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(54) FOOD CONTAINERS AND PACKAGES
BEHÄLTER FÜR LEBENSMITTEL UND VERPACKUNGEN
RECIPIENTS POUR ALIMENTS ET EMBALLAGES

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Description

[0001] The present invention relates to a food container in the shape of a cup, tub or tray, the container being made of a coated packaging board which consists of a fiber board base and at least one polymer-based coat on the inner surface of the container, said coat forming a barrier to transmission of liquids and gases. Furthermore, the invention relates to food packages comprising such a container.

[0002] The board used for packaging liquid foods and other products sensitive to spoiling must, for the sake of the durability of the product, be impermeable to liquid and gas. Such packaging board prevents airborne oxygen from penetrating to the inside of the package and, consequently, the product from spoiling and, respectively, the aromas which evaporate from the product from escaping from the package. In board used for disposable containers, it is important to have a liquid-resistant coat which protects the board from wetting.

[0003] One known method for rendering product packaging impermeable to liquid and gas is to provide the board used for the packaging with a metal foil. However, the disadvantages of such packaging include high manufacturing costs, non-biodegradability of the foil layer, problems of regeneration of the packaging material, and the unsuitability of the packaging for heating in a microwave oven.

[0004] Because of the said problems associated with metal foil, a shift has been made in food packaging to increased use of boards in which the impermeability to liquid and gas has been achieved by means of one or more polymeric barrier layers. Among polymer materials, especially EVOH has excellent barrier properties but, for example, polyamide is also usable for the purpose. By combining various polymer materials, an impermeability substantially corresponding to that of aluminum foil has been achieved, but owing to the required successive barrier and bonding agent layers the board becomes complicated in structure and the consumption of polymer material is high.

[0005] The special problems of EVOH in packaging boards include its mechanical weakness and sensitivity to moisture. During the heat sealing of the board, the EVOH layer tends to be perforated by the steam escaping out of the board. In these respects polyamide is a material more durable than EVOH, but its barrier properties are not equal to those of EVOH. There are known packaging boards in which the solution to the problem has been sought through a suitable combining of EVOH and polyamide.

[0006] A common problem associated with on-line coating of boards with polymers continues to be the risk of sticking during the rolling subsequent to the drying of the coat. The sticking will damage the coat, which should specifically be unbroken and continuous in order to provide the desired impermeability to oxygen and water vapor. The large amount of polymeric material present in the coating layers also detract from the pulpability of the board during its recycling.

[0007] The publication WO-A-96/15321 describes a greaseproof and grease-resistant wrapping material, which comprises a paper coated with a layer containing pigment, such as kaolin, talc, calcium carbonate, titanium dioxide or aluminium silicate, and a binder. Such a wrapping paper is distinct from the shaped food containers and packages of the present invention, based on a packaging board with liquid and gas barrier properties.

[0008] US-A-5 635 279 published Jun. 3, 1997 shows boxes of corrugated board for shipment of frozen meat, fruit, vegetables, poultry or like foodstuffs. The corrugated board is composed of separate coated inner and outer linerboards and a corrugated intermediate fluting. The coat comprises a polymer matrix, a wax component and pigments, the pigment choices including talc as one of several alternatives. The coat is described as water-repellant, as opposed to complete water-blocking properties. The teaching thus falls short of the liquid barrier requirement of the containers and packages of the present invention.

[0009] US-A-3 790 402 describes a coated paper for use e.g. as the wrapping inside of breakfast cereal boxes. The coating material is a blend of aluminium silicate and a copolymer of vinylidene chloride. The material is said to have good gas and moisture vapour permeability, which are characteristics opposite to the goals of the present invention.

[0010] WO-A-96/22329 relates to a vapour barrier coating of a paper base for flexible packaging. The coat is composed of a polymer and an additive selected from hydrated aluminium silicate, calcium carbonate and polyvinyl acetate homopolymer, with an aim to improve repulpability of the coat. There is no disclosure of food containers in the shape of a cup, or food packages comprising such a shaped container and food contained therein.

[0011] The object of the present invention is to provide a food container made of a board provided with a polymer-based coat impermeable to liquids and gases, substantially avoiding the said disadvantages associated with known coated boards. The container according to the invention is characterized in that the coat is formed from a polymer dispersion applied on the board during the manufacturing process in a board machine, talc particles having been added to the polymer dispersion so that talc constitutes 30-80 % of the total weight of the dried coat.

[0012] Further objects of the invention are a frozen food package comprising a container as defined above and frozen food contained therein, as well as a food package comprising a container as defined above, wherein the container is closed and has processed food contained therein.

