

United States Patent [19]

Anders et al.

[11] **Patent Number:** **4,798,729**

[45] **Date of Patent:** **Jan. 17, 1989**

[54] **METHOD FOR DELAYING *CLOSTRIDIUM BOTULINUM* GROWTH IN FISH AND POULTRY**

[75] **Inventors:** **Robert J. Anders, Middleton; John G. Cerveny; Andrew L. Milkowski, both of Madison, all of Wis.**

[73] **Assignee:** **Oscar Mayer Foods Corporation, Madison, Wis.**

[21] **Appl. No.:** **120,769**

[22] **Filed:** **Nov. 13, 1987**

Related U.S. Application Data

[63] **Continuation of Ser. No. 808,319, Dec. 12, 1985, abandoned.**

[51] **Int. Cl.⁴** **A23B 4/14**

[52] **U.S. Cl.** **426/326; 426/332; 426/532**

[58] **Field of Search** **426/332, 264, 265, 268, 426/532, 325, 326, 412**

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,658,551	4/1972	Bundus et al.	426/332
3,852,486	12/1974	Walker et al.	426/332 X
3,934,044	1/1976	Busch et al.	426/332 X
4,011,346	3/1977	Ernst	426/332 X
4,075,357	2/1978	Szeresniak et al.	426/332
4,212,894	7/1980	Franzen et al.	426/332
4,262,027	4/1981	Tonner et al.	426/332 X

OTHER PUBLICATIONS

Krol, "Meat Products", Voedingsmiddelen-Technologie, 1972, pp. 157-158.

Primary Examiner—Arthur L. Corbin
Attorney, Agent, or Firm—Joseph T. Harcarik; Daniel J. Donovan

[57] **ABSTRACT**

This invention pertains to poultry or fish foodstuffs wherein lactate salt is added in an amount effective to delay *Clostridium botulinum* growth.

11 Claims, No Drawings

METHOD FOR DELAYING *CLOSTRIDIUM BOTULINUM* GROWTH IN FISH AND POULTRY

This application is a continuation of application Ser. No. 808,319, filed 12/12/85, now abandoned.

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

This invention relates to poultry and fish foodstuff containing lactate salt in amounts effective to delay *Clostridium botulinum* growth.

2. DESCRIPTION OF THE PRIOR ART

The preservation of foodstuff has many aspects. For example, it has been suggested to add sodium lactate to meat products, such as ham and sausage at levels of approximately 1 to 3%. It is suggested that the sodium lactate lowers the a_w of the foodstuff and has a bacteriostatic effect which results in a better shelf life during refrigeration, a possibility of storage without refrigeration and a possibility of lowering the sodium chloride content of the foodstuff resulting in a better taste without the decreased shelf life. Sodium lactate, however, has not been suggested as an agent for controlling or delaying *Clostridium botulinum* growth.

The need to control *Clostridium botulinum* occurs in foodstuffs such as meats and poultry which are packaged and cooked, but not sterilized, in anaerobic plastic barrier packages. Under temperature abuse, *Clostridium botulinum* may grow and produce toxin. Injury to humans resulting from this bacteria has been relatively rare since there are various means for preventing its growth. For example, high temperature processing of foodstuffs prior to packaging or after packaging will destroy the *Clostridium botulinum*. Other means for controlling the *Clostridium botulinum* have been to refrigerate the foodstuff and to add agents such as sodium nitrite to foodstuff such as bacon. The sodium nitrite while delaying the growth of *Clostridium botulinum* also forms a durable red pigment in the meat. This red coloring is desirable in many foodstuffs such as pork and beef products but is undesirable in other products such as poultry and fish.

While the control of food *Clostridium botulinum* has been successful, it is desired to find additional methods of controlling *Clostridium botulinum* without occurring side effects such as red coloring described above.

SUMMARY OF THE INVENTION

The invention relates to a method for delaying *Clostridium botulinum* growth in a foodstuff selected from the group consisting of fish and poultry, the method consisting essentially of:

- (a) adding a lactate salt to a fresh foodstuff selected from the group consisting of fish and poultry, said lactate salt being added in an amount of about 1% to about 7%;
- (b) cooking the foodstuff at high humidity to a temperature sufficient to cook the foodstuff but not sufficient to sterilize the foodstuff;
- (c) cooling the cooked foodstuff; and
- (d) packaging the cooked foodstuff in a plastic barrier package.

DETAILED DESCRIPTION OF THE INVENTION

The foodstuffs included in this invention are non-red meat foodstuff such as fish and poultry wherein the

poultry includes meats such as turkey and chicken. This invention is particularly useful when the fish or poultry is packaged in anaerobic conditions such as packaged whole meat or when the fish and poultry is packaged with other foodstuffs such as refrigerated meals and soups.

The lactate salt employed in this invention includes salts such as sodium lactate, calcium lactate, potassium lactate and ammonium lactate. Preferably the lactate salt is sodium lactate. The lactate salts are employed in amounts effective to delay *Clostridium botulinum* growth. The amount of a lactate salt effective to delay *botulinum* growth can be determined by a simple abusive temperature test procedure.

Foodstuffs that are to be protected by the lactate salt are stored at 80° F. A control is utilized wherein no lactate salt or other *Clostridium botulinum* delay agent is used. The product is then treated with levels of lactate salt. The products are analyzed at various time periods. The levels of the lactate salt which delay the toxin formation compared to the control are amounts which are effective for delaying the *Clostridium botulinum* growth.

