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(54) Title: PROCESS FOR PREPARING A PUMPABLE BROTH COMPOSITION

(57) Abstract: Disclosed here is a process for preparing a concentrated liquid composition (such as a broth) from poultry or other meat sources without the use of any enzymes. The resultant composition may have high content of solids but are pumpable or pourable and have relatively long shelf life at room temperature. Also disclosed are methods of extracting proteins from raw poultry or other meat sources at relatively low temperatures. Methods of making a high protein curd is also disclosed.

PROCESS FOR PREPARING A PUMPABLE BROTH COMPOSITION

RELATED APPLICATION

[0001] This application claims priority to U.S. Patent application 62/048, 648, filed September 10, 2014, the entire content of which is hereby incorporated by reference into this application.

BACKGROUND

1. Field of the Invention

[0002] This disclosure relates to a process for making a broth composition. More particularly, the disclosure relates to a pumpable composition prepared from poultry or other meat sources without using an enzyme.

2. Description of Related Art

[0003] Broth or soups prepared from animals have high nutrition values. They are rich in proteins and have been shown to possess both nutritional and therapeutic values.

[0004] Many existing methods for making concentrated broth fail to efficiently utilize the broth derived from the meat processing industry. For instance, some methods fail to produce a concentrated stock or broth that is pumpable or pourable. Broth that is not pumpable or pourable is difficult to process. Poor utilization of the broth not only causes economical waste but also generates excessive waste water and environmental pollutions.

SUMMARY

[0005] The instrumentalities disclosed herein overcome the problems outlined above by providing a pumpable broth composition having high percentage of solids and relatively long shelf life. In another embodiment, the disclosure also provides a cold raw extraction prepared from various meat sources. In another embodiment, the present disclosure also provides a protein curd composition prepared from various meat sources.

[0006] In one embodiment, the higher solids of the disclosed concentrated broth composition may help control microbial growth and prevent spoilage of the broth products. In another embodiment, no non-poultry ingredient other than water is

introduced into the composition. In another embodiment, no extraneous enzymes are added to the composition or used in the process of making the product.

[0007] In one embodiment, a process is disclosed for making a broth composition that is pumpable or pourable. In another embodiment, the broth composition may be in a concentrated form, with at least 50%, 60%, 70%, 80%, or 90% solids.

[0008] In another embodiment, a raw extraction process is disclosed which may include at least the following steps: (a) mixing one or more poultry or animal parts with water, (b) incubating the mixture of (a) at a temperature between -20°C and 70°C for at least 10 minutes to generate a suspension, (c) separating the suspension from step (b) into a liquid fraction and a solid fraction, and (d) collecting the liquid fraction from step (c) to obtain the extract.

[0009] In one aspect, the temperature for step (a) may be between -10°C and 40°C, between 0°C and 25°C, or between 5°C and 15°C. In another aspect, the incubation time of step (a) may be at least 5 minutes, 10 minutes, or at least 30 minutes. In another aspect, the incubation of step (a) may be accompanied by stirring, mixing, etc. The poultry or animal part may be selected from the group consisting of mechanically separated poultry (MSP), mechanically separated chicken (MSC), poultry trims, animal meat trims, ground poultry parts, ground animal parts and combination thereof. In another aspect, the ratio between the poultry or animal part and water in the extraction is between about 1:1 to 1:4 by weight. The raw poultry or animal meat extract obtained according to this process may be subject to further processing described below, such as concentration, cooking, membrane separation, among others.

[0010] In another aspect, the separation step (c) may be performed by centrifugation, or filtration of the suspension. In another aspect, the centrifugation may be conducted at a speed of 1,000 rpm, 2,000 rpm, 3,000 rpm, 4,000 rpm. In another aspect, the centrifugation may be conducted at a speed lower than 10,000 rpm.

[0011] In another embodiment, a process is disclosed which may include at least the following steps: (a) incubating a raw liquid material at a temperature between about 50°C and 160°C for a period of at least 30 minutes to generate a suspension containing liquid and solid components, (b) separating the liquid component of the suspension from the solid component of the suspension, and (c) collecting the liquid component from step (b). In one aspect, the raw liquid material may be incubated in

step (a) at a temperature ranging from 50°C to 160°C, or more specifically, at least 60°C, 70°C, 80°C, or 90°C, or over 100° with corresponding pressure and the period of incubation may be at least 0.5 hour, 1 hour, 2 hours, 4 hours, 8 hours, or at least 24 hours. The raw liquid material may be at least one member selected from the group consisting of poultry sarcoplasm, blood from poultry or other animals, raw poultry or animal meat extract as described above, animal sarcoplasm, and combination thereof. As used herein, the term "animal" may include all mammals, birds, fish, reptiles and amphibians.