[0013] In a food container or package according to the invention, impermeability of the coated board to water, water vapor, oxygen and aromas can be achieved by means of suitable batching of talc, in addition to which the coat is impermeable to fats and oils. The barrier properties of the coat are based on the presence of a very pure talc made...
up substantially of small, flaky particles, typically less than 50 µm in size, while the polymer closing the gaps between
the talc particles forms a continuous phase which finally ensures the impermeability of the coat. It should be noted that
calling the coat polymer-based refers to the presence of the said continuous polymer phase and not to the polymer
necessarily constituting the largest ingredient proportion in the coat, a fact which can be observed even from the range
of the weight proportion of talc.

[0014] Besides the achievable barrier properties, the talc-containing coat of board also has many other advantages
over known coating materials. The talc-containing coat is not sensitive to moisture; it protects the board from wetting
so that the board retains its mechanical strength. The coating is thus especially suitable for disposable containers and
for packaging of liquid foodstuffs. The talc-containing coating compound is also suitable, without problems, for on-line
coating processes which are in use, and the coating does not have a tendency to stick when the completed board is
wound on a roll. The coating withstands heating, for which reason the coated board is suitable, for example, for baking
containers. The coating also improves the mechanical properties of the board by increasing its stiffness.

[0015] Furthermore, the talc-containing coating has good printing properties owing to the fact that its surface is not
hydrophobic. It is possible to carry out printing without a corona treatment, which is required by many other polymers,
such as polyethylene, used as coatings.

[0016] Since the presence of talc in the coating compound reduces the amount of polymeric coating material, the
coated board used for food containers according to the invention is better pulpable and thus easier to recycle than
known boards having corresponding barrier properties. For the same reason the use of talc is preferable in terms of
the compostability and biodegradability of the board.

[0017] A talc-containing coat is in itself transparent, which may be an advantage in some uses of the board. On the
other hand, the talc-containing coating compound can be easily colored by adding pigments to the polymer dispersion
forming the coat, applied onto the board.

[0018] The oxygen and water vapor barrier properties of a talc-containing coat depend on the basis weight of the
coat and the amount of talc therein. Generally speaking, the dry weight of an individual talc-containing coat on either
side of the board may vary within a range of 2-40 g/m². Preferably the weight of the coat is 5-40 g/m², by means of
which it is possible to achieve impermeability of the coat to water vapor, and most preferably within a range of 8-20 g/
m², in which case the coat can be made impermeable to oxygen, a so-called High Barrier coating with an oxygen
permeability below 100 cm³O₂/m²·d. The proportion of talc is 30-80 %, preferably 40-75 %, of the weight of the dried
coat.

[0019] Polymers suitable for the polymer basis of the coat include styrene butadiene, styrene acrylate, acrylic or
vinyl acetate polymers and copolymers, or blends of these. The polymer may be prepared by using a monomer blend
containing as its principal components vinyl acetate and a (methyl, ethyl, propyl or butyl) ester of acrylic acid and/or
methacrylic acid and/or lower alcohols, or by using a monomer blend containing as its principal components styrene
and a (methyl, ethyl, propyl or butyl) ester of acrylic acid and/or methacrylic acid and/or lower alcohols or by using a
monomer blend containing as its principal components a (methyl, ethyl, propyl or butyl) ester of acrylic acid and/or
methacrylic acid and/or lower alcohols and/or a copolymer of these. The said polymers form polymer latexes, i.e.
polymer dispersions, which can be combined with talc particles and be applied onto board as a coat in which dispersed
polymer particles join one another as a polymer phase which binds the talc particles together. Furthermore, polyaldehydes,
polyhydroxybutyrates/polyhydroxyvalerates, modified starches and other biopolymers which are compostable or en-
tirely biodegradable can be mentioned as usable polymers which are especially advantageous.

[0020] The colorability, already pointed out above, of a talc-containing coat is an especially advantageous property,
in particular in the packaging of foods which must be protected from the detrimental effect of ultraviolet light. The coat
of board intended for the food container or package may thus advantageously contain, in addition to talc, also some
coloring pigment in an amount of at maximum 5 % of the total coating layer. For example, soot, metal pigments, mineral
pigments and organic pigments can be used.

[0021] In addition to talc, the coat may contain some other mineral component which serves as a filler. Examples of
such components, the weight proportion of which is most preferably at maximum 30 %, include titanium dioxide, calcium
carbonate, kaolin and gypsum.

[0022] In a board to be used for the food packages and containers it may be preferable to incorporate into the coating
compound a hydrophobic agent, for example, a wax dispersion such as paraffin wax, PE wax or a AKD wax dispersion,
in an amount of at maximum 20 % of the total weight of the coat. A hydrophobic coat decreases the tendency of the
food to adhere to the board. Wax, and a mineral pigment used together with it, additionally reduce the sticking together
of the dried coats during rolling. A high wax content may, on the other hand, weaken the printing properties of the
surface.