In general these amounts range from about 1 to about 7% lactate salt and preferably are in the range from about 1.5 to 3.5 lactate salt.

The lactate salt may be incorporated into the foodstuff by a wide variety of procedures. For example, the lactate salts may be added into the foodstuff either in a concentrated form or as a solution such as an aqueous solution. The lactate salts may be mixed directly into the foodstuff or may be injected into the foodstuff utilizing injection needles.

After the lactate salts are added to the foodstuff the foodstuff may be packaged in anaerobic plastic barrier packages and then heated to temperatures sufficient to cook the foodstuff but not sufficient to sterilize the foodstuff. Cooking the foodstuff below sterilization temperatures is desirable for the quality of the cooked foodstuff but *Clostridium botulinum* may later grow if temperature abused. The added lactate salts will, however, delay *Clostridium botulinum* growth. Other processing means may also be used such as cooking the foodstuff with the lactate salt added and then packaging. In this process the concerns for *Clostridium botulinum* growth are lessened but the added lactate salt is effective for delaying *Clostridium botulinum* growth.

It has also been found that while the lactate salts delays the growth of *Clostridium botulinum*, they do not add any coloring to the meat such as a red coloring.

While the lactate salts may be added as sole agent for delaying *Clostridium botulinum*, the lactate salts may be added in combination with other agents which delay *Clostridium botulinum* growth such as sodium chloride or sodium nitrite. In such cases the amount of lactate salts added will be reduced and the effective amount of lactate salt will be the amounts which delay *Clostridium botulinum* in combination with the other growth delaying agents.

The following examples are further presented to describe the invention, but it is to be understood that the invention is not to be limited to the details described therein.

EXAMPLE I

In these examples, a turkey batter was prepared by grinding turkey breasts and mixing salt at 1.4 wt % and phosphate at 0.49 wt %. *Clostridium botulinum* spores

3

were added to the turkey batter. The batter was divided into aliquots. Some of the aliquots were designated controls, and no sodium lactate was added. To the other aliquots were added sodium lactate in varying amounts as indicated in Table I below. The inoculated aliquots were vacuum packaged, and water cooked to an internal temperature of 160° F. The cooked turkey products were then cooled to 80° F. and incubated at that temperature. Periodically, the product was removed and tested for toxin. The results of the test are shown in Table I.

TABLE I

Percent Lactate	Effect of Sodium Lactate on <i>C. botulinum</i> in Temperature Abused Cook-In Turkey							
	Days at 80° F.							
	2	4	5	7	8	9	10	
0 (Control)	0/3*	5/5						
2.0	0/5	2/5	5/5					
2.5	0/5	0/5	0/5	5/5				
3.0	0/5	0/5	0/5	4/5	5/5			
3.5	0/5	0/5	0/5	0/5	0/5	2/5	5/5	

*Number of toxic samples/number of samples examined.

From these results it is clear that sodium lactate added at the amounts indicated delays the growth of *Clostridium botulinum*.

EXAMPLE II

According to this example 1,000 lbs. of fresh trim turkey breasts are injected with sodium lactate at a weight percent of 2.5% sodium lactate. The turkey breasts range from about 2.5 to about 3.75 lbs. The turkey breasts are injected with a brine solution comprising the following: 69.50% water; 22.49% sodium lactate syrup (60% sodium lactate; 40% water); 6.16% salt and 1.85% sodium phosphate. For each pound of turkey breasts there is injected 0.2274 lbs. of brine using a Townsend Model 1400 type injector.

The turkey breasts are placed on a rack in an oven and cooked at high humidity at 160° F. dry bulb, for 2 hours and then at 170° F. dry bulb, until the internal temperature of the turkey breasts is 155° F. (approximately 15 minutes). The oven is turned off, but not opened and a solution of 2 lbs. of a commercial caramel powder and

4

13 lbs. of water is introduced to the oven through atomizing nozzles along with air over a period of 45 minutes. The turkey breasts are then removed from the oven, chilled and packaged.

We claim:

1. A method for delaying *Clostridium botulinum* growth in a foodstuff selected from the group consisting of fish and poultry, the method consisting essentially of:
 - (a) adding a lactate salt to a fresh foodstuff selected from the group consisting of fish and poultry, said lactate salt being added in an amount of about 1% to about 7%;
 - (b) cooking the foodstuff at high humidity to a temperature sufficient to cook the foodstuff but not sufficient to sterilize the foodstuff;
 - (c) cooling the cooked foodstuff; and
 - (d) packaging the cooked foodstuff in a plastic barrier package.
2. A method according to claim 1 wherein adding said lactate salt is effected by injecting the lactate salt into said foodstuff.

3. A method according to claim 1 wherein the foodstuff comprises poultry.

4. A method according to claim 3 wherein the foodstuff comprises turkey.

5. A method according to claim 1 wherein the lactate salt is in an amount from about 1.5% to about 3.5%.

6. A method according to claim 1 wherein the lactate salt is selected from the group consisting of sodium lactate, calcium lactate, potassium lactate and ammonium lactate.

