***Responses to Dear Reviewers***

Dear Reviewers, Many thanks for your valuable time and attention. Thanks to you, changes were made taking into account all your suggestions one by one, and the manuscript was greatly improved. King Regards

Reviewer 1

Dear authors,

the manuscript is dealing with an extensive topic, and the review is not comprehensive, only brief summarizing some and few examples but that is not enough, and not in accordance with the expectations of Food journal.

Answer: Data for 40 more articles were added to the manuscript and also greatly increased in data in tables. Thank you. Newly added articles are marked yellow in the references section

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Un the abstract, conclusions the consumers are mentioned but there is no section dealing with consumers' expectations, awareness and at the end very important how to educate them in relation to the subject.

Answer: The conclusion section has been greatly improved and comments have been added according to the criticism.

Nowadays, consumers prefer healthier, fresh and minimally processed, high-quality, safe and long-lasting foods. The purpose of antimicrobial packaging, which has emerged as an active packaging technology, is to achieve controlled release of the antimicrobial substance added to the packaging material or atmosphere into the foods. Thus, it will be possible to ensure food safety by inhibiting microorganisms that affect food deterioration, and to protect food longer and more actively by preserving quality and sensory properties. In antimicrobial food packaging, methods such as adding vesicles / pads containing antimicrobial agents into the packaging, adding antimicrobial agents to packaging films and coatings, and using antimicrobial polymers are used. In recent years, great efforts have been made to develop more efficient, long-lasting and environmentally friendly antimicrobial packaging materials by increasing the performance of antimicrobial agents. For this purpose, more effective antimicrobial compounds of natural origin such as essential oils, natural extracts, bacteriocins and biopolymers are preferred instead of chemical antimicrobials such as organic acids, nitrates, sulfites. The current studies such as the antimicrobial agents are resolutely incorporated into the packaging materials, providing continuous antimicrobial effect to the food with a more controlled release and protecting these antimicrobials from deterioration or evaporation. This review includes current research on the different types of antimicrobial agents that can be included in food packaging systems and their antimicrobial effects in foods and antimicrobial packaging methods. According to the literature research findings, one of the most effective methods used to extend the shelf life of foods is that bioactive components, metals and other active ingredients show higher antimicrobial and antioxidant effects on nanosurfaces by encapsulation methods. The techniques used in this sense have a very important place in extending the shelf life of foods and synthesizing antimicrobial food packaging. It is observed that there is a significant increase in the in vitro, biocompatibility and antimicrobial effects of packaging films. However, as it is known, there are many encapsulation techniques. Among these methods, electrospinning methods are considered to be quite efficient. This review shows that the biomaterials used in packaging can extend the shelf life of foods and offer healthier foods to the consumer. In particular, packaging films synthesized as a result of encapsulation of biodegradable polymers and biomaterials give the consumer the chance to consume much healthier food. This review offers many suggestions to improve the awareness of consumers. The most important of these suggestions is to be more selective in consumer perception, which affects health in the packaging as well as the consumed foods.

Reviewer 2

Comments and Suggestions for Authors

This review entitled “**Shelf Life of foods and bioactive materials used in the antimicrobial food packaging**” reports the Research findings on antimicrobial food packaging used to extend the shelf life of foods. I would suggest some recommendations to the authors to improve the quality of the paper:

 -There are a number of grammatical errors and instances of badly worded/constructed sentences. Please check the manuscript and refine the language carefully.

Answer: The grammar of the entire manuscript was carefully reviewed and errors corrected.

-Title: Revise the title: what did you mean by shell life ?? Shelf lifeThe title should reflect the review content

Answer: The title was corrected as shelf life.

-Abstract : « It also includes a comparison of the researches made to extend the shelf life of foods and the activities of the biomaterials and compounds used. »Please revise this sentence which is difficult to understand

Answer: The sentence has been revised as follows

“In this review, the activities of different biomaterials and compounds used to extend the shelf life of foods were compared”

-L78 :  Revise this sentence « According to the an research, It was produced antimicrobial…. »

Answer: The sentence has been revised as follows

“In the another study, Researchers have synthesized an antimicrobial film by immobilizing nisin on bio-based carboxylated cellulose nanofibers (CNF).”