[0012] In another embodiment, the composition prepared from raw extraction of poultry contains relatively low levels of hydroxyproline. By way of example, the levels of hydroxyproline as a percentage of total amino acids in the composition may be as low as 2%, 1%, 0.5%, 0.2% or less, 0.1% or less, 0.01% or less.

[0013] In one aspect, the liquid component from step (c) may be subject to a concentration step (d), where the liquid component is boiled or is subject to an evaporation process to reduce the volume. The concentration step may help prepare a concentrated broth composition that contains high solids, for example, at greater than 50%, 60%, 70%, 80% solids. In another aspect, such composition may be stable at room temperature for at least 12 months, 24 months, 36 months, 48 months, 60 months, or longer. In another aspect, the composition obtained from step (d) may have less than 0.85, 0.75, 0.7, 0.6 or 0.5 water activity.

[0014] The raw liquid material may be derived from chicken, turkey, beef, pork or other animal or poultry sources. In one embodiment, the raw liquid material may be in a substantially liquid form which contains significant amount of poultry sarcoplasm. The term "substantially liquid form" means that the raw liquid material is mostly liquid but may contain minor amount of insoluble material. For instance, the raw liquid material may be collected from a poultry processing plant or from a poultry storage container or package. In another embodiment, one type of the raw liquid material typically exudes from cut and exposed muscle or bone tissues, which is also known as muscle serum or myogen. In another embodiment, the raw liquid material may appear reddish because it may contain intercellular, and/or intracellular liquid, sarcoplasm, and/or sarcoplasmic reticulum with its muscle pigment myoglobin, proteins, minerals, and metabolites. In another embodiment, the raw liquid material may be blood or plasma obtained from poultry or other animals.

[0015] In another embodiment, the raw liquid material may be obtained by extracting raw mechanically separated poultry (MSP), mechanically separated chicken (MSC), or finely ground poultry pieces (such as poultry trims or ground poultry parts) with water. By way of example, the extraction may be conducted by adding water into raw MSC. The mixture can then be stirred to facilitate mixing and extracting. The ratio between the MSC and water in the extraction mixture may range from about 4:1 to about 1:20 by weight, from about 1:1 to about 1:4 by weight, or about 1:2 by weight. In another embodiment, the MSC and water mixture may be subject to centrifugation at the end of the extraction. The liquid phase resulting from the centrifugation may be collected and used as the raw liquid material for preparing the pumpable broth composition of the present disclosure.

[0016] The raw liquid material may be prepared on-site and may be used for making the composition right after it is made fresh on-site. Alternatively, the raw liquid material may be from packaged products or may be collected off-site.

[0017] After the incubation of step (a) where the raw liquid material is incubated at an elevated temperature, the suspension may be subject to filtration to separate the liquid component from the solid component of the suspension, for example, by pouring through a 200 mesh sieve. In another aspect, fat may be further removed from the liquid component. For instance, the liquid phase may be cooled down or refrigerated to allow the fat to form a fat layer on top of the liquid phase. The top fat layer may then be removed by scooping or by other decanting methods known in the art.

[0018] In another embodiment, the raw liquid material may be cooked at an elevated temperature, e.g., 50-160°C for a period of time such that an insoluble protein curd is formed. In one aspect, this insoluble protein curd may be separated from the liquid component and may be used in various food products. For example, the protein curd may be used as a source of protein, or in a snack. In another aspect, the protein curd may be used as is, or may be processed into powder.

[0019] In another embodiment, the liquid component obtained in step (c) may be subject to a concentration step (d). In one aspect, concentration may be accomplished by boiling. In another aspect, the concentrating step may be accomplished by evaporation. In another aspect, liquid component obtained in step (c) may be subject to membrane separation to further remove certain undesirable proteins, peptides, compounds, or lipids,

or to enrich certain desirable proteins, peptides, compounds, or lipids. In another aspect, membrane separation may help enrich one or more peptides or proteins in the extract.