7. A method according to claim 6 wherein the lactate salt comprises sodium lactate.

8. A method according to claim 6 wherein the lactate salt comprises calcium lactate.

9. A method according to claim 6 wherein the lactate salt comprises potassium lactate.

10. A method according to claim 6 wherein the lactate salt comprises ammonium lactate.

11. A method according to claim 1 wherein the foodstuff is cooked to an internal temperature of up to about 160° F.

* * * * *

45

50

55

60

65

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 4,798,729

DATED : January 17, 1989

INVENTOR(S) : Robert J. Anders, John G. Cervený; Andrew L. Milkowski

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 4, Claim 11, line 42, delete "up to".

Signed and Sealed this
Twenty-ninth Day of May, 1990

Attest:

HARRY F. MANBECK, JR.

Attesting Officer

Commissioner of Patents and Trademarks



US004798729B1

REEXAMINATION CERTIFICATE (2366th)**United States Patent [19]****[11] B1 4,798,729****Anders et al.****[45] Certificate Issued Aug. 30, 1994**

[54] **METHOD FOR DELAYING CLOSTRIDIUM BOTULINUM GROWTH IN FISH AND POULTRY**

FOREIGN PATENT DOCUMENTS

59-175870A 10/1984 Japan

[75] **Inventors:** Robert J. Anders, Middleton; John G. Cerveny; Andrew L. Milkowski, both of Madison, Wis.

OTHER PUBLICATIONS

[73] **Assignee:** Oscar Mayer Foods Corporation, Madison, Wis.

Lee, S. H., et al., "Factors Affecting Inhibition of Clostridium botulinum in Cured Meats," J. Food Sci., 43(5):1371 (1978).

Purac, Inc.'s "Citizen Petition" to the FDA, May 22, 1998.

Reid, T. F., "Lactic Acid and Lactate in Food Products," Food Manufacturing (Oct., 1969).

Tompkin, R. B. et al., "Causes of Variation of Cured Meats." Applied and Environmental Microbiology 35(5):886.

Reexamination Request:

No. 90/003,104, Jun. 23, 1993

Reexamination Certificate for:

Patent No.: 4,798,729

Issued: Jan. 17, 1989

Appl. No.: 120,769

Filed: Nov. 13, 1987

Maas, M. R., "Sodium Lactate Delays Toxin Production by Clostridium botulinum in Cook-in-Bag Turkey Products," Applied and Environmental Microbiology, 55(9):2226 (1989).

Troller, J. A. and Christian, J. H. B. Water Activity and Food, Academic Press (1978) pp. 86-89.

45 Fed. Reg. 32324 (May 16, 1980).

49 Fed. Reg. 35366 (Sep. 7, 1984).

45 Fed. Reg. 10317 (Feb. 15, 1990).

58 Fed. Reg. 4067 (Jan. 13, 1993).

C.F.R. Section 1.32 Affidavit by Dr. M. R. Maas, Paper No. 4 to Ser. No. 809,319.

48 Fed. Reg. 8086 (Feb. 25, 1993).

50 Fed. Reg. 6252 (Feb. 14, 1985).

"Declaration in Support of Reexamination," by Dr. Lee N. Christiansen Jun. 21, 1993.

Angersbach, Dr. H., Systematische mikrobiologische und technologische Untersuchungen zur Verbesserung der Beschaffenheit vom Tier stammender Lebensmittel, No. 2/1971, pp. 205-210 (translation included).

Certificate of Correction issued May 29, 1990.

Related U.S. Application Data

[63] Continuation of Ser. No. 808,319, Dec. 12, 1985, abandoned.

[51] **Int. Cl.⁵** A23B 4/14

[52] **U.S. Cl.** 426/326; 426/332;
426/532

[58] **Field of Search** 426/264, 265, 268, 325,
426/326, 332, 412, 532

[56] References Cited**U.S. PATENT DOCUMENTS**

4,285,980 8/1991 Lewis 426/249

4,421,823 12/1983 Theisen 428/349

4,592,892 6/1986 Ueno et al. 422/28

Primary Examiner—Arthur L. Corbin**[57] ABSTRACT**

This invention pertains to poultry or fish foodstuffs wherein lactate salt is added in an amount effective to delay Clostridium botulinum growth.

**REEXAMINATION CERTIFICATE
ISSUED UNDER 35 U.S.C. 307**

NO AMENDMENTS HAVE BEEN MADE TO
THE PATENT

AS A RESULT OF REEXAMINATION, IT HAS
BEEN DETERMINED THAT:

5 The patentability of claims 1-11 is confirmed.

* * * * *

10

15

20

25

30

35

40

45

50

55

60

65

United States Patent [19]

Anders et al.

[11] Patent Number: **4,888,191**

[45] Date of Patent: * **Dec. 19, 1989**

[54] **METHOD FOR DELAYING CLOSTRIDIUM BOTULINUM GROWTH IN FISH AND POULTRY**

[75] Inventors: **Robert J. Anders, Middleton; John G. Cerveny; Andrew L. Milkowski, both of Madison, all of Wis.**

[73] Assignee: **Oscar Mayer Foods Corporation, Madison, Wis.**

[*] Notice: The portion of the term of this patent subsequent to Jan. 17, 2006 has been disclaimed.

[21] Appl. No.: **287,252**

[22] Filed: **Dec. 20, 1988**

Related U.S. Application Data

[63] Continuation of Ser. No. 120,769, Nov. 13, 1987, Pat. No. 4,798,729, which is a continuation of Ser. No. 808,319, Dec. 12, 1985, abandoned.