-L84 : have produced a composite film

Answer: The sentence has been revised as follows

Divsalar et al. (2018) have synthesized a composite films containing chitosan, cellulose and nisin and used it as an antimicrobial package of ultra-filtered (UF) cheese [3].

-L87 : the sentence « while the pure chitosan-cellulose film did not show » is incomplete

Answer: The sentence has been revised as follows

“….while the pure chitosan-cellulose film did not show to antimicrobial properties”.

-In the Introduction section, the authors should clearly indicate what is novel and why it is significant.

Answer: It was revised as below;

In this review study, antibacterial agents, organic acids and other compounds, enzymes, bacteriocins, natural extracts, essential oils, nanomaterials, biopolymers, which are used to effectively extend the shelf life of foods and ensure healthy consumption of foods, were examined in detail. By comparing the literature research findings, the most effective methods to extend the shelf life of foods were determined. This study also proposes the most effective food packaging methods and parameters that extend the shelf life of foods according to recent research. It aims to provide the components used among these parameters and the methods by which these components reach higher efficiency.

-Remove the title “ Materials & Methods” and replace it with “Antimicrobial agents”

Answer: It was replaced with Antimicrobial agents

-L119:  Please revise “The some organic acids”

- Your review should focus on the most interesting and relevant articles published in the **past 5 years** in the field

Answer: 40 more articles from the last 5 years have been added

-L365: Please revise the title “Immoblation of the antimicrobial agent to the polymer »

**Answer: It was corrected as Addition of the antimicrobial agent to the polymers**

-L381: The use of natural antimicrobial polymers

**Answer: It was corrected as The natural antimicrobial polymer**

-Please carefully modify the reference style and follow journal guidelines

- The conclusion section should be revised because it did not provide a critical analysis of the industrial use of antimicrobial packaging and did not suggest possible future research opportunities on the topic.

Answer: The conclusion section was revised as follow

Nowadays, consumers prefer healthier, fresh and minimally processed, high-quality, safe and long-lasting foods. The purpose of antimicrobial packaging, which has emerged as an active packaging technology, is to achieve controlled release of the antimicrobial substance added to the packaging material or atmosphere into the foods. Thus, it will be possible to ensure food safety by inhibiting microorganisms that affect food deterioration, and to protect food longer and more actively by preserving quality and sensory properties. In antimicrobial food packaging, methods such as adding vesicles / pads containing antimicrobial agents into the packaging, adding antimicrobial agents to packaging films and coatings, and using antimicrobial polymers are used. In recent years, great efforts have been made to develop more efficient, long-lasting and environmentally friendly antimicrobial packaging materials by increasing the performance of antimicrobial agents. For this purpose, more effective antimicrobial compounds of natural origin such as essential oils, natural extracts, bacteriocins and biopolymers are preferred instead of chemical antimicrobials such as organic acids, nitrates, sulfites. The current studies such as the antimicrobial agents are resolutely incorporated into the packaging materials, providing continuous antimicrobial effect to the food with a more controlled release and protecting these antimicrobials from deterioration or evaporation. This review includes current research on the different types of antimicrobial agents that can be included in food packaging systems and their antimicrobial effects in foods and antimicrobial packaging methods. According to the literature research findings, one of the most effective methods used to extend the shelf life of foods is that bioactive components, metals and other active ingredients show higher antimicrobial and antioxidant effects on nanosurfaces by encapsulation methods. The techniques used in this sense have a very important place in extending the shelf life of foods and synthesizing antimicrobial food packaging. It is observed that there is a significant increase in the in vitro, biocompatibility and antimicrobial effects of packaging films. However, as it is known, there are many encapsulation techniques. Among these methods, electrospinning methods are considered to be quite efficient. This review shows that the biomaterials used in packaging can extend the shelf life of foods and offer healthier foods to the consumer. In particular, packaging films synthesized as a result of encapsulation of biodegradable polymers and biomaterials give the consumer the chance to consume much healthier food. This review offers many suggestions to improve the awareness of consumers. The most important of these suggestions is to be more selective in consumer perception, which affects health in the packaging as well as the consumed foods.

