



New connection on: : 30-10-2018 : 23:51:26 - Last disconnection on: : 30-10-2018 : 23:49:06

V 4.0.0.44358(LP,U,linux) (Rev:43856 2017-04-27 09:03:29 +0200#(D201802)) (RPM D201802)

Welcome to EPOQUE Rebuild under the Production Environment

[No database/cluster active] transparent and substrate

No database has been activated within this session yet.

- Use the command **..FI (CL)** in order to activate a database (cluster). *ERROR(-101007)*

[No database/cluster active] ..fi

Select a database: ..FI EPODOC

 Database: EPODOC

[EPODOC: SS 1] transparent and substrate and coat+

Results in EPODOC **21.092**

[SS 2] (protecti+ 2d layer)

Results in EPODOC **159.810**

[SS 3] deposit+

Results in EPODOC **752.314**

[SS 4] titanium 5d based

Results in EPODOC **8.017**

[SS 5] 1 and 2

Results in EPODOC **1.202**

[SS 6] 5 and 4

Results in EPODOC 6

[SS 7] ..li ss 6



[SS 7] 6 and pd<20141127

Results in EPODOC 1

[SS 8] ..li ss 7



[SS 8]

Disconnection from EPOQUE on: 31-10-2018 00:02:37 *DISCONNECT(1005)*

Session saved. *INFO(1006)*



New connection on: : 03-11-2018 : 00:45:48 - Last disconnection on: : 31-10-2018 : 20:30:19

V 4.0.0.44358(LP,U,linux) (Rev:43856 2017-04-27 09:03:29 +0200#(D201802)) (RPM D201802)

Welcome to EPOQUE Rebuild under the Production Environment

[No database/cluster active] ..fi

Select a database: ..FI EPODOC



Database: EPODOC

[EPODOC: SS 1] CONTAINER OR VESSEL OR RECIPIENT OR RECEIV+ OR PACK

Results in EPODOC 6.514.125

[SS 2] EDIBL+ OR COMESTIB+ OR EATAB+ OR PALATAB+ OR ESCULENT

Results in EPODOC **110.428**

[SS 3] (FAT OR GREAS+) AND (SUGAR OR GLUCOS+ OR SWEETEN+)

Results in EPODOC **21.916**

[SS 4] 1 and 2 and 3

Results in EPODOC **103**

[SS 5] HOLLO+ OR GAP OR HOL+ OR CAVIT+ OR VOI+ CONCAV+ OR PIT OR DIMPLE

Results in EPODOC **7.806.165**

EPODOC: No term found in index 'BI' for the truncation 'VOI+ CONCAV+'. *WARNING(401)*

[SS 6] 4 and 5

Results in EPODOC **3**

[SS 7] ..li ss 6



1/3 © EPODOC / EPO

PN - [AU2017261592](#) A1 20180215

PR - AU20170261592 20171116; AU20160202796 20160502; AU20110286161 20110803; AU20100904799 20101028; AU20100903463 20100803

AP - AU20170261592 20171116

DT - I

CCI - [A23L19/03](#) ; [A23L33/135](#) ; [A23L33/14](#)

CUI - [A23K40/00](#)

PA - JORROCKS PTY LTD

TI - Vacuum infusion for the inclusion of a food supplement into food products

AB - A method of vacuum infusion of a supplement in a porous food product comprising treating a porous food product having a majority of pore sizes of less than about 1000 pm in diameter with a supplement having a particle diameter size range less than the pore size range, wherein said supplement is present in a carrier, and said method is performed under suitable conditions and for a suitable time to achieve infusion of the supplement into the food product, the improvement comprising higher levels of supplement incorporation than with other pore size and particle diameter size ranges. WO 2012/016282 PCT/AU2011/000981 Title VACUUM INFUSION FOR THE INCLUSION OF A SUPPLEMENT INTO FOOD PRODUCTS 5 Field of the Invention The present invention relates to a method and composition for preparing dry pet food products including a specifically formulated dietary supplement. It is particularly related to products containing inactivated probiotics, probiotics, enzymes, Inactivated yeasts, botanical extracts and dairy components. Background Animal (and some human) feeds typically are supplied as pellets or pieces ("kibble"). The Pellets are typically formed from a