[0020] In another embodiment, the disclosed composition obtained from step (d) has relatively low water activity. By way of example, the water activity of the final product may be less than 0.85, or even less than 0.8, 0.7, or 0.6. In one aspect, salt may be added to the composition to further reduce the water activity. The salt may be added to the composition prior to step (d), during step (d), or after performance of step (d). Examples of salt may include but are not limited to NaCl, or other edible salts. For example, about 5 percent of salt may be added to a product that is 40% solids to achieve about 0.83 water activity.

[0021] Reduced water activity in the final broth product may help reduce microbial growth during storage and transportation. As a result, no anti-microbial agents or preservatives need to be added into the broth during or at the end of the process. Because anti-microbial agents and preservatives may be perceived negatively by consumers, avoidance of these substances may add to the marketability of the broth products. In one embodiment, nitrogen or other inert gases may be used during packaging to modify the head space in order to prevent growth of mold or bacteria.

[0022] The reduction of water activity may also simplify the packaging process of the final product. More specifically, because the broth composition obtained from step (d) contains little water to support microbial growth, sterile conditions may not be required when packaging the composition of the instant disclosure. In another aspect, the shelf life of the final broth composition obtained in step (d) may be at least 6 months, at least 12 months, at least 24 months, or at least 36 months at room temperature. By way of example, the shelf life of the final broth composition may be 12-24 months, 12-36 months, 24-36 months, or 36-48 months at room temperature.

[0023] In another embodiment, the composition prepared according to the instant disclosure has relative higher amount of Guanosine-5'-Monophosphate and Inosine-5'-Monophosphate. In one aspect, the total amount of Guanosine-5'-Monophosphate and Inosine-5'-Monophosphate is at least 25% of the total nucleotides in the composition. In another aspect, more than 70%, or even 80% of total proteins in the composition have a molecular weight (MW) below 30 kiloDalton (KD).

[0024] In another embodiment, the composition prepared according to the instant disclosure is pumpable or pourable, which is advantageous for packaging and

handling. For instance, the broth may contain at least 50%, 60%, 70%, 80%, or 85% solids but is still pourable (or pumpable) at room temperature.

[0025] In one embodiment, the disclosed composition may be packed in a squeezable or pumpable bottle and may be used by consumers at home or at any public places, such as restaurants. In another embodiment, the disclosed composition may be packed in a container, such as a bulk container, a trailer tanker, or a railroad tanker for transportation. In one aspect, the container may have a headspace, and the air in the headspace may be replaced with a gas having reduced oxygen content to prevent growth of molds. Suitable gases may include but are not limited to nitrogen, carbon dioxide, or inert gas.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] Figure 1 shows the protein profile of the myogen broth prepared according to one method.

DETAILED DESCRIPTION

[0027] The present disclosure relates to cold raw extraction prepared from various meat sources. The present disclosure also relates to pumpable compositions prepared from various meat sources. The present disclosure also relates to protein curd compositions prepared from various meat sources. In one aspect, the disclosed broth product is pumpable, flowable and pourable. In another aspect, the disclosed pumpable composition has higher solids than many other products prepared according to existing methods. Another advantage afforded by the instant methods is the relatively longer shelf life of the resulting broth product.

[0028] In one embodiment, one or more enzymes may be added in the raw extraction process. In one aspect, the enzyme may include, for example, proteases. In another aspect, the temperature of the raw extraction may be at about 50-60 C. Both the addition of enzymes and elevation of temperature may help increase the amount of essential amino acids that are included in the extracted fractions.

[0029] In another embodiment, the raw extraction process may further include an acidification step (f) to reduce the pH of the soluble protein composition obtained from step (e). In another embodiment, the acidification step (f) may include adding an acidic agent to the broth layer obtained from step (e) or partially hydrolyzing the broth layer, wherein the acidic agent is selected from the group consisting of carbonated water, carbon

dioxide gas, and combination thereof. In one aspect, acid hydrolysis may help removing fat (lipid) from the composition. In another aspect, acid hydrolysis may facilitate selective fractionation of proteins and improve amino acid profiles, especially to increase the content of essential amino acids

[0030] The terms "poultry part" and "animal part" refer to parts of the bird or animal, as well as whole bird or whole animal.

[0031] The term "broth" refers to an aqueous composition containing at least one solute. A broth may be a liquid, a solution, or a suspension. For purpose of this disclosure, the term "broth" may be used interchangeably with the terms "stock," "extract," "fond," or "demi-glace." It is to be recognized that as a broth becomes more and more concentrated, it may become highly viscous and may have much lower liquidity as compared to a dilute broth. The concentrated broth composition of the present disclosure may be a highly concentrated broth in a liquid form. Alternatively, a concentrated broth composition may be a dried or semi-dried broth product in the form of powder or paste.