[51] Int. Cl. **A23B 4/14**

[52] U.S. Cl. **426/281; 426/325;**

426/326; 426/332; 426/532

[58] Field of Search **426/332, 264, 265, 268,**

426/532, 325, 326, 412, 281

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,658,551	4/1972	Bundus et al.	426/332
3,852,486	12/1974	Walker et al.	426/332 X
3,934,044	1/1976	Busch et al.	426/332 X
4,011,346	3/1977	Ernst	426/332 X
4,075,357	2/1978	Szeziesniak et al.	426/332
4,212,894	7/1980	Franzen et al.	426/332
4,262,027	4/1981	Tonner et al.	426/332 X
4,798,729	1/1989	Anders et al.	426/326

OTHER PUBLICATIONS

Patent Abstracts of Japan, vol. 9, No. 32 (C-265) [1755], 9th Feb. 1985; and JP-A-59 175 870 (Shiyouwa Sangyo K.K.) 04-10-1984.

Purac Inc., "Lactic Acid and Lactates", pp. 10 & 11. C. V. Chemie Combinatie Amsterdam C.C.A., 2 pages. Krol, "Meat Products", Voedingsmiddelen Technologie, 1972, pp. 157-158.

Primary Examiner—Arthur L. Corbin
Attorney, Agent, or Firm—Joseph T. Harcarik

[57] **ABSTRACT**

This invention pertains to poultry or fish foodstuffs wherein lactate salt is added in an amount effective to delay *Clostridium botulinum* growth.

11 Claims, No Drawings

METHOD FOR DELAYING *CLOSTRIDIUM BOTULINUM* GROWTH IN FISH AND POULTRY

This is a continuation of application Ser. No. 120,769, filed 11/13/87, now U.S. Pat. No. 4,798,729, which is a continuation of Ser. No. 808,319, filed 12/12/85 now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to poultry and fish foodstuff containing lactate salt in amounts effective to delay *Clostridium botulinum* growth.

2. Description of the Prior Art

The preservation of foodstuff has many aspects. For example, it has been suggested to add sodium lactate to meat products, such as ham and sausage at levels of approximately 1 to 3%. It is suggested that the sodium lactate lowers the a_w of the foodstuff and has a bacteriostatic effect which results in a better shelf life during refrigeration, a possibility of storage without refrigeration and a possibility of lowering the sodium chloride content of the foodstuff resulting in a better taste without the decreased shelf life. Sodium lactate, however, has not been suggested as an agent for controlling or delaying *Clostridium botulinum* growth.

The need to control *Clostridium botulinum* occurs in foodstuffs such as meats and poultry which are packaged and cooked, but not sterilized, in anaerobic plastic barrier packages. Under temperature abuse, *Clostridium botulinum* may grow and produce toxin. Injury to humans resulting from this bacteria has been relatively rare since there are various means for preventing its growth. For example, high temperature processing of foodstuffs prior to packaging or after packaging will destroy the *Clostridium botulinum*. Other means for controlling the *Clostridium botulinum* have been to refrigerate the foodstuff and to add agents such as sodium nitrite to foodstuff such as bacon. The sodium nitrite while delaying the growth of *Clostridium botulinum* also forms a durable red pigment in the meat. This red coloring is desirable in many foodstuffs such as pork and beef products but is undesirable in other products such as poultry and fish.

While the control of food *Clostridium botulinum* has been successful, it is desired to find additional method of controlling *Clostridium botulinum* without occurring side effects such as red coloring described above.

SUMMARY OF THE INVENTION

This invention pertains to foodstuff selected from the group consisting of fish and poultry which contains a lactate salt in amounts effective to delay *Clostridium botulinum* growth.

It has been found that when sodium lactate is added to poultry or fish foodstuffs, growth of *Clostridium botulinum* in the foodstuff is delayed but the foodstuff is not colored red by the sodium lactate salt.

DETAILED DESCRIPTION OF THE INVENTION

The foodstuffs included in this invention are non-red meat foodstuff such as fish and poultry wherein the poultry includes meats such as turkey and chicken. This invention is particularly useful when the fish or poultry is packaged in anaerobic conditions such as packaged whole meat or when the fish and poultry is packaged

with other foodstuffs such as refrigerated meals and soups.

The lactate salt employed in this invention includes salts such as sodium lactate, calcium lactate, potassium lactate and ammonium lactate. Preferably the lactate salt is sodium lactate. The lactate salts are employed in amounts effective to delay *Clostridium botulinum* growth. The amount of a lactate salt effective to delay botulinum growth can be determined by a simple abusive temperature test procedure.

Foodstuffs that are to be protected by the lactate salt are stored at 80° F. A control is utilized wherein no lactate salt or other *Clostridium botulinum* delay agent is used. The product is then treated with levels of lactate salt. The products are analyzed at various time periods. The levels of the lactate salt which delay the toxin formation compared to the control are amounts which are effective for delaying the *Clostridium botulinum* growth.

In general these amounts range from about 1 to about 7% lactate salt and preferably are in the range from about 1.5 to 3.5 lactate salt.