starch and/or protein containing base ingredient, e.g. wheat or corn, mixed with a variety of other ingredients. The starch or protein containing base ingredient has a functional as well as a nutritional role in the pellet. Its functional role is to bind all other ingredients together and to provide the textural and physical (most importantly the porosity) characteristics of the product. Binding of ingredients typically occurs because of the gelatinization of starch or the denaturation of protein. Both of these physical / chemical processes are usually carried out at elevated temperature and/or pressure. Those harsh conditions often result in the degradation of labile additives, such as probiotics and other dietary supplements. This problem has been overcome by the cold extrusion process disclosed in WO 2007/059588. However, the cold extrusion process can be time-consuming and often forms a "bottle-neck" in many processing plants. Thus, there is a need for an alternative process that will allow the incorporation of labile components into products prepared via other forms of the extrusion process without significant degradation of those components. WO 2012/016282 PCT/AU2011/000981 It is proposed that the installation of vacuum infusion technology as an adjunct to a standard dry pet food extrusion process will ensure that a heat-labile component may be delivered into the finished product with full functionality, whilst not causing any loss to the production capacity of the processing plant.

Liquid coatings are commonly added to the external surface of extruded products for a number of reasons including:

- 1) To improve product surface aesthetics (for example, the glossy coatings used on the surface of extruded rice snacks).
- 2) To improve product flavour (for example, the addition of flavourings greatly enhances the **palatability** of extruded pet food).
- 3) To increase the product energy density. (The addition of oils and fats to the product significantly increases the metabolizable energy of the product.)
- 4) To modify the product textural attributes. (The addition of a plasticizer, such as glycerol, to an extruded structure is one means of producing a "soft" texture.)
- 5) To allow the post-process addition of active ingredients or infusates. (Many of the most expensive functional ingredients, such as vitamins, minerals, pigments, etc are also temperature sensitive. Hence post-process addition can result in significant savings on formulation costs.)

The development of the vacuum infusion process is closely linked to the growth of the aquaculture industry. During the 1970's a number of the major feed manufacturers began to utilize extrusion cooking technology to replace the more traditional pellet milling processes. One of the major justifications for this change in processing technology was the deemed improvement in product quality and also the ability to produce feeds with an oil content in excess of 20 %. The initial processing was focused predominantly on single screw extruders (S.S.E.). Extensive research into the metabolism of various marine species (especially trout and salmon), during the early 1980's, showed that an increase in the Total **Fat** Content (up to at least 30 %) would be beneficial. It was difficult to add this amount of oil externally on the pellets. The incorporation of this level of **fat** into the formulation began to stretch the limits of the extrusion technology and this led to WO 2012/016282 PCT/AU2011/000981 the use of Twin Screw Extruders and also Specialty S.S.E. It was during this period that the Dinnissen Company (**Holland**) and BP. Nutrition (now known as Nutreco) began to collaboratively develop the vacuum infusion process for the addition of significant levels of **fat**, post-extrusion. The major benefit of this process was that significantly higher levels of oil could be incorporated into pellets produced via standard extrusion technology. In order to provide an understanding of how this technology works, we now describe the fundamental processes that are involved in the liquid coating of porous substrates. 10