[0032] For purpose of this application, the terms "pumpable" and "pourable" may be used interchangeably to refer to the fluidic characteristics of a composition which can be transferred by using a device (e.g., a pump) typically used in the food (e.g., broth) packaging industry or which can be poured from one container into another.

[0033] The term "water activity" refers to unbound water in a material, for example, food. Water that is not bound to food molecules can support the growth of bacteria yeast or molds (fungi). Thus, water activity may be used to indicate the inherent tendency by which certain food material may become contaminated or spoiled.

[0034] The range of water activity may extend from 0 (bone dry) to 1.0 (pure water). Most food products have a water activity level in the range of 0.2 for very dry foods to 0.99 for moist fresh foods. In practice, water activity is usually measured as equilibrium relative humidity (ERH). The water activity of fresh meat is typically about 0.99, while the water activity of aged cheddar cheese is about 0.85. Dried food usually has lower water activity. For instance, most dried fruit products have water activity of about 0.6, while dry milk powder has water activity of about 0.2.

[0035] The terms "agent," "ingredient," "component," and "constituent" may be used interchangeably in this disclosure. The term "enrich" means to increase the concentration of a component in a mixture that contains more than one components.

[0036] The compositions of the present disclosure may contain additional ingredients. It is to be understood that these additional ingredients may confer upon the disclosed compositions certain desirable properties. Examples of such desirable properties may include but are not limited to enhanced inhibition of spoilage microorganisms, improved flavor, or increased stability of the composition, and so on.

[0037] It is to be noted that, as used in this disclosure, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to "a composition" includes reference to two or more of such compositions.

[0038] In another embodiment, the disclosed compositions may be prepared and/or distributed in a concentrated form. A concentrate may be dissolved or dispersed in a solvent to form a reconstituted solution.

EXAMPLES

[0039] The following examples are provided to illustrate the present invention, but are not intended to be limiting. The reagents, materials and instruments are presented as typical components, and various substitutions or modifications may be made in view of the foregoing disclosure by one of skills in the art without departing from the principle and spirit of the present invention.

Example 1 Preparation of pumpable broth from raw liquid sarcoplasm

[0040] Raw liquid was collected in a poultry manufacturing plant from totes of raw chicken frames. This liquid has been identified as primarily liquid sarcoplasm that exudes from cut and exposed muscle tissue, and is also known as muscle serum or myogen. This reddish liquid is a natural part of muscle tissue and is often seen in grocery store packages of raw meat and poultry. When fully cooked, the red color disappears and the product takes on the appearance of broth.

[0041] A quantity of this raw liquid was collected and weighed into a large stock pot. It was fully cooked at a simmer for about an hour at 85 – 99 °C, and the resultant liquid broth was separated from insoluble solids through a 230 mesh sieve. This broth portion was concentrated by boiling down (reducing) on stove top for several hours to yield an extract with high solids. Upon reaching 57% solids, a sample was taken and the water activity of the sample was determined to be at 0.79. The remainder of the extract was further concentrated to 73% solids with a water activity of 0.59. Both

samples had less than 0.85 in water activity and were considered shelf stable. Both samples were very flowable and pumpable upon cooling.

Example 2 Preparation of pumpable broth from raw mechanically separated chicken

[0042] Freshly made raw mechanically separated chicken (MSC) was obtained from a poultry plant. Portions of the MSC were weighed into cooking pots and two parts cold water was added into the MSC. Each batch was mixed enough to break up lumps. Then, the raw slurry was centrifuged at 3,500 rpm for 5 minutes and separated into a bottom meaty, insoluble phase, a large liquid phase in the middle, and a thin fat layer on top. The liquid phase and the fat layer were separated from the meaty phase by pouring. The liquid phase and fat layer were then cooked on stove top at 85-99°C for about an hour. After cooking, the liquid broth obtained was separated from insoluble solids by pouring through a 230 mesh sieve. Fat was removed by cooling overnight in a refrigerator and simply scooping off the solidified fat. The broth was concentrated by boiling down (reducing) on stove top.

[0043] This concentrated broth was sampled and shown to have 57.4% solids with a water activity of 0.77. This sample remains very flowable, pourable, and pumpable at ambient temperature.