The lactate salt may be incorporated into the foodstuff by a wide variety of procedures. For example, the lactate salts may be added into the foodstuff either in a concentrated form or as a solution such as an aqueous solution. The lactate salts may be mixed directly into the foodstuff or may be injected into the foodstuff utilizing injection needles.

After the lactate salts are added to the foodstuff the foodstuff may be packaged in anaerobic plastic barrier packages and then heated to temperatures sufficient to cook the foodstuff but not sufficient to sterilize the foodstuff. Cooking the foodstuff below sterilization temperatures is desirable for the quality of the cooked foodstuff but *Clostridium botulinum* may later grow if temperatures abused. The added lactate salts will, however, delay *Clostridium botulinum* growth. Other processing means may also be used such as cooking the foodstuff with the lactate salt added and then packaging. In this process the concerns for *Clostridium botulinum* growth are lessened but the added lactate salt is effective for delaying *Clostridium botulinum* growth.

It has also been found that while the lactate salts delay the growth of *Clostridium botulinum*, they do not add any coloring to the meat such as a red coloring.

While the lactate salts may be added as sole agent for delaying *Clostridium botulinum*, the lactate salts may be added in combination with other agents which delay *Clostridium botulinum* growth such as sodium chloride or sodium nitrite. In such cases the amount of lactate salts added will be reduced and the effective amount of lactate salt will be the amounts which delay *Clostridium botulinum* in combination with the other growth delaying agents.

The following examples are further presented to describe the invention, but it is to be understood that the invention is not to be limited to the details described therein.

EXAMPLE I

In these examples, a turkey batter was prepared by grinding turkey breasts and mixing salt at 1.4 wt % and phosphate at 0.49 wt %. *Clostridium botulinum* spores were added to the turkey batter. The batter was divided into aliquots. Some of the aliquots were designated controls, and no sodium lactate was added. To the other aliquots were added sodium lactate in varying amounts

as indicated in Table I below. The inoculated aliquots were vacuum packaged, and water cooked to an internal temperature of 160° F. The cooked turkey products were then cooled to 80° F. and incubated at that temperature. Periodically, the product was removed and tested for toxin. The results of the test are shown in Table I.

TABLE I

Percent Lactate	Effect of Sodium Lactate on <i>C. botulinum</i> in Temperature Abused Cook-in Turkey							
	Days at 80° F.							
	2	4	5	7	8	9	10	
0 (Control)	0/5*	5/5						
2.0	0/5	2/5	5/5					
2.5	0/5	0/5	0/5	5/5				
3.0	0/5	0/5	0/5	4/5	5/5			
3.5	0/5	0/5	0/5	0/5	0/5	2/5	5/5	

*number of toxic samples/number of samples examined.

From these results it is clear that sodium lactate added at the amounts indicated delays the growth of *Clostridium botulinum*.

EXAMPLE II

According to this example 1,000 lbs. of fresh trim turkey breasts are injected with sodium lactate at a weight percent of 2.5% sodium lactate. The turkey breasts range from about 2.5 to about 3.75 lbs. The turkey breasts are injected with a brine solution comprising the following: 69.50% water; 22.49% sodium lactate syrup (60% sodium lactate; 40% water); 6.16% salt and 1.85% sodium phosphate. For each pound of turkey breasts there is injected 0.2274 lbs. of brine using a Townsend Model 1400 type injector.

The turkey breasts are placed on a rack in an oven and cooked at high humidity at 160° F. dry bulb, for 2 hours and then at 170° F. dry bulb, until the internal temperature of the turkey breasts is 155° F. (approximately 15 minutes). The oven is turned off, but not opened and a solution of 2 lbs. of a commercial caramel powder and 13 lbs. of water is introduced to the oven through atomizing nozzles along with air over a period of 45 minutes.

The turkey breasts are then removed from the oven, chilled and packaged.

We claim:

1. A method for delaying *Clostridium botulinum* growth in a foodstuff selected from the group consisting of fish and poultry, the method consisting essentially of:

(a) adding a lactate salt to a fresh foodstuff selected from the group consisting of fish and poultry, said lactate salt being added in an amount of about 1% to 7%;

(b) packaging the fresh foodstuff in a plastic barrier package; and

(c) cooking the foodstuff in said plastic barrier package to a temperature sufficient to cook the foodstuff but not sufficient to sterilize the foodstuff.

2. A method according to claim 1, wherein the foodstuff comprises poultry.

3. A method according to claim 2, wherein the foodstuff comprises turkey.

4. A method according to claim 1, wherein the lactate salt is added in an amount from about 1.5% to about 3.5%.

5. A method according to claim 1, wherein the lactate salt is selected from the group consisting of sodium lactate, calcium lactate, potassium lactate and ammonium lactate.

6. A method according to claim 5, wherein the lactate salt comprises sodium lactate.

7. A method according to claim 5, wherein the lactate salt comprises calcium lactate.

8. A method according to claim 5, wherein the lactate salt comprises potassium lactate.

9. A method according to claim 5, wherein the lactate salt comprises ammonium lactate.

10. A method according to claim 1, wherein adding said lactate salt is effected by injecting the lactate salt into said foodstuff.

11. A method according to claim 1, wherein the foodstuff is cooked to an internal temperature of about 160° F.

* * * * *

45

50

55

60

65

United States Patent [19]

Anders et al.