The Atmospheric Coating Process The adsorption of liquid coatings during the atmospheric coating process is primarily controlled by the action of capillary forces. The magnitude of a capillary force is determined by the radius of the capillary, R_p , and by the liquid surface tension, σ . The magnitude of the suction pressure is given by the following simple expression - $P_c = 2 \cdot \sigma \cdot \cos \theta / R_p$ This behaviour is shown in Figure 1 for the absorption of vegetable oil ($\sigma = 0.073 \text{ N m}^{-1}$ at $T = 25^\circ \text{C}$). The data clearly indicates that the use of very fine capillaries would be beneficial. The resultant flow rate within these fine capillaries would, however, be very slow. 20 The Fanning Equation may be used to estimate the pressure drop associated with this flow - $P_f = 2 \cdot f \cdot [L / (2R_p)] \cdot \rho \cdot v^2$ The provision of larger pores would therefore ensure a more rapid uptake of the liquid coatings, due to the reduced pressure drop within the larger pores. The uptake of suspended infusates would also be promoted by the use of larger pores. 25 The subsequent leakage of liquids from the pellets (a common problem for high oil content products) would, however, also be promoted by the provision of larger pores, since the capillary force will not retain the liquid within the pore. One of the primary objectives during the manufacture of an expanded extruded product must therefore be to provide an optimal pore size distribution. The gross 30 means of monitoring this product attribute in the manufacturing environment is via the measurement of the product bulk density. WO 2012/016282 PCT/AU2011/000981 The measurement of bulk density alone is not enough, however. It is also necessary to give consideration to both the sectional expansion and longitudinal expansion. These parameters are shown schematically in Figure 2. These parameters are commonly monitored in an indirect manner in many applications 5 since $SEI = D_2 / d_2$ (common to measure the product diameter) and $LEI = f$ (piece length) (common to measure the cutter speed) Changes to the magnitude of either the sectional expansion index (S.E.I.) and / or the longitudinal expansion index (L.E.I.), even at a constant bulk density or Volumetric Expansion index ($V.E.I. = S.E.I. \times L.E.I.$) will result in significant 10 changes to the pore morphology (i.e. the size, number and shape of the pores). These changes to the pellet internal characteristics will have an effect upon the coating characteristics of the product via an atmospheric coating process. The magnitude of the SEI and the LEI are influenced by both the ingredient composition and via the process parameters used during the manufacture of the 15 product.

The Vacuum Infusion Process As a result of the limitations of both the atmospheric coating process (as outlined above) and the extrusion process (unable to handle large amounts of added oil), an alternative means of Increasing the oil content of the finished product needed 20 to be found. This scenario ultimately led to the development of the vacuum infusion process. The design of a typical vacuum infusion process is presented in Figure 3. The mechanism via which the process proceeds is shown schematically in Figure 4 and may be described via the following steps: 25 1) The required amount of product (typically pre-weighed in a weigh hopper) is charged into a vacuum **vessel**. The **vessel** is then sealed. 2) The **vessel** is then depressurized (a vacuum is drawn) to the required level (typically about 0.2 bar [abs.] or 80% Vacuum). This ensures that most of the air is removed, even from within the pores of the product. 30 3) The required amount of liquid coating (which may or may not contain a quantity of infusates) is then sprayed into the **vessel** via a series of nozzles, whilst WO 2012/016282 PCT/AU2011/000981 the bed of product is being blended via mixing paddles. This ensures that all of the product surfaces become wetted. 4) The vacuum is then slowly released. The Rate of Pressure Rise, ΔP , is one of the most important process control points. In order for optimal coating to 5 proceed, the external pressure must increase at a rate that is able to

