate change, the deterioration of microbial balances and the resistance factors developed by microorganisms for life, there will be significant negative consequences for public health. In order to shed light on researchers, in our article, we talk about the importance of reducing the risks caused by climate changes in agricultural farming and food safety, making some recommendations to shed light on the academic studies that can be done is the main theme of our article.

Key words: Climate change, lettuce, microbial, food, safety

Introduction

Today, plants such as lettuce are grown and harvested all year round in a large area and under various climatic conditions (FAO / who, 2008). Microbial epiphytes living on these plants are subjected to climatic changes on a daily basis, and their populations in the phyllosphere undergo seasonal changes (Seynnaeve, and Uyttendaele, 2014). Several studies have shown the relationship between climatic parameters such as precipitation, temperature, and radiation due to changes in epiphyte bacteria of green leafy yesilas such as lettuce (Seynnaeve, and Uyttendaele, 2014; Rastogi et al, 2012; Strawn et al, 2013). Many of these researchers have developed multiple linear regression models useful for predicting potential changes in the bacterial population due to climate changes. Over several weeks, they evaluated the dynamics of epiphyte bacteria, such as total aerobic bacteria, Pseudomonas, and lettuce coliforms, to obtain information on the effect of climate variables on the growth period. When comparing bacterial populations during the summer and fall months, these authors found seasonal differences in the microbial community in the lettuce fraction. Rastogi and dig. (2012) reported higher values than total cultivated bacteria (4.5 ± 0.5 log CFU / G) were obtained in Rheumatoli lettuce collected in summer (3.6 ± 0.5 log CFU / g) compared to winter. Williams and dig. (2013) showed a seasonal effect on bacterial diversity, showing variation between samples collected at different sampling times. However, it was found that pseudomonas growth was positively correlated with the frequency of warm nights occurring only in spring. On the other hand, factors such as intense weather conditions (humidity amounts, wind speed and minimum temperature fluctuations) affect Pseudomonas, and it is noteworthy that with the development of spring, coliforms increase rapidly (López-Velazco et al 2012), The dry conditions of low-rainfall, windy, and warm nights may support the proliferation of other microbial groups that better adapt to these conditions (Williams et al., 2013). These climatic factors have been reported to affect the dynamics of epiphytic bacteria (Kinkel, 1997). For example, several studies have shown the inhibitory effect of UV radiation on the microbial population (Kadivar & Stapleton, 2003). Jacobs and Sundin (2001) have proposed that solar UV radiation is a significant environmental stress for phylosphere bacteria, wind dryness can also be considered an environmental stress for bacterial populations (Rastogi et al. (2012), With Kinkel (1997) and Lindow and Brandl (2003), they reported that microbial population rates on the fiosphere are very variable over short periods of time, and that variability is often associated with some environmental events. Effect on coliform count (3.3 ± 0.6 log CFU / g) in lettuce grown during harvest week Rastogi et al. (2012) found that by winter it was lower (1.9 ± 0.1 log CFU / g).

(Leff and ferer 2013) by Bacillus and Pseudomonas spp. by comparison, he observed that a negative correlation was obtained between each other during the harvest weeks for three different lettuce varieties. He argued that these results may be related to changing climatic conditions. Adequate water availability is an important parameter, but fluctuations in water availability also result in osmotic stress affecting the abundance and diversity of the bacterial population (Axtell and Beattie, 2002;). Weather / climatic changes can affect not only the abundance and diversity of the ever-present population of bacteria, but also the communities of degradation and pathogenic bacteria that may be present. For example, Pseudomonas spp. it is particularly important because members of this genus have been identified as producing enzymes associated with degradation (Babic, Roy, Watada, & Wergin, 1996). Moreover, previous studies have concluded that changes in climatic conditions in which plants grow affect not only the population of the fiosphere, but also the ability of foodborne pathogens to colonize and survive in plant tissue (Jackson et al 2013). The risk of foodborne illnesses is directly related to the prevalence and concentration of pathogenic bacteria in the tissue. In Yesil Yesil in particular, the possibility of green contamination of green plants that eat leaves and the presence of associated pathways in relevant concentrations for public health is strongly associated with and climatic conditions (Liu, Hofstra and Franz, 2013).

Conclusion and recommendations

In order to understand in more detail the impact of climate changes on plants, researchers need to intensify their research on this issue in order to model sustainable agriculture in the perspective of food security and agricultural aquaculture. The relative distribution of epiphytic bacterial populations and identification of selected pilot plants and laboratory conditions and field trials in parallel with the investigation of climate variables with Principal Component Analysis and linear regression analysis with main air modes should be characterized by the proportional distributions of these effects on specific populations of seasonal changes is well should research.

Given the various functions of Phyllospheric microbes, Pseudomonas spp. Understanding variations of specific communities such as. Because of climate change, it can help to understand the different sensitivities of crops to be affected by pathogenic bacteria.

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