[11] Patent Number: 5,017,391

[45] Date of Patent: May 21, 1991

- [54] **PACKAGED FOODSTUFF CONTAINING A LACTATE SALT**
- [75] Inventors: **Robert J. Anders**, Middleton; **John G. Cerveny**; **Andrew L. Milkowski**, both of Madison, all of Wis.
- [73] Assignee: **Oscar Mayer Foods Corporation**, Madison, Wis.
- [21] Appl. No.: **448,341**
- [22] Filed: **Dec. 11, 1989**

Related U.S. Application Data

- [60] Division of Ser. No. 287,252, Dec. 20, 1988, Pat. No. 4,888,191, which is a continuation of Ser. No. 120,769, Nov. 13, 1987, Pat. No. 4,798,729, which is a continuation of Ser. No. 808,319, Dec. 12, 1985, abandoned.
- [51] Int. Cl.³ **A23L 1/315; A23L 1/325**
- [52] U.S. Cl. **426/129; 426/643; 426/644**
- [58] Field of Search **426/332, 264, 265, 268, 426/532, 325, 326, 412, 281, 129, 643, 644**

References Cited

U.S. PATENT DOCUMENTS

- 3,658,551 4/1972 Bundus et al. 426/332
- 3,852,486 12/1974 Wacker et al. 426/332 X
- 3,934,044 1/1976 Busch et al. 426/332
- 4,011,346 3/1977 Ernst 426/332
- 4,075,357 2/1978 Szeszniak et al. 426/332
- 4,212,894 7/1980 Franzen et al. 426/332

- 4,262,027 4/1981 Tonner et al. 426/332
- 4,576,825 3/1986 Tracy et al. 426/332 X
- 4,798,729 1/1989 Anders et al. 426/326

FOREIGN PATENT DOCUMENTS

- 2324672 5/1975 Fed. Rep. of Germany .

OTHER PUBLICATIONS

Patent Abstracts of Japan, vol. 9, No. 32 (C-265) [1977], Feb. 9, 1985; and JP-A-59 175 870 (Shiyouwa Sangyo K.K.) 04-10-1984.

FSTA Journal, 83-12-r0877, No. 83075100; D. S. Kim et al.; "Effect . . . humectants," and Bulletin of the Korean Fisheries Society, vol. 15, No. 1, pp. 74-82, 10 ref. 1982.

"Sodium Lactate in Meat Products", C. V. Chemie Combinatie Amsterdam C.C.A.

Krol, "Meat Products", Voedingsmiddelentechnologie, 1972, pp. 157, 158.

Troller, J. A., and Christian, J. H. B., Appendix B, Water Activity and Food, Academic Press, New York, 1978.

Primary Examiner—Arthur L. Corbin

Attorney, Agent, or Firm—Joseph T. Harcarik

[57] ABSTRACT

This invention pertains to poultry or fish foodstuffs wherein lactate salt is added in an amount effective to delay *Clostridium botulinum* growth.

11 Claims, No Drawings

PACKAGED FOODSTUFF CONTAINING A LACTATE SALT

This is a division of co-pending application Ser. No. 07/287,252, filed Dec. 20, 1988, now U.S. Pat. No. 4,888,191, which is a continuation of application Ser. No. 07/120,769, filed Nov. 13, 1987, now U.S. Pat. No. 4,798,729, which is a continuation of application Ser. No. 06/808,319, filed Dec. 12, 1985, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to poultry and fish foodstuff containing lactate salt in amounts effective to delay *Clostridium botulinum* growth.

2. Description of the Prior Art

The preservation of foodstuff has many aspects. For example, it has been suggested to add sodium lactate to meat products, such as ham and sausage at levels of approximately 1 to 3%. It is suggested that the sodium lactate lowers the a_w of the foodstuff and has a bacteriostatic effect which results in a better shelf life during refrigeration, a possibility of storage without refrigeration and a possibility of lowering the sodium chloride content of the foodstuff resulting in a better taste without the decreased shelf life. Sodium lactate, however, has not been suggested as an agent for controlling or delaying *Clostridium botulinum* growth.

The need to control *Clostridium botulinum* occurs in foodstuffs such as meats and poultry which are packaged and cooked, but not sterilized, in anaerobic plastic barrier packages. Under temperature abuse, *Clostridium botulinum* may grow and produce toxin. Injury to humans resulting from this bacteria has been relatively rare since there are various means for preventing its growth. For example, high temperature processing of foodstuffs prior to packaging or after packaging will destroy the *Clostridium botulinum*. Other means for controlling the *Clostridium botulinum* have been to refrigerate the foodstuff and to add agents such as sodium nitrite to foodstuff such as bacon. The sodium nitrite while delaying the growth of *Clostridium botulinum* also forms a durable red pigment in the meat. This red coloring is desirable in many foodstuffs such as pork and beef products but is undesirable in other products such as poultry and fish.

While the control of food *Clostridium botulinum* has been successful, it is desired to find additional methods of controlling *Clostridium botulinum* without occurring side effects such as red coloring described above.

SUMMARY OF THE INVENTION

This invention pertains to foodstuff selected from the group consisting of fish and poultry which contains a lactate salt in amounts effective to delay *Clostridium botulinum* growth.

It has been found that when sodium lactate is added to poultry or fish foodstuffs, growth of *Clostridium botulinum* in the foodstuff is delayed but the foodstuff is not colored red by the sodium lactate salt.