cooking to a process, the external pressure must increase at a rate that is able to sustain the rate of flow of liquids into the pores. The rate of flow must also not exceed the rate of wetting of the pore inlets, 5) When the pressure within the **vessel** has returned to atmospheric pressure, the **vessel** contents may be discharged. 10 The above references to and descriptions of prior proposals or products are not intended to be, and are not to be construed as, statements or admissions of common general knowledge in the art. Preferred embodiments of the invention 15 In one aspect the present invention provides an improved method of vacuum infusion of a supplement into a porous food product comprising treating a porous food product having a majority pores of within a certain diameter size range with a supplement dispersed in a carrier wherein the supplement comprises particles the majority of which have a size range which is less than the pore size range, 20 wherein said method performed under suitable conditions and for a suitable time to achieve infusion of the supplement into the food product, the improvement comprising higher levels of supplement incorporation than with other supplement particle sizes. The term "a supplement" refers to specifically formulated dietary supplements, 25 particularly particulate supplements, such as products containing probiotics, inactivated probiotics, yeasts, inactivated yeasts, probiotics, enzymes, botanical extracts and/or dairy components. The probiotics may be selected from one or more of the following group used singly or in combination and used whole or in fractions of the whole bacterial 30 organism: *Bacillus coagulans*, *Bacillus licheniformis*, *Bacillus subtilis*, *Bitldobacterium* sp., *Enterococcus faecium*, *Lactobacillus acidophilus*, WO 2012/016282 PCT/AU2011/000981 *Lactobacillus casei*, *Lactobacillus fennentum*, *Lactobacillus johnsoni*, *Lactobacillus paracasei*, *Lactobacillus reuter*, *Lactobacillus ruminis*, *Lactobacillus ,hamnosus*, *Pediococcus acidifacticii*. The probiotics may be supplied in a live state, that is, capable of metabolizing 5 nutrients and proliferating. Probiotics may also be supplied in an inactivated state, that is, incapable of metabolizing nutrients and proliferating. Where probiotic bacteria are supplied in the inactivated state they still maintain an identifiably approximate physical formation or structure to that manifested in the live state. 10 The yeasts may include any of the strains of yeasts of the species *Saccharomyces cerevisiae* used singly or in combination, used whole or in fractions of the whole yeast organism. The yeasts may be supplied in an active state, that is, capable of metabolizing nutrients and proliferating. Yeasts may also be supplied in a 'inactivated' state, that is, incapable of metabolizing nutrients and 15 proliferating. Where yeasts are supplied in the inactivated state they still maintain the same physical formation or structure manifested in the live state. The prebiotics may include any of the following, singly or in combination: galacto oligosaccharide, lactulose, lactosucrose, fructo-oligosaccharide, raffinose, stachyose and malto- oligosaccharide. 20 The enzymes may include any of the following enzymes, singly or in combination: alpha-amylase, beta-amylase, cellulase, alpha-galactosidase, beta-glucanase, beta-**glucosidase**, glucoamylase, lactase, pectinase, xylanase, lipase and protease. The term "a porous food product" means a dry or semi-moist food product which 25 has pores or minute passages or interstices which make the product permeable to liquids. Typically this is this is dried pet food kibble or the like which has been produced by the direct expansion process after extrusion cooking or via the cold extrusion process. The porous food may comprise a variety of grains, legumes, pulses or vegetables 30 such as amaranth, quinoa, millet, bulgur, wild rice, cous cous, sooji, spelt, kamut, kasha, kaniwa, tapioca and the like. The term 'a majority pores of within a certain diameter