[0044] The procedure above was repeated and similar results were obtained. An extract was obtained that was shown to be 48.8% solids with a water activity of 0.83, which is considered shelf stable with no need of refrigeration.

Example 3 Chemical Analysis of the Composition

[0045] The composition prepared according to Example 1 (referred to as Myogen Broth) was subject to chemical analysis to determine the content of nucleotides and amino acids. A chicken broth prepared by conventional method (referred to as Home-style Broth) was used as control. The amount of total nucleotides in the Myogen Broth after corrected on solid basis was 3855.66 mg/100 grams. By contrast, the amount of total nucleotides in the Home-style Broth after corrected on solid basis was 2461.08 mg/100 grams. These results indicated that the total nucleotides in the Myogen Broth is about 56% (or at least 50%) greater than the total nucleotides in Home-style Broth. The amounts of each nucleotide as a percentage of total nucleotides for Myogen Broth and

Home-style Broth are shown in Table 1, respectively. The amounts of each amino acid as a percentage of total amino acids for Myogen Broth are shown in Table 2.

TABLE 1 NUCLEOTIDE CONTENT

Percentage of total Nucleotides %	Myogen Broth	Home-style Broth
Adenosine-5'-Monophosphate	2.0	9.2
Cytidine-5'-Monophosphate	1.7	3.3
Uridine-5'-Monophosphate	70.5	64.3
Guanosine-5'-Monophosphate	0.88	1.2
Inosine-5'-Monophosphate	24.8	21.9

TABLE 2 AMINO ACID CONTENT

Amino acid	Percentage of total amino acids %
Aspartic acid	0.77
Threonine	0.45
Serine	0.47
Glutamic acid	2.68
Glycine	1.25
Alanine	1.01
Valine	0.49
Methionine	0.25
Isoleucine	0.39
Leucine	0.67
Tyrosine	0.31
Phenylalanine	5.04
Lysine	0.85
Histidine	1.15
Arginine	0.61
Proline	0.89
Hydroxyproline	0.20
Cysteine	0.11
Tryptophan	0.10

[0046] The same Myogen broth was also subject to SDS-PAGE analysis to determine the molecular weight distribution of proteins in the composition. As shown in Fig. 1, more than about 70%, or 80% of the total proteins have a MW below 30 KD.

Example 4 Preparation of a high-protein, low-ash solid composition

[0047] To prepare a solid high-protein, low-ash composition, in Test 1, about 10 pounds of raw mechanically separated chicken (MSC) was extracted with about 20 pounds of solution of water and chicken broth. The raw liquid fraction was separated from the more solid fraction using a centrifuge. Fat was mostly removed from the decanted liquid. The liquid was then fully cooked to about 80°C for at least 10 minutes. Upon cooking, an insoluble protein curd formed in the liquid which was separated from the liquid with a screen. The curd was pressed in the screen by hand to remove excess liquid. The resultant protein curd was analyzed. The results are shown below in Table 3. The resultant curd was high in moisture (72.2%) and proportionally high in protein (19.2%) and low in ash (0.77%). Calculated to a dry or solids basis, the product had about 61% protein, 36% fat, and 2.5% ash.

TABLE 3 ANALYSIS RESULT OF HIGH PROTEIN CURD OBTAINED IN TEST 1

Moisture	Protein	Fat	Ash	Dry:	Protein	Fat	Ash
72.2	19.2	11.1	0.77		61.8	35.7	2.48

[0048] In Test 2, 10 pounds of raw MSC (6°C) was mixed with 20 pounds of ice water. Solids were separated from liquid using a centrifuge resulting in 19 pounds of liquid. The separated liquid was cooked with stirring to greater than 80°C for more than 10 minutes, resulting in a clear chicken broth fraction and formation of an insoluble protein curd. The curd was separated from the liquid broth using a standard No. 230 sieve with hand pressing, then analyzed in the lab. Table 4 shows the results of the analysis.

TABLE 4 ANALYSIS RESULT OF HIGH PROTEIN CURD OBTAINED IN TEST 2

Moisture	Protein	Fat	Ash	Dry:	Protein	Fat	Ash
68.7	19.0	9.8	0.6		64.6	33.4	2.0

[0049] The amino acid content of the protein curd is shown in Table 5.