DETAILED DESCRIPTION OF THE INVENTION

The foodstuffs included in this invention are non-red meat foodstuff such as fish and poultry wherein the poultry includes meats such as turkey and chicken. This invention is particularly useful when the fish or poultry

is packaged in anaerobic conditions such as packaged whole meat or when the fish and poultry is packaged with other foodstuffs such as refrigerated meals and soups.

The lactate salt employed in this invention includes salts such as sodium lactate, calcium lactate, potassium lactate and ammonium lactate. Preferably the lactate salt is sodium lactate. The lactate salts are employed in amounts effective to delay *Clostridium botulinum* growth. The amount of a lactate salt effective to delay botulinum growth can be determined by a simple abusive temperature test procedure.

Foodstuffs that are to be protected by the lactate salt are stored at 80° F. A control is utilized wherein no lactate salt or other *Clostridium botulinum* delay agent is used. The product is then treated with levels of lactate salt. The products are analyzed at various time periods. The levels of the lactate salt which delay the toxin formation compared to the control are amounts which are effective for delaying the *Clostridium botulinum* growth.

In general these amounts range from about 1 to about 7% lactate salt and preferably are in the range from about 1.5 to 3.5 lactate salt.

The lactate salt may be incorporated into the foodstuff by a wide variety of procedures. For example, the lactate salts may be added into the foodstuff either in a concentrated form or as a solution such as an aqueous solution. The lactate salts may be mixed directly into the foodstuff or may be injected into the foodstuff utilizing injection needles.

After the lactate salts are added to the foodstuff the foodstuff may be packaged in anaerobic plastic barrier packages and then heated to temperatures sufficient to cook the foodstuff but not sufficient to sterilize the foodstuff. Cooking the foodstuff below sterilization temperatures is desirable for the quality of the cooked foodstuff but *Clostridium botulinum* may later grow if temperature abused. The added lactate salts will, however, delay *Clostridium botulinum* growth. Other processing means may also be used such as cooking the foodstuff with the lactate salt added and then packaging. In this process the concerns for *Clostridium botulinum* growth are lessened but the added lactate salt is effective for delaying *Clostridium botulinum* growth.

It has also been found that while the lactate salts delays the growth of *Clostridium botulinum*, they do not add any coloring to the meat such as a red coloring.

While the lactate salts may be added as sole agent for delaying *Clostridium botulinum*, the lactate salts may be added in combination with other agents which delay *Clostridium botulinum* growth such as sodium chloride or sodium nitrite. In such cases the amount of lactate salts added will be reduced and the effective amount of lactate salt will be the amounts which delay *Clostridium botulinum* in combination with the other growth delaying agents.

The following examples are further presented to describe the invention, but it is to be understood that the invention is not to be limited to the details described therein.

EXAMPLE I

In these examples, a turkey batter was prepared by grinding turkey breasts and mixing salt at 1.4 wt % and phosphate at 0.49 wt %. *Clostridium botulinum* spores were added to the turkey batter. The batter was divided into aliquots. Some of the aliquots were designated

3

controls, and no sodium lactate was added. To the other aliquots were added sodium lactate in varying amounts as indicated in Table I below. The inoculated aliquots were vacuum packaged, and water cooked to an internal temperature of 160° F. The cooked turkey products were then cooled to 80° F. and incubated at that temperature. Periodically, the product was removed and tested for toxin. The results of the test are shown in Table I.

TABLE I

Percent Lactate	Effect of Sodium Lactate on <i>C. botulinum</i> in Temperature Abused Cook-In Turkey								
	Days at 60° F.								
	2	4	5	7	8	9	10		
0 (Control)	0/5 ^a	5/5							
2.0	0/5	2/5	5/5						
2.5	0/5	0/5	0/5	5/5					
3.0	0/5	0/5	0/5	4/5	5/5				
3.5	0/5	0/5	0/5	0/5	0/5	2/5	5/5		

^aNumber of toxic samples/number of samples examined.

From these results it is clear that sodium lactate added at the amounts indicated delays the growth of *Clostridium botulinum*.

EXAMPLE II

According to this example 1,000 lbs. of fresh trim turkey breasts are injected with sodium lactate at a weight percent of 2.5% sodium lactate. The turkey breasts range from about 2.5 to about 3.75 lbs. The turkey breasts are injected with a brine solution comprising the following: 69.50% water; 22.49% sodium lactate syrup (60% sodium lactate; 40% water); 6.16% salt and 1.85% sodium phosphate. For each pound of turkey breasts there is injected 0.2274 lbs. of brine using a Townsend Model 1400 type injector.

The turkey breasts are placed on a rack in an oven and cooked at high humidity at 160° F. dry bulb, for 2 hours and then at 170° F. dry bulb, until the internal temperature of the turkey breasts is 155° F. (approximately 15 minutes). The oven is turned off, but not opened and a solution of 2 lbs. of a commercial caramel powder and

4

13 lbs. of water is introduced to the oven through atomizing nozzles along with air over a period of 45 minutes. The turkey breasts are then removed from the oven, chilled and packaged.