size range" means WO 2012/016282 PCT/AU2011/000981 substantially 80% of the pores in that size range. Generally the majority of pores in such a product are 200 to 1000pm in diameter. The term "dispersed in a carrier" means that the particles are kept in suspension via agitation, preferably in vegetable oil and/or tallow. 5 The term "particles the majority of which have a size range which is less than the pore size range" means that substantially 85% of the particles are less than the pore size range. Preferably, the particles are < 250 pm and the mass average particle size is about 210 pm. The term "performed under suitable conditions and for a suitable time to achieve 10 infusion" means that the method is carried out under the appropriate conditions and for the appropriate time to achieve infusion. These parameters include the maximum vacuum attained (prior to the slurry being coated onto the product), the wet mixing time (during which the slurry is absorbed into the product via capillary forces) and the vacuum release rate (VRR). The accurate control of the VRR 15 ensures that the slurry is driven into the pores. The term "higher levels of supplement incorporation" means the processing of infusate slurries containing greater than 20% w/w particulate. In another aspect, the invention provides an improved method of vacuum infusion of a supplement in a porous food product comprising treating a porous food 20 product having a majority of pore sizes of less than about 1000pm, preferably between about 250 to about 600 pm in diameter with a supplement having a particle diameter size range less than the pore size range, wherein said supplement is present in a carrier, and said method is performed under suitable conditions and for a suitable time to achieve infusion of the supplement into the 25 food product, the improvement comprising higher levels of supplement incorporation than with other pore size and particle diameter size ranges. In addition to the higher levels of supplement incorporation achieved with the method of the invention process times are greatly shortened. This means that the improved process of the invention allows the dried food to be produced at much 30 lower cost. The cold extrusion process results in a reduction of the average processing rate of the extruder by approximately 50%. The use of the vacuum infusion process allows for the extruder to be operated at its rated capacity. WO 2012/016282 PCT/AU2011/000981 The preferred dietary supplement for use in the invention is Y+. Y+ is a commercial product containing probiotics, inactivated probiotics, yeasts, inactivated yeasts, probiotics and enzymes. Preferably, the Y+ is incorporated into the finished product at a concentration of 5 1% w/w of the kibble. The dietary supplement is milled (using appropriate size reduction technology) to an average particle size less than 0.5mm or 500 pm. The milled supplement is then blended with beef tallow, poultry tallow, fish oil or vegetable oil to form a suspension (or slurry) containing not less than 10% w/w of 10 the supplement. The base product (consisting of one or more extrusion cooked kibble components) is added to the vacuum coater and agitated to ensure uniform mixing. An appropriate level of vacuum is drawn on the **vessel**. The suspension is then added to the coater, whilst continuing the agitation in order to ensure a 15 substantially uniform surface coating of the kibble. The vacuum is then slowly released in order to ensure the substantially uniform penetration of the supplement into the kibble. The optimal vacuum release rate can be determined experimentally. Details of preferred vacuum infusion coating requirements are given in Table 1 20 and the calculation of a prediction of the wettability of kibble pellets is shown in Table 2. Additional Considerations for Optimisation of Preferred Embodiments Ensure that pellets have a minimal moisture content ($m < 20\%$ w/w). Ensure that pellets are uniformly dried. Case hardened pellets will retard liquid 25 penetration due to the shrunken pores. Ensure that the pellet core

temperature is less than 50 °C. This will prevent pellet moisture from boiling during the vacuum process. Ensure that the vacuum release time is adequately slow. If liquids are drawn/driven into the capillaries more quickly than the surface wetting rate, voids will be formed within the pores. WO 2012/016282 PCT/AU2011/000981 It may be necessary to utilize a multi-stage process (drawing vacuum more than once) for some applications. Ensure that the liquid temperature (and hence the viscosity and surface tension) is optimal. 5 Providing an over-pressure on the liquid supply may augment the process performance. An external coat of solid **fat** may be used to seal up the pores after filling to ensure that leakage does not occur. The shelf life of the finished product can be extended by controlling the pH level of the pellets. Preferably, the pH should be less than 7 and it is particularly preferable for the pH to be about 6. The pellets may be prepared by using a liquid acid digest, typically obtained commercially from animal by-product renderers. Preferably, the liquid acid digest is neutralized (by a base, such as sodium hydroxide or potassium hydroxide) and then dried into a powder form. Detailed description of tests with a model system In order to gain a deeper insight into the fundamental mechanisms involved in this process a series of trials was completed using a model system. 20 The liquid used for the tests was vegetable oil (since it is liquid and has a low viscosity at room temperature). Jet milled **sugar** was incorporated in order to simulate the effect of an infusate addition. (The **sugar** concentration was varied from 6% to 32% w/w.) The density of the slurry was related linearly to the **sugar** concentration via $\rho_{\text{SLURRY}} = 0.915 + 0.004 \times \text{sugar}$ (g cm⁻³). (It was therefore possible to determine the amount of infused **sugar** and / or oil via changes in the slurry density.) The "pore size" was controlled by using woven filter cloths made of synthetic fibres. The apparatus is shown schematically in Figure 5. The vacuum used for all tests was initially set at 0.2 bar and the vacuum release rate was 0.1 bar per 10 seconds. WO 2012/016282 PCT/AU2011/000981 The testing method used for the investigation consisted of the following steps: The vials (4) for each test are pre-weighed (W_{Vi}). The filter mesh (of the required pore size) for each vial is pre-weighed (W_{Fi}) and then fitted to the vial. 5 The vacuum chamber is sealed and the pressure is reduced to P = 0.2 bar. A slurry is prepared, containing the required **sugar** concentration in vegetable oil. The valve is opened and the chamber is allowed to fill, such that the surface of the vial is covered by ~ 1cm of slurry. The vacuum is then released at a rate of 0.1 bar per 10 seconds, and the slurry is then drained from the chamber and the vials are removed for weighing. The following data is obtained: W_{Tf} = Final weight of the vial, filter and collected slurry W_{Ff} = Final weight of the filter and collected infusate W_{Vf} = Final weight of vial and collected slurry 15 V_f = Volume of collected slurry The total infused weight (oil and **sugar**) is determined from the average of the four individual results at each slurry concentration, via $W = W_{Vf} - (W_{Vi} + W_{Fi})$ The density of the collected slurry is given by $\rho_{\text{SLURRY}} = (W_{Vf} - W_{Vi}) / V_f$ The total infusate added is given by $M = \{ \rho_{\text{SLURRY}} - 0.915 \} V_f + 20 (W_{Ff} - W_{Fi})$ The results obtained from the tests are best presented in a graphical form as shown in Figure 6. The data clearly shows that both the pore size (most significant) and also the slurry concentration have an impact upon the total infused weight of the finished product. The result may be modeled via $W = f [R_p - 0.0005, c - 0.7, \exp(R_p)]$ (r² = 0.87). WO 2012/016282 PCT/AU2011/000981 Inspection of the slurry collected within the vials showed that two distinct layers existed. Initially the material passing through the cloth consisted of true slurry. As the test proceeded, however, the material became clearer. The cloths were acting as a filter and the coarser particles were being retained. This is given 5 further validation when one

