

Response to Oxidative Stress by Foodborne Pathogens

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<http://dx.doi.org/10.13005/bbra/2725>

(Received: 06 January 2019; accepted: 23 March 2019)

Microorganisms such as *Escherichia coli* and *salmonella* as well other organisms were affected by stress radiation, mechanical nutrient deprivation, high light stress, environmental and osmotic stress. Most of the entero pathogens to cause disease it was important for them to survive in an acid environment as inside the host, these organisms meet in the small intestine of inorganic acid (H+) in the stomach and a combination of inorganic and organic acids (volatile fatty acids). Here I review some pathogens such as *E. Coli* and *salmonella*, their mode of activity and survival against oxidative.

Keywords: *Escherichia Coli*, *Salmonella*, Genes, Oxidative Stress.

Oxidative stress is well documented and takes part in the causes disease associated with the way a person or group of people live such as; atherosclerosis, hypertension, diabetes mellitus, ischemic diseases, and malignancies¹. There are strains of *Escherichia coli* such as *E. coli* O157: H7 which release colanic acid that saves them from osmotic and oxidative stress². As we know about metabolism in organisms that love oxygen, the oxygen is changed to water. In a series of distinct stages, move electrons that create free reactive oxygen classes. As well as superoxide radical, hydrogen peroxide and hydroxyl radical. Production of free reactive oxygen species and other radicals that is more than necessary, may physically harm proteins, polyunsaturated fatty acids, DNA, carbohydrates, and could thus cause oxidative stress and on

the way to a diverse progressive deterioration then diseases include, immunodeficiencies, aging, inûammation, neurological disorders, atherosclerosis, coronary heart disease³. During pathogenesis, the microorganisms such as *Escherichia coli* and *Salmonella entericaserovar Typhimurium* have a delight fulinfluence to living in harsh circumstances that they chance in their environs and inside the human body. The situation is mostly agreed that the capacity of these pathogens to live in addition to exist in hardship these championships are straight associated to their disease producing capacity. One of the vital host protection of complex entire both organisms essential break in demand to induce illness is the acid stress problem obtainable in the intestinal. Separating this acid obstacle, the bacteria occupy abdominal macrophages cells, develop swallowed

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then inhabited in acidic phagolysosomes. As a result, these microorganisms have developed an acid stress reaction technique and makes easy to live but that also help to colonize and intensify pathogenicity⁴. Bacteria can take signals from one another. And these reciprocal actions are interesting in many inhabitants and the determined physical or biochemical characteristics of an organism using genetic makeup and environmental influence and including those in host environments. The modern device indicated that *Escherichia coli* operates the conveying information of indole so that it can expand antibiotic resistance within all its community. Because abdominal pathogen of *Salmonella typhimurium* rises its antibiotic resistance in reaction to indole, even though could not natively response indole of *S. typhimurium*⁵. Putrescine increase in cellular response to a molecular stimulus in a concentration-dependent manner, the production quantity of the oxyR and Kat G genes of *Escherichia coli* cells disclosed to hydrogen peroxide. Its provoked outcome was more noticeable under the state of strong oxidative stress⁶. The very tiny manganese is familiar for *Escherichia coli* below standard development state: the importation system is not strongly expressed, the amount of manganese is small, and a manganese dependent enzyme is not properly metalized. It was create that manganese could not safe peroxide-stressed cells by removing peroxide. As an alternative, the advantageous effect of it correlated with its capability to metalize by mononuclear enzymes. For the reason that iron encumbered enzymes are exposed to the possibility of being attacked to the reaction of Fenton, the replacing of manganese might stop the damage of protein⁷. Bacteria in a very clear manner understands their whole gene expression when they come to the starvation situation. For example, *Escherichia coli* cells make effort to achieve and provide for food necessary for growth when there is not enough food in the place through activating endogenous biosynthetic pathways⁸. In every part of *Escherichia coli* life cycle, faced with different place threats and it regulates gene expression accordingly. One process of regulation is through modifying in the promoter identification of RNA polymerase via different situation-specific factors⁹. The Natural Resistance-Associated Macrophage Proteins (NRAMPs) is designated to sure causing