What is claimed is:

1. In a packaged foodstuff, said foodstuff being selected from the group consisting of fish and poultry, said fish or poultry being cooked, but not sterilized, being packaged in an anaerobic plastic barrier package and intended to be stored under refrigeration, said foodstuff being subject to the growth of *Clostridium botulinum* under temperature abuse, the improvement wherein the foodstuff comprises a lactate salt in an amount of from 1 to 7% by weight and sufficient to delay growth of *Clostridium botulinum* in the foodstuff.

2. A packaged foodstuff according to claim 1 wherein the foodstuff is poultry.

3. A packaged foodstuff according to claim 2 wherein the foodstuff is turkey.

4. A packaged foodstuff according to claim 1 wherein the lactate salt is in an amount from about 1.5% to about 3.5%.

5. A packaged foodstuff according to claim 1 wherein the lactate salt is selected from the group consisting of sodium lactate, calcium lactate, potassium lactate and ammonium lactate.

6. A packaged foodstuff according to claim 5 wherein the lactate salt is sodium lactate.

7. A packaged foodstuff according to claim 5 wherein the lactate salt is calcium lactate.

8. A packaged foodstuff according to claim 5 wherein the lactate salt is potassium lactate.

9. A packaged foodstuff according to claim 5 wherein the lactate salt is ammonium lactate.

10. A packaged foodstuff according to claim 1 wherein said foodstuff is packaged in said anaerobic plastic barrier package prior to being cooked.

11. A packaged foodstuff according to claim 1 wherein said foodstuff is cooked prior to being packaged in said anaerobic plastic barrier package.

* * * * *

45

50

55

60

65



US005017391A

REEXAMINATION CERTIFICATE (2255th)**United States Patent** [19][11] **B1 5,017,391****Anders et al.**[45] Certificate Issued * **Mar. 29, 1994**[54] **PACKAGED FOODSTUFF CONTAINING A LACTATE SALT**

4,592,892 6/1986 Ueno et al. 422/28

[75] **Inventors:** Robert J. Anders, Middleton; John G. Cervený; Andrew L. Milkowski, both of Madison, all of Wis.**FOREIGN PATENT DOCUMENTS**

59-175870A 10/1984 Japan .

[73] **Assignee:** Oscar Mayer Foods Corporation, Madison, Wis.**OTHER PUBLICATIONS****Reexamination Request:**

No. 90/003,105, Jun. 25, 1993

Reexamination Certificate for:

Patent No.: 5,017,391
 Issued: May 21, 1991
 Appl. No.: 448,341
 Filed: Dec. 11, 1989

Angersbach, Dr. H., Systematische mikrobiologische und technologische Untersuchungen zur Verbesserung der Beschaffenheit vom Tier stammender Lebensmittel, Feb. 1971, pp. 205-210 (translation included).

Lee, S. H., et al., "Factors Affecting Inhibition of *Clostridium botulinum* in Cured Meats," J. Food Sci., 43(5):1371 (1978).

Purac, Inc.'s "Citizen Petition" to the FDA, May 22, 1998.

Reid, T. F., "Lactic Acid and Lactate in Food Products," Food Manufacturing (Oct., 1969).

Tompkin, R. B. et al., "Causes of Variation of Cured Meats," Applied and Environmental Microbiology 35(5):886 (May, 1978).

Maas, M. R., "Sodium Lactate Delays Toxin Production by *Clostridium botulinum* in Cook-in-Bag Turkey Products," Applied and Environmental Microbiology, 55(9):2226 (1989).

Troller, J. A. and Christian, J. H. B. Water Activity and Food, Academic Press (1978) pp. 86-89.

45 Fed. Reg. 32324 (May 16, 1980).

49 Fed. Reg. 35366 (Sep. 7, 1984).

45 Fed. Reg. 10317 (Feb. 15, 1990).

58 Fed. Reg. 4067 (Jan. 13, 1993).

48 Fed. Reg. 8086 (Feb. 25, 1993).

50 Fed. Reg. 6252 (Feb. 14, 1985).

Primary Examiner—Arthur L. Corbin[*] **Notice:** The portion of the term of this patent subsequent to Jan. 17, 2006 has been disclaimed.**Related U.S. Application Data**

[60] Division of Ser. No. 287,252, Dec. 20, 1988, Pat. No. 4,888,191, which is a continuation of Ser. No. 120,769, Nov. 13, 1987, Pat. No. 4,798,729, which is a continuation of Ser. No. 808,319, Dec. 12, 1985, abandoned.

[51] **Int. Cl.³** A23L 1/315; A23L 1/325[52] **U.S. Cl.** 426/129; 426/643;

426/644

[58] **Field of Search** 426/129, 264, 268, 281,

426/265, 332, 325, 326, 532, 412, 643, 644

[56] **References Cited****U.S. PATENT DOCUMENTS**

4,285,980 8/1991 Lewis 426/249

4,421,823 12/1983 Theisen 428/349

[57] **ABSTRACT**

This invention pertains to poultry or fish foodstuffs wherein lactate salt is added in an amount effective to delay *Clostridium botulinum* growth.

**REEXAMINATION CERTIFICATE
ISSUED UNDER 35 U.S.C. 307**

**AS A RESULT OF REEXAMINATION, IT HAS
BEEN DETERMINED THAT:**

NO AMENDMENTS HAVE BEEN MADE TO
THE PATENT.

5 The patentability of claims 1-11 is confirmed.

* * * * *

10

15

20

25

30

35

40

45

50

55

60

65