considers the infusate weight alone. These data may be readily modeled via $M = f [Rp^3]$ ($r^2 = 0.96$). The data obtained from these experiments clearly shows that the provision of an optimal pore size distribution is indeed critical to the adequate operation of a vacuum infusion process. The data also indicates that the amount of infusate that may be added is independent of the slurry concentration. While the present invention has been described with reference to a few specific embodiments, the description is illustrative of the invention and is not to be construed as limiting the invention. Various modifications may occur to those skilled in the art without departing from the true spirit and scope of the invention as defined by the appended claims. "Comprises/comprising" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

WO 2012/016282 PCT/AU2011/000981 Vacuum infusion Coating Requirements Product Requirements Finished Product Required, F 1000.Q kg Additive Inclusion Level, [a] % w/w of Finished Product 1 1.D kg Slurry Coating Level, C.: .. 5 % w/w of Finished Product 75.0 kg Base Product Required, P 925.0 kg Brown Kibble 90.0 % 832.5 kg White Kibble . % 92.5 kg Coating Slurry Make up Oil, O 64.0 kg Supplement, S 11.0 kg 17.2% of Slurry Table 1 SUBSTITUTE SHEET (RULE 26)

RO/AU WO 2012/016282 PCT/AU2011/000981 Prediction of the Wettability of Pellets Washburn Equation $t = 8 * u * z^{21}$ (s R,) Fluid Viscosity, μ 0.06 Ns m² Fluid Surface Tension, σ 0.072 N m⁻¹ Pellet Diameter, d 0 mm 0.008 m Pore Length, z 4.0 mm 0.004 m Pore Radius, R_p . 50.0 micron 0.00005 m $t = 2.13$ s Modified Washburn Equation $t = hK^*a^*(1-E)*u^*z^2/[E*s^*Cosa]$ hK 005 2 3 a 4000 m m E 0.3 -0.2 < E < 0.5 $\cos a:1.;$, t 3.73 s Table 2 SUBSTITUTE SHEET (RULE 26) RO/AU WO 2012/016282 PCT/AU2011/000981 Mesgtof Pore 8bw a. Capillary Pressure 2m00 0 20 40 60 so 100 120 140 Pare ske (micron) Figure 1 - Effect of Pore Size on Capillary Suction Pressure -in- WO 2012/016282 PCT/AU2011/000981 Figure 2 - Product Expansion Characteristics ve v 1L10 Do SECTIONAL LONGITUDINAL EXPANSI EXPANSION EXPANSION INDEX INDEX INDEX $VEt = SEI.LEI SEI = (Do/Dd)^2 LEI = Ve/Vd VEI = (DENSITYI)^{-2/7}$ WO 2012/016282 PCT/AU2011/000981 Figure 3 - Typical Vacuum Infusion process equipment 5 SFINSS PRODUCT MICROCO PONENTS FLAVU RING/ -T'GEST151 VACUUM SYSTEM FINISHED PRODUCT SUBSTITUTE SHEET (RULE 26) RO/AU WO 2012/016282 PCT/AU2011/000981 Extruded/pelletized product. Under normal atmospheric conditions, the product is full of air. Depressurisation forces the air out of the product. The liquids are sprayed onto the product under vacuum conditions. Air pressure is allowed to return to normal, and the liquids and suspended active ingredients are sucked into the core of the product. 5