TABLE 5 AMINO ACID CONTENT

Amino acid	Percentage of total amino acids %
Aspartic acid	10.22
Threonine	4.54
Serine	4.31
Glutamic acid	12.58
Glycine	4.57
Alanine	5.89
Valine	6.11
Methionine	2.40
Isoleucine	4.82
Leucine	8.86
Tyrosine	3.59
Phenylalanine	5.52
Lysine	8.03
Histidine	3.53
Arginine	6.46
Proline	5.62
Hydroxyproline	0.01
Cysteine	1.42
Tryptophan	1.53

[0050] To test the nutritional values of the protein curd, a quantity of the protein curd prepared according to Test 2 above was fed to rats along with control animal protein diet, and the growth of the rats was monitored and compared to rats fed with other animal protein products. The weight gain and growth of the test group was very close to the control group fed with standard animal protein products.

[0051] Example 5 Preparation of beef curd from beef materials

[0052] Two beef raw materials were processed by the cold raw extraction method as described in the above examples. These raw materials contain similar components of raw liquid with some fat and raw insoluble meaty solids. The raw liquid extract phase was fully cooked at >85°C for more than 10 minutes. The protein curd

formed after cooking was separated from the broth phase by screening. The curd was pressed by hand on a fine screen to reduce moisture, then analyzed for protein and fat. Samples were also sent to a commercial lab for amino acid analyses.

[0053] The first raw material was from a Commercial Finely Textured Reduced Fat Beef product, and the resultant protein curd had 15.8% protein and 6.2% fat (on a dry basis 71.8% protein and 28.2% fat).

[0054] The second raw material was from standard ground beef purchased in a local supermarket. The protein curd prepared from this sample had 13.4% protein and 3.7% fat (on a dry basis 78.4% protein and 21.6% fat).

[0055] Both curd samples on a dry basis score a perfect 100 on PDCAAS score. Table 6 shows PDCAAS of beef protein curd made from raw extraction of the first sample. Values entered are the amino acid test results converted to a solids basis. The PDCAAS is 100 based on egg white or casein standard.

TABLE 6 AMINO ACID CONTENT OF BEEF CURD PREPARED FROM RAW BEEF PRODUCT

Amino acid	Percentage of total amino acids %
Aspartic acid	10.2
Threonine	4.3
Serine	4.1
Glutamic acid	12.0
Glycine	4.9
Alanine	5.9
Valine	5.3
Methionine	2.6
Isoleucine	4.3
Leucine	9.5
Tyrosine	3.3
Phenylalanine	4.9
Lysine	11.0
Histidine	4.3
Arginine	5.4

Amino acid	Percentage of total amino acids %
Proline	5.0
Hydroxyproline	0.1
Cysteine	1.4
Tryptophan	1.5

[0056] The beef protein curd samples had a mild flavor and an amorphous, soft texture and had a mottled (light and dark) appearance. Protein digestibility as measured by the standard pepsin digestibility method was at 98.8%.

[0057] Changes may be made in the disclosed compositions and methods without departing from the scope hereof. It should thus be noted that the matter contained in the above description should be interpreted as illustrative and not in a limiting sense. The following claims are intended to cover all generic and specific features described herein, as well as all statements of the scope of the present methods and compositions, which, as a matter of language, might be said to fall therebetween.

[0058] The contents of all cited references (including literature references, patents, patent applications, and websites) that maybe cited throughout this application are hereby expressly incorporated by reference in their entirety for any purpose, as are the references cited therein.

CLAIMS

We claim:

1. A process for preparing an extract from poultry or animal parts, comprising:
 - (a) mixing one or more poultry or animal parts with water,
 - (b) incubating the mixture of (a) at a temperature between -20°C and 70°C for at least 10 minutes to generate a suspension,
 - (c) separating said suspension into a liquid fraction and a solid fraction, and
 - (d) collecting said liquid fraction from step (c) to obtain said extract.
2. The process of claim 1, wherein said temperature in step (b) is between 0°C and 25°C.
3. The process of claim 1, wherein said poultry or animal part is selected from the group consisting of mechanically separated poultry (MSP), poultry trims, animal meat trims, ground poultry parts, ground animal parts and combination thereof.
4. The process of claim 3, wherein the ratio between said poultry or animal part and water in said extraction is between about 1:1 to 1:4 by weight.
5. The process of claim 3, wherein said separation of step (c) is by centrifugation of said suspension.
6. The process of claim 1, further comprising a step (e) of adding an acidic agent to said liquid fraction obtained from step (d), wherein said acidic agent is selected from the group consisting of carbonated water, carbon dioxide gas, and combination thereof.
7. The process of claim 1, further comprising a step (f) of passing said extract from step (d) through a membrane to enrich one or more peptides or proteins in said extract.

