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United States Patent
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Method for making a food preservative and for preserving food

Abstract

A method for making a food preservative comprises the steps of removing outer skins of *taro* corms, cutting the corms into pieces, grinding the pieces of corm to produce ground *taro*, drying the ground *taro*, diluting the ground *taro* with water, cooking the *taro* and water, inoculating the cooked *taro* and water with a selected bacteriocin producing bacterium and permitting the *taro* to ferment, to provide the food preservative.

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Field of Search: **426/46,52,331,335,532,637,615 435/253.4,252.9**

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Government Interests

STATEMENT OF GOVERNMENT INTEREST

The invention described herein may be manufactured and used by the U.S. Government for governmental purposes without the payment of any royalty thereon.

Claims

What is claimed is:

1. A method for making a food preservative, the method comprising the steps of:

removing outer skins of *taro* corms;

cutting the corms into pieces;

grinding the pieces of corm to produce ground *taro*;

drying the ground *taro*;

diluting the ground *taro* with water;

cooking the *taro* and water;

inoculating the cooked *taro* and water with a selected bacteriocin-producing bacterium, wherein the bacterium is the bacteriocin producer *Lactococcus lactis* subsp. *lactis* ATCC 11454; and fermenting the *taro*, to provide the food preservative.

2. The method in accordance with claim 1 wherein the removal of the corm outer skin is accomplished by peeling.

3. The method in accordance with claim 1 including the additional step of adding to the cooked *taro* and water, along with the selected bacteriocin-producing bacterium, a selected one of a yeast extract or a nitrogen source.

4. The method in accordance with claim 1 wherein cooking of *taro* corms comprises a selected one of (i) steaming or (ii) autoclaving.

5. A method for preserving food, the method comprising the steps of:

producing fermented poi from *taro*, wherein producing the poi from *taro* comprises the steps of:

removing outer skins from *taro* corms;

cutting the corms into pieces;

grinding the pieces of corm to produce ground *taro*;

drying the ground *taro*;

diluting the ground *taro* with water;

cooking the *taro* and water;

inoculating the cooked *taro* and water with a selected bacteriocin-producing bacterium, wherein the bacterium is the bacteriocin producer *Lactococcus lactis* subsp. *lactis* ATCC 11454; and

fermenting the *taro*, to provide the food preservative; and

placing the poi in food requiring preservation.

6. The method in accordance with claim 5 wherein the removal of the corm outer skin is accomplished by peeling.

7. The method in accordance with claim 5 including the additional step of adding to the cooked *taro* and water, along with the selected bacteriocin-producing bacterium, a selected one of a yeast extract or a nitrogen source.

8. The method in accordance with claim 5 wherein cooking of *taro* corms comprises a selected one of (i) steaming or (ii) autoclaving.

9. As a composition of manufacture, a food preservative made in accordance with claim 1.

10. A method for making a food preservative, the method comprising the steps of:

removing outer skins or *taro* corms;

cutting the corms into pieces;

grinding the pieces of corm to produce ground *taro*;

drying the ground *taro*;

diluting the ground *taro* with water;

cooking the *taro* and water;

inoculating the cooked *taro* and water with a selected bacteriocin-producing bacterium, wherein the bacterium is the bacteriocin producer *Streptococcus* sp. ATCC 10035, and a selected one of a yeast extract or a nitrogen source; and fermenting the *taro*, to provide the food preservative.

11. A method for making a food preservative, the method comprising the steps of:

preparing cooked *taro* and water;

inoculating the cooked *taro* and water with a selected bacteriocin-producing bacterium, wherein the bacterium is the bacteriocin producer *Lactococcus lactis* subsp. *lactis* ATCC 11454; and

fermenting the *taro*, to provide the food preservative.

12. A method for making a food preservative, the method comprising the steps of:

preparing cooked *taro* and water;

inoculating the cooked *taro* and water with a selected bacteriocin-producing bacterium, wherein the bacterium is the bacteriocin producer *Streptococcus* sp. ATCC 10035, and a selected one of a yeast extract or a nitrogen source; and

fermenting the *taro*, to provide the food preservative.

13. A food preservative comprising:

fermented ground *taro* having antimicrobial activity, whereby ground *taro* is inoculated with the bacteriocin-producing bacterium *Lactococcus lactis* subsp. *lactis* ATCC 11454; and

the inoculated ground *taro* is fermented to produce said food preservative.

14. A food preservative comprising:

fermented ground *taro* having antimicrobial activity, whereby ground *taro* is inoculated with the bacteriocin-producing bacterium *Streptococcus* sp. ATCC 10035; and a selected one of a yeast extract or a nitrogen source, and

the inoculated ground *taro* is fermented to produce said food preservative.