Figure 4 - The Vacuum Infusion Process SUBSTITUTE SHEET (RULE 26) RO/AU WO 2012/016282 PCT/AU2011/000981 to vacuum* wump raw Poper MOMi UM sad t Umh

Figure 5 - Design of the Experimental Test Rig for simulation of the Vacuum Infusion Process 517 - WO 2012/016282 PCT/AU2011/000981 Infused Weight of Oil plus Sucrose vs Pore Size as a function of Sucrose Concentration a. -g25 10 21 33 43 53 67 so 105 Pare She (micron) Figure 6 - Infused Weight of Oil plus **Sugar** vs. Pore Size as a function of **Sugar** 5 Concentration - 6/7 - WO 2012/016282 PCT/AU2011/000981 Infused Weight vs Pore Size 20 40 60 so 100 t 0 #6 2 es2 x ' 15 a a X19 Pore Size (micron) Figure 7 - Effect of Pore Size upon the Total Infusate Weight -7(7- WO 2012/016282 PCT/AU2011/000981 The claims defining the invention are as follows: 1. A method of vacuum infusion of a supplement in a porous food product 5 comprising treating a porous food product having a majority of pore sizes of less than about 1000pm, in diameter with a supplement having a particle diameter size range less

than the pore size range, wherein said supplement is present in a carrier, and said method is performed under suitable conditions and for a suitable time to achieve infusion of the supplement into the food product, the improvement 10 comprising higher levels of supplement incorporation than with other pore size and particle diameter size ranges 2. The method of claim 1 wherein the majority of pore sizes are between about 250 to about 600 pm in diameter. 3. A method of vacuum infusion of a supplement in a porous food product comprising treating a porous food product having a majority pores of within a certain diameter size range with a supplement dispersed in a carrier wherein the supplement comprises particles the majority of which have a size range which is 20 less than the pore diameter size range, said method performed under suitable conditions and for a suitable time to achieve infusion of the supplement into the food product, the improvement comprising higher levels of supplement incorporation than with other supplement particle sizes. 25 4. The method of claim 3 wherein the particle size is around 500pm. 5. The method of any one of claims 1 to 4 wherein the supplement comprises probiotics, inactivated probiotics, yeasts, inactivated yeasts, probiotics and/or enzymes. SUBSTITUTE SHEET (RULE 26) RO/AU WO 2012/016282 PCT/AU2011/000981 6. The method of claim 5 wherein the supplement is Y+. 7. A porous food product produced by the method of any one of claims 1 to 6. 5 8. The porous food product of claim 7 in which the supplement is incorporated at a concentration of at least 1.1% w/w of finished food product. SUBSTITUTE SHEET (RULE 26) ROIAU

2/3 © EPODOC / EPO

PN - [CN103704601](#) A 20140409

PR - CN20131677873 20131213

AP - CN20131677873 20131213

DT - I

CT - || STSE (A)

[CN1593194](#) A 20050316 [A] (ANHUI HUAIBEI TIANHONG GROUP I [CN])

[A] 1-2

* 全文 *;

[CN103202430](#) A 20130717 [Y] (ANHUI FENGBAO FOODSTUFF GROUP CO LTD)

[Y] 1-2

* 权利要求1-2 *;