8. A process for making a composition, comprising:
 - (a) incubating a raw liquid material at a temperature between about 50°C and 160°C for a period of at least 10 minutes to generate a suspension containing liquid and solid components,
 - (b) separating the liquid component of said suspension from the solid component of said suspension,and
 - (c) collecting the liquid component from step (b),wherein said raw liquid material is at least one member selected from the group consisting of poultry sarcoplasm, blood from poultry or other animals, raw poultry or animal meat extract, animal sarcoplasm, and combination thereof.
9. The process of claim 8, wherein said raw liquid material is a raw extract prepared by the process of claim 1.
10. The process of claim 8, wherein said separation in step (b) is through filtration using a 100-300 mesh sieve.
11. The process of any one of claims 1-10, wherein no extraneous enzyme is added in the process.
12. The process of claim 8, further comprising a step (d) of concentrating the liquid component obtained from step (c).
13. The process of claim 12, wherein the composition obtained from step (d) comprises at least 70% solids.
14. The process of claim 12, wherein the composition obtained from step (d) has less than 0.85 water activity.
15. The process of claim 8, further comprising a step (e) of adding an acidic agent to said liquid component obtained from step (c), wherein said acidic agent is selected from the group consisting of carbonated water, carbon dioxide gas, and combination thereof.

16. A composition prepared according to claim 7 or claim 12, wherein said composition is pumpable.
17. The composition of claim 16, wherein said composition comprises less than 2% hydroxyproline.
18. The composition of claim 16, wherein the total amount of both Guanosine-5'-Monophosphate and Inosine-5'-Monophosphate in said composition is at least 25% of the total nucleotides in said composition.
19. A process for making a composition, comprising:
- (a) incubating a raw liquid material at a temperature between about 50°C and 160°C for a period of at least 10 minutes to generate a suspension containing liquid and solid components,
 - (b) separating the liquid component of said suspension from the solid component of said suspension,
- and
- (c) collecting the solid component from step (b),
- wherein said raw liquid material is at least one member selected from the group consisting of poultry sarcoplasm, blood from poultry or other animals, raw poultry or animal meat extract, animal sarcoplasm, and combination thereof.
20. A composition prepared according to the process of claim 19, comprising less than 2% hydroxyproline.
21. A method of using the composition of claim 16, wherein said pumpable composition is packed in a container selected from the group consisting of a squeezable bottle, a squeezable tube, a pumpable bottle, a bulk container, a trailer tanker, and a railroad tanker.
22. The method of claim 21, wherein said container has a headspace, and wherein air in said headspace is replaced with a gas selected from the group consisting of nitrogen, carbon dioxide, inert gas, and combination thereof.