[0023] The forming of a coat on a board is preferably carried out by applying a talc-containing dispersion onto the
board in two or more successive steps, the dispersion applied in the preceding step being dried before the subsequent
application step. By such a step-wise coating procedure a coat of a better quality is achieved than by applying the
entire amount of dispersion for the coat onto the board at one time.
[0024] Board intended for heat-sealable packaging can, in addition to a talc-containing coat according to the invention, be provided with one or more polymeric heat sealing layers adhering to the coat. There may thus be a talc-containing coat on one side of the board and a heat sealing layer sealable to the said coat on the opposite side of the board. Alternatively, both sides of the board may be provided with a heat sealing layer, in which case at least on one side of the board the heat sealing layer is applied on top of a talc-containing coat. Suitable materials for the heat sealing layer include LD-polyethylene and heat sealing lacquers.

[0025] Since the heat sealing layer, contrary to the talc-containing coat, may in order to be printable require a corona treatment, it may be advantageous to introduce the heat sealing polymer onto the board only in narrow streaks in the areas of the heat seals to be produced. Thus the said polymer will not complicate the printing of the areas between the seals. At the same time, savings of material are achieved and the structure of the board and the containers and packages made therefrom is rendered lighter.

[0026] A board used for the food containers and packages according to the invention, provided with a talc-containing polymer coat, is most preferably a multi-layer board comprising two or more fiber-based layers; its weight without the coats may be within a range of 130-500 g/m², preferably 170-350 g/m². One example is a three-layer board which comprises a thicker middle layer which is formed in part or entirely from a mechanical pulp, such as CTMP; on both sides of the middle layer there are thinner outer layers formed from a sulfate pulp. Onto the outer layers on both sides of the board there are introduced polymeric coats which, in accordance with the invention, include at least one talc-containing barrier layer. The said board in itself has a stiff and non-buckling structure, and the talc-containing coat on one or both sides of the board gives the board additional stiffness. The talc-containing barrier provides the further advantage that the ingredients of wood origin present in the mechanical pulp will not give detrimental odor or taste to the packaged product. If recycled paper pulp is used for making the board, the barrier layers correspondingly insulate the product from any impurities present in the board.

[0027] Of the food packages according to the present invention there must be mentioned, above all, food packages in which the talc-containing barrier layers of the board ensure the durability of the product. Products packaged in accordance with the invention are protected from airborne oxygen and from outside moisture, while the water, fat and aroma barrier properties of the coat preserve the quality of the product and prevent packaged products from damaging one another during storage. Examples of products to be packaged include moist or liquid foods, such as juices, water, milk and other milk products such as cream, buttermilk, yogurt and ice-cream.

[0028] The food containers can be used not only for industrial product packaging but may also constitute disposable tableware.

[0029] An especially advantageous area of application for products according to the invention consists of frozen-foods containers, in which an inside talc-containing coat prevents the product from sticking to the container. Examples of frozen products to be packaged include ready-made foods such as casseroles and ice-cream.

[0030] The invention is described below in greater detail with the help of examples, initially with reference to the accompanying drawings, wherein

Figure 1 depicts a frozen-foods container according to the invention, formed from a coated board,
Figure 2 depicts a cross-section of the edge of the container in an enlargement of Figure 1,
Figure 3 depicts schematically the layered structure of the board used in the container according to Figures 1 and 2,
Figure 4 depicts schematically a layer-structured board used for another embodiment of the invention,
Figure 5 depicts a disposable mug according to the invention, formed from a coated board,
Figure 6 depicts the layered structure of the board used in the mug according to Figure 5, and
Figure 7 depicts the structure of one further board usable for the invention.

[0031] The frozen-foods container 1 according to the invention, shown in Figures 1 and 2, suitable for example for packaging processed foods, is made of board 2 which is on the inside of the container coated with a polymer-based coat 3 which contains dispersed talc particles. The coat 3 serves as an oxygen and aroma barrier for the product in the closed container and at the same time protects the board 1 from moisture derived from the product.

[0032] The structure of the coated board used for the frozen-foods container 1 according to Figures 1 and 2 is shown in greater detail in Figure 3. The coat 3 is made up of a primer coat 4 of a talc-containing polymer dispersion, applied onto the board 2, and a top coat 5 of the same dispersion, on top thereof. These coats serve as a water, fat and oxygen barrier protecting the board 2. According to the example, the weight of each coat 4, 5 is 10 g/m². The three-layer board 2 under the coat is according to Figure 3 made up of a thicker middle layer 6 which is a blend of sulfate pulp and CTMP and of thinner outer layers 7 on both sides of the middle layer, the outer layers being of sulfate pulp. The proportion of the middle layer 6 is approx. 60 % and that of each outer layer 7 approx. 20 % of the weight of the board 2. The total weight of the board 2, without the coats, is, for example, approx. 225 g/m².