Reviewer 3

This is an interesting work. However, I have a few comments.

1. The title should be corrected .."Shelf life" not "Shell life".

Answer: It was corrected as shelf life.

2. Line line 69 is confusing. It should be corrected.

Answer: It was corrected as follow

Generally used antimicrobial agents consist of organic-inorganic nanocomposites, organic acids, organic acid salts, triclosan, antibiotics, alcohols, sulphides, nitrites, ammonium salts, bacteriocins, enzymes, biopolymers, natural extracts, essential oils, phages, metal nanoparticles

3. At the end of the introduction the authors mentioned to discuss the most effective methods to extend shelf life. However, no such observations were found in the manuscript except a couple of lines in the conclusion which are very broad remarks as well. The authors should write a section on the mentioned topics and discuss the pros and cons elaborately.

Answer: Conclusion was revised as follow;

Nowadays, consumers prefer healthier, fresh and minimally processed, high-quality, safe and long-lasting foods. The purpose of antimicrobial packaging, which has emerged as an active packaging technology, is to achieve controlled release of the antimicrobial substance added to the packaging material or atmosphere into the foods. Thus, it will be possible to ensure food safety by inhibiting microorganisms that affect food deterioration, and to protect food longer and more actively by preserving quality and sensory properties. In antimicrobial food packaging, methods such as adding vesicles / pads containing antimicrobial agents into the packaging, adding antimicrobial agents to packaging films and coatings, and using antimicrobial polymers are used. In recent years, great efforts have been made to develop more efficient, long-lasting and environmentally friendly antimicrobial packaging materials by increasing the performance of antimicrobial agents. For this purpose, more effective antimicrobial compounds of natural origin such as essential oils, natural extracts, bacteriocins and biopolymers are preferred instead of chemical antimicrobials such as organic acids, nitrates, sulfites. The current studies such as the antimicrobial agents are resolutely incorporated into the packaging materials, providing continuous antimicrobial effect to the food with a more controlled release and protecting these antimicrobials from deterioration or evaporation. This review includes current research on the different types of antimicrobial agents that can be included in food packaging systems and their antimicrobial effects in foods and antimicrobial packaging methods. According to the literature research findings, one of the most effective methods used to extend the shelf life of foods is that bioactive components, metals and other active ingredients show higher antimicrobial and antioxidant effects on nanosurfaces by encapsulation methods. The techniques used in this sense have a very important place in extending the shelf life of foods and synthesizing antimicrobial food packaging. It is observed that there is a significant increase in the in vitro, biocompatibility and antimicrobial effects of packaging films. However, as it is known, there are many encapsulation techniques. Among these methods, electrospinning methods are considered to be quite efficient. This review shows that the biomaterials used in packaging can extend the shelf life of foods and offer healthier foods to the consumer. In particular, packaging films synthesized as a result of encapsulation of biodegradable polymers and biomaterials give the consumer the chance to consume much healthier food. This review offers many suggestions to improve the awareness of consumers. The most important of these suggestions is to be more selective in consumer perception, which affects health in the packaging as well as the consumed foods.

4. I am not sure what the significant of using sub title "Materials and methods" in line 95.

Answer: It was corrected as antimicrobial agents.

5.  Enzyms ... is wrong spelling in line 96.

Answer: It was corrected as enzyme.

6. I am not sure if the figures are redrawn or directly taken from other source. There is no reference of the source used for the images.

Answer: Most of the figures in the manuscript were cited in the articles. Below are examples.

Figure 2 shows the mechanisms of antibiotic resistance [87].

Figure 3 shows the mechanism of biosynthesis of NPs using algae [93].

Figure 4 shows the mechanisms of NP molecules in the bacteria cell [94].

Figure 6 shows the schematic to Show antimicrobial mechanism of action according to the literature [134].