disease in mammals as divalent transition metal transporters involved in iron metabolism and host resistance. The process of disease-causing agent ability of being not effective is put forward to implicated taking of Fe²⁺ and Mn²⁺, co-factors of both eukaryotic and prokaryotic catalases and superoxide dismutase, not for the purpose of protecting the macrophage against its own age groups of reactive oxygen classes, nevertheless to refuse the cations to the causing disease microbes for combination of its protecting enzymes. The Iron is an important food for wholly arrangements of life¹⁰. The need for iron is fundamental to its function in cellular systematic series of action extending from DNA replication to oxygen transport, energy generation and preservation against oxidative stress. The bacterial pathogens could not release from this iron need, as these organisms essential get iron surrounded by their vertebrate hosts so that, they can become more and cause disease. Unique of the major outlines of protection against bacterial contamination is the collection of food to stop bacterial extension in a procedure named as nutritional immunity. The greatest meaningful arrangement of food immunity is the removal of nutrient iron¹¹. In most of the microorganisms causes oxidative stress with tellurium oxyanion tellurite. The tellurite disclosure effects in more membrane lipid peroxides and oxidized proteins are stops and reduced glutathione content and the activity of oxidation-sensitive enzymes in *Escherichia coli*¹². The physiology and gene expression authorities for the cells existence to break and extensive reprogramming cause of bacterial development. The treatment of H₂O₂ and glucose lactose diauxie undergoing transitory development imprisonment in the system response in *Escherichia coli* and also entering into the stationary phase. The maximum of the genes determined the translation and transcription method very only miserably regulated and examined a total stable state after development initiates once again¹³. Because of more changes of the bacterial stress, the amount of universal proteins in *Escherichia coli* increase in response to lack of nitrogen, sulfate carbon, amino acids and phosphate, sulfate and when discovered to hot temperature, metals, uncouplers of the electron transport chain, oxidants, polymyxin, cycloserine, antibiotics and ethanol¹⁴. When pH of the environment raises, an *E. Coli*

flagella synthesis is repressed and protons are quickly imported, on the contrary low pH speeds acid using up and proton export. pH regulates more of periplasmic and envelope proteins in a way that varies according to circumstances₁₅.

CONCLUSION

Oxidative stress is well documented and takes part in the causes disease associated with the way a person or group of people live such as; atherosclerosis, hypertension, diabetes mellitus, ischemic diseases, and malignancies. These diseases have been described as dangerous because oxygen free radicals invade organic matter such as lipids, proteins, and DNA. Anyhow, oxidative stress also has an essential function in the normal functions of living organisms in order to adjust themselves and in the direction of signal conversions located in the cells. For these reasons, a more essentially clear of oxidative stress may be defined as a state where oxidative interact is more than antioxidant complex because of the loss of the even distribution between them¹⁶. Nitric oxide (NO·) is very necessary intermediary of innate immunity. Occurring optionally in response to circumstances intracellular pathogen *Salmonella* has evolved a process to detoxify and escape the antimicrobial actions of host-derived NO· produced in the time infection¹⁷. *Salmonella* are an accruing optimal intracellular causing disease that is connected to cause gastroenteritis, septicemia, and typhoid fever and make copies in macrophages at the time of infection and they are disclosed to a number of stressful environments at the time of their life cycle. *Salmonella* meet during causing infection by the phagocyte NADPH oxidase of production of superoxide anion O₂⁻. Form this, O₂⁻ be able to go past the bacterial outer membrane and are significant defense used by the macrophage to destroy the swallowed up bacteria¹⁸. The whole transcriptionally regulated genes of bacteria have often named shock and stress response systems that gives them the ability to change the rapidly modification of physical and chemical which is the particular part of the atmosphere such as temperature, pH, water, oxygen concentration and activity. Changes to greatest extent if not wholly, atmosphere moves in most case includes a transitory or severestage that contains of quick reaction

required to start the changing to the novel status, and a permanent or persisting stage that include an answer which is required to give assistance raise of growth, perhaps at a new extension quantity, in the altered environment¹⁹. There are two operon genes in *Escherichia coli* such as (*otsB*) anabolic trehalose-6-phosphate phosphatase and (*otsA*) for trehalose-6-phosphate synthase. *With these genes it can utilize for energy and carbo sources, thus for stress protection*. In *E. coli*, there are also seven sigma factors which have essential characters based on the ecological incentives (σ^{54} : nitrogen regulation, σ^{19} : ion transport, σ^{32} : heat shock, σ^{24} : extreme temperature, σ^{28} : flagella genes, σ^{38} : stationary phase or carbon starvation *etc.*, σ^{70} : housekeeping) and alternative type of universal of transcriptional regulator such as histone-like nucleotide structuring protein (H-NS) which controls a variability of physical characteristic such as virulence flagella synthesis, fimbriae expression, metabolism and proper function.²⁰ We conclude in this short review that all bacteria have a sigma factor, which is protein required for beginning of transcription. In prokaryotes transcription initiation influence that permits definite required of RNA polymerase to gene promoters and a regulation of gene expression. On the other hand, *Salmonella* and *Escherichia coli* have been found in a number of Anti-sigma factors and it's prevent transcriptional activity. However, if there is a possibility to make antibody anti all sigma of *Escherichia coli* and *Salmonella* we will be able to gain protection from these hazardous bacteria.

ACKNOWLEDGEMENTS

Thanks and great gratitude is extended to all my colleagues at College of Science and Department of Botany and Microbiology. And to those who contributed this short review.

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