23. A method of using the composition of claim 20, wherein said composition is made into a snack.

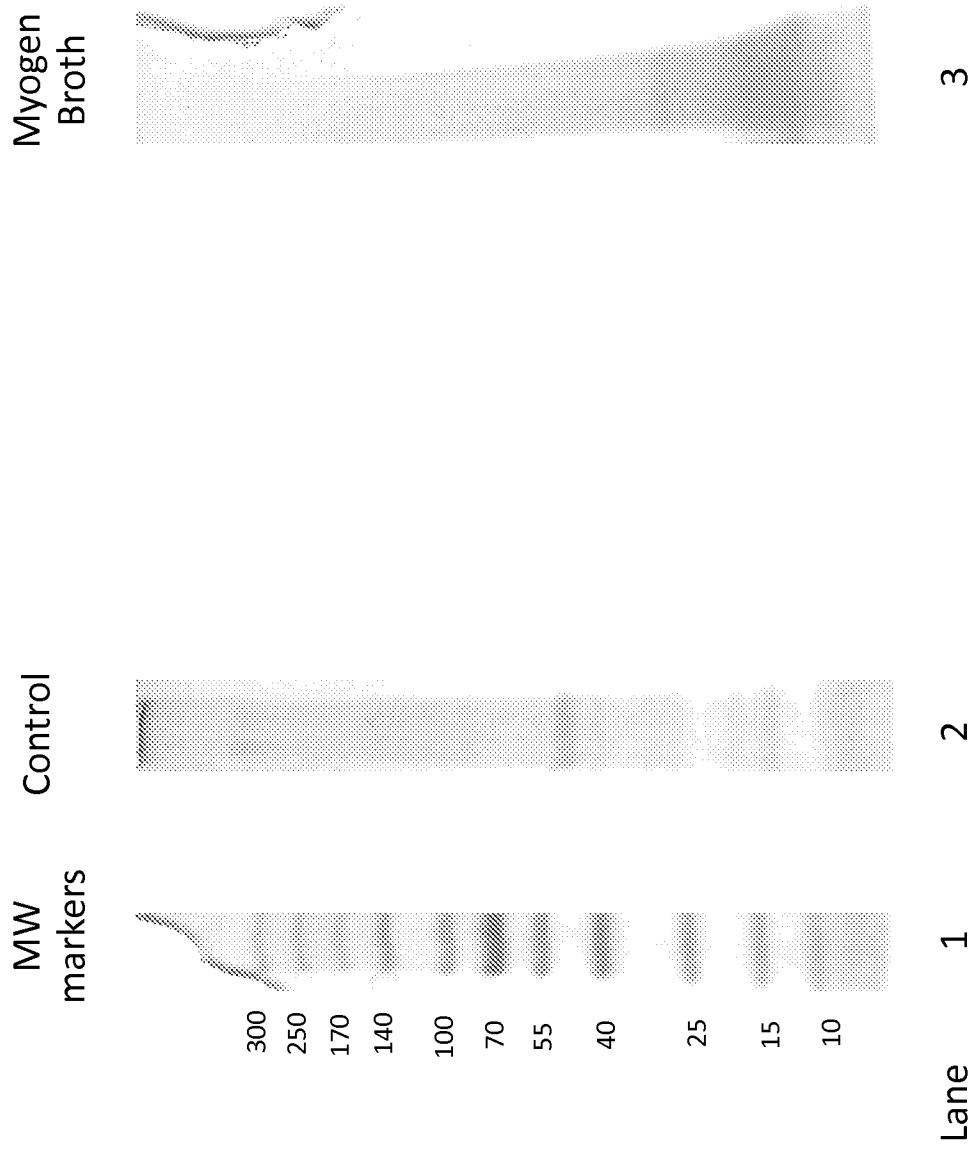


FIG. 1

A. CLASSIFICATION OF SUBJECT MATTER**A23L 1/39(2006.01)i, A23L 1/305(2006.01)i, A23L 1/311(2006.01)i, A23L 1/315(2006.01)i, A23J 1/02(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A23L 1/39; A23J 1/10; A23L 1/00; A23L 1/40; A23L 1/315; A23L 1/313; A61K 38/39; A23L 1/305; A23L 1/311; A23J 1/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: extract, broth, animal, temperature, suspension, solid, liquid, acidic agent

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	US 4176199 A (VOLLMER, ARTHUR N. et al.) 27 November 1979 See abstract; column 1, lines 51-63; column 5, lines 8-15; claim 1.	1,3-7,16,21-22 9,15 2,8,10,12-14,17-20 ,23
X Y A	US 4113884 A (KRASOVEC, BRANKO et al.) 12 September 1978 See abstract; column 2, lines 38-40; claim 1.	8,10,12-14,16,19 ,21-22 9,15 1-7,17-18,20,23
A	US 6780841 B2 (ISHAQ, SUHAIL) 24 August 2004 See abstract; claim 1.	1-10,12-23
A	EP 0180281 A2 (THE PROCTER & GAMBLE COMPANY) 7 May 1986 See abstract; claim 1.	1-10,12-23
A	US 5073394 A (DAKE, ROGER L. et al.) 17 December 1991 See abstract; claim 1.	1-10,12-23
A	JP 2002-045154 A (CHINESE RESTAURANT SYSTEM, K. K.) 12 February 2002 See abstract; claim 1.	1-10,12-23

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

30 November 2015 (30.11.2015)

Date of mailing of the international search report

30 November 2015 (30.11.2015)

Name and mailing address of the ISA/KR

International Application Division

Korean Intellectual Property Office

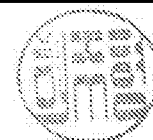
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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.: 11
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of any additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2015/049406

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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EP 0180281 A2	07/05/1986	EP 0180281 A3	25/01/1989
US 5073394 A	17/12/1991	None	
JP 2002-045154 A	12/02/2002	None	