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to preservation of foodstuffs and is directed more particularly to a method for making a food preservative and a method for preserving food.

2. Description of the Prior Art

Taro (*Colocasia esculenta*), a native crop of *Hawaii*, is known to naturally ferment to produce an end product, poi. In ancient times, poi comprised a large portion of the Hawaiian diet. Today, poi is still sold commercially and consists of a purplish to grayish paste.

It is known that bacteriocins, small anti-microbial peptides that are naturally produced by certain bacteria, that is, food-safe organisms, can inhibit food spoilage by inhibiting the growth of food spoilage/pathogenic bacteria.

It has been discovered that poi can support the growth of bacteria that produce bacteriocin.

Accordingly, there is a need for a method for converting *taro* to poi in such a manner as to provide for the production of bacteriocin at a high level, and thereby to provide a method for preserving commercial

and military foodstuffs.

An object of the invention is, therefore, to provide a method for producing a suitable poi, and a method for preserving foodstuffs.

SUMMARY OF THE INVENTION

With the above and other objects in view, a feature of the present invention is the provision of a method for making a food preservative, the method comprising the steps of removing outer skins of *taro* corms, cutting the corms into pieces, grinding the pieces of corm to produce ground *taro*, drying the ground *taro*, diluting the ground *taro* with water, cooking the *taro* and water, inoculating the cooked *taro* and water with a selected bacteriocin producing bacterium, and permitting the *taro* to ferment for producing fermented poi, to provide the food preservative.

In accordance with a further feature of the invention, there is provided a method for preserving food, the method comprising the steps of producing fermented poi from *taro* and placing the fermented poi containing bacteriocin in the food requiring preservation.

The above and other features of the invention, including various novel details of combinations of components and method steps, are more particularly described hereinbelow and pointed out in the claims. It will be understood that the particular methods embodying the invention are described by way of illustration only and not as limitations of the invention. The principles and features of this invention may be employed in various and numerous embodiments without departing from the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference is made to the accompanying drawings in which are shown illustrative embodiments of the invention, from which its novel features and advantages will be apparent.

In the drawings:

FIG. 1 is a block diagram showing an illustrative embodiment of the method for making a food preservative; and

FIG. 2 is a block diagram showing an illustrative embodiment of the method for preserving food.

DESCRIPTION OF THE PREFERRED EMBODIMENT

It has been found that poi is a good growth medium for various lactic acid bacteria that produce bacteriocins. Accordingly, poi can serve as a functional food ingredient for the preservation of various commercial and military foods.

To prepare the poi, the outer skin of *taro* corms is removed, as by a knife. After the corm is peeled, it is cut into pieces. The corm pieces are then ground, as by a meat grinder. Three passes through the grinder

provide sufficient particulation to produce ground *taro*. The ground *taro* is then dried. The dried *taro* is then diluted with water and the *taro* and water are cooked, as by steaming or autoclaving. The cooked *taro* and water are then inoculated with a selected bacteriocin producer and allowed to ferment. A suitable bacteriocin producer has been found in *Lactococcus lactis* subspecies *lactis* ATCC 11454.

An analysis of the resulting poi has revealed that the *Lactococcus lactis* subspecies *lactis* ATCC 11454 produces nisin, a bacteriocin that has been FDA approved for use as a food preservative in select foods. The nisin inhibits a test bacteria, *Micrococcus luteus* ATCC 10240, known to cause food spoilage. Thus, the *Lactococcus lactis* subspecies *lactis* ATCC 11454 grows in the *taro* and produces a bacteriocin therein.

The above-described process has been conducted using another bacteriocin producer, *Streptococcus* sp. ATCC 10035. In this instance, it has been found that while the *taro* supports good growth of *Streptococcus* sp. ATCC 10035, there is no detectable production of bacteriocin and no detectable inhibition of a test bacteria, *Lactobacillus plantarum*. It has been found, however, that adding trypticase or yeast extract to the *taro* enables the *Streptococcus* sp. ATCC 10035 to produce bacteriocin. Trypticase is a pancreatic digest of casein that provides to the medium an additional nitrogen source. Yeast extract is a water-soluble portion of autolyzed yeast, providing the medium with a source of naturally occurring B-complex vitamins. Thus, if a bacteriocin is to be produced by *Streptococcus* sp. ATCC 10035 in *taro*, a supplement must be added to the medium.

It has been found that the fermented *taro*, or poi, may be dried without any significant sacrifice in the activity of the bacteriocin produced.

It is to be understood that the present invention is by no means limited to the particular components and method steps herein disclosed and/or shown in the drawings, but also comprises any modification or equivalent within the scope of the claims.

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