[CN103005291](#) A 20130403 [A] (WU CAIPING)

[A] 1-2

* 全文 *;

[CN103250992](#) A 20130821 [Y] (LI YUESU)

[Y] 1-2

* 权利要求1 *;

[CN101658261](#) A 20100303 [A] (GUIYOU LIU)

[A] 1-2

* 全文 *

CNOI - [A23L7/109](#) ; [A23L11/00](#) ; [A23L31/00](#) ; [A23L33/10](#)

CNOL - A23V2002/00, A23V2200/30, A23V2200/08, ADD

CNOA - [A23V2002/00](#)

PA - TIAN SHIWEI

TI - **Edible** fungus noodle and preparation method thereof

AB - The invention discloses an **edible** fungus noodle, which is composed of the following raw materials in parts by weight: 80 to 90 parts of barley, 45 to 55 parts of vigna eylindrica, 25 to 35 parts of seed of Job's tears, 10 to 15 parts of pumpkin flower, 20 to 25 parts of bolete, 20 to 25 parts of pleurotus nebrodensis, 18 to 24 parts of pholiota nameko, 1 to 2 parts of white glorybower, 1 to 3 parts of hawthorn, 1 to 2 parts of viola inconspicua, 1 to 2 parts of **hollyhock** root, 1 to 2 parts of noodle additive, and a proper amount of water. The preparation method takes barley, vigna eylindrica, and seed of Job's tears as the main raw materials; wherein the barley has the functions of treating diabetes, removing heat toxin, tonifying qi and the middle, relieving the fatigue, strengthening the blood **vessel**, moistening the skin, and relieving the hunger; the vigna eylindrica contains following components: protein, **fat**, **sugar**, phosphor, calcium, iron, zinc, vitamin B1, vitamin B2, nicotinic acid, pantothenic acid, stigmasterol, phosphatide, cyanophoric glycoside, blood coagulation factor, and the like; the bolete has the functions of fortifying the spleen, removing the dampness, clearing the heat, relieving the temper, nourishing the blood, regulating the middle, expelling the wind and cold, relaxing the muscles, activating the blood, tonifying deficiency, and refreshing; and the pleurotus nebrodensis has the functions of removing food retention, killing parasites, relieving cough, modulating the human physiological balance, and strengthening the human immunity.

3/3 © EPODOC / EPO

PN - [JPH04144646](#) A 19920519

PNFP - JPH0797967B B2 19951025

PR - JP19900267408 19901003

AP - JP19900267408 19901003

DT - I

FI - A23G9/00&101; A23G9/02; A23G9/36; A23G9/38; A23G9/48; A23G9/50

FT - 4B014/GB22; 4B014/GE14; 4B014/GG07; 4B014/GG08; 4B014/GG12; 4B014/GG14; 4B014/GG16; 4B014/GP04; 4B014/GP13; 4B014/GP25; 4B014/GQ10; 4B014/GQ12; 4B014/GY03; 4B014/GY04

PA - (A)
NISSEI LTD

TI - (A)
SOFT ICE CREAM

AB - (A)
PURPOSE:To obtain a soft ice cream capable of easily filled in an **edible container** by compounding essential components of soft ice cream at specific ratios, cooling the mixture to obtain an air-containing formed emulsion and adjusting the consistency to a level extrudable at -8 deg.C to -20 deg.C. CONSTITUTION:A soft ice cream mix is prepared by compounding 50-75wt.% of water, 15-35wt.% of **sugar**, 0.3-1.3wt.% of ethanol, 3-7wt.% of protein and <=25wt.% of oil and **fat**. The compounded raw materials are homogeneously emulsified, sterilized and cooled below the cryohydric point under frothing to obtain the objective product. As necessary, the mixture is incorporated with other assistant components such as emulsifier, stabilizer, flavor

and colorant. Preferably a frozen mixture is filled in a compression-deformable small **vessel** having a discharging **hole**, the **vessel** is taken out of a freezer before eating and the content is squeezed into an **edible container**. A product having balanced sweetness and excellent chilling feeling can be prepared by this process.

[SS 71]