[0033] Figure 4 shows a coated board which differs from that shown in Figure 3 only in that the board 2 is provided on each side with a polymer-based coat 3 which contains talc particles, serving as a barrier. Each coat 3 is formed by
a two-step coating process in which first a primer coat 4 is formed and thereafter a top coat 5.

Figure 5 depicts a disposable drinking mug 8 according to the invention, and Figure 6 shows the layer-structured board used for making it. This embodiment of the board differs from that shown in Figure 4 in that on one side of the board there is topmost a heat sealing layer 9 of LDPE. The heat sealing layer 9 is applied onto the talc-containing coat 3 without a bonding agent layer between them. The talc-containing coats 3 may be made up of primer and top coats 4, 5 in a manner corresponding to Figures 3 and 4. In the mug 8 the board is oriented so that the inner surface 10 of the mug is formed by the LDPE layer 9 and the outer surface 11 is formed by the talc-containing coat 3 which constitutes a barrier. At the seal 12 the layers 3, 9 of the opposite sides of the board are heat sealed to each other.

The layer-structured board according to Figure 7 differs from that shown in Figure 6 in that the heat sealing polymer is applied onto one side of the board only as a streak 14 at the heat sealing point. Outside the heat sealing points 14 the board surface is made up of a talc-containing barrier 3. This option saves heat sealing polymer and improves the printability of the surface.

Instead of LDPE it is possible to use for heat sealing a lacquer which is applied onto the packaging blanks in connection with the printing in the printing press.

The invention is illustrated further with the following embodiment examples.

Example 1

Talc, either as a powder or granulated, was slurried in water according to the following formulation: 1585.6 g of water, 4.1 g of sodium polyacrylate and 16.2 g of sodium carboxymethyl cellulose were weighed into a dispersion vessel. High rotation speeds were used in the dispersion in order to break up talc agglomerates. Talc was added to the mixture gradually, in total 2700.0 g. Halfway through the adding of the talc, a further 4.1 g of sodium polyacrylate and 2.4 g of sodium hydroxide were added. The dispersing vessel was equipped with a cooling mantle, and the cooling of the slurry was started at 20 min from the ending of the talc adding step. Thereafter the dispersing was continued for another 20 min. The product obtained was a talc slurry having a solids content of 63.0 % and a viscosity of 200 mPas, measured by using a Brookfield LVT viscometer with measuring head No. 3, at a rotation speed of 100 r/min. The final coating compound was obtained by mixing the talc slurry with a polymer latex.

Example 2

Talc, either as a powder or granulated, was slurried in a polymer latex, according to the following formulation: 181.1 g of water, 1700.0 g of a polymer latex based on styrene butadiene (solids content 50 %, second order transition temperature +20 °C), 3.4 g of sodium hydroxide and 1.7 g of organomodified siloxane were weighed into a dispersion vessel. High rotation speeds were used in the dispersing in order to break up any talc agglomerates. Talc was added to the mixture gradually, in total 1700.0 g. The dispersion vessel was equipped with a cooling mantle, and the cooling of the slurry was started at 20 min from the ending of the talc adding step. Thereafter the dispersing was continued for another 20 min. The product obtained was a coating compound having a solids content of 68.0 % and a viscosity of 1150 mPas, measured by using a Brookfield LVT viscometer with measuring head No. 4, at a rotation speed of 100 r/min.

The following examples describe the effect of completed coating compounds prepared by the technique according to Examples 1 and 2, applied onto board, on the properties of the board. The permeability measurements in the examples were made, unless otherwise stated, in the following conditions: air temperature 23 °C and relative humidity 50 %. The unit for water permeability was g/m², for water vapor permeability g/m²·d, and for oxygen permeability cm³/m²·d.

Example 3

A styrene-butadiene-based coating compound which contained different amounts of talc was applied by means of a laboratory coating machine onto a board, from which water vapor transmission rates (WVTR) were measured. The transmission rates of the coatings are shown in Table 1.
Example 4

[0042] Value PA in Table 2 shows the pulpability properties of board treated with a coating compound which contained a talc-containing polymer latex based on styrene butadiene. The value was determined as follows: the treated board was disintegrated according to the method SCAN-C 18:65. Laboratory sheets were prepared from the stock. The quality of the sheet was assessed on a scale of 0-5, where 0 stands for good pulpability (no accumulations due to the coating compound are observed) and 5 stands for poor quality (a great deal of accumulations of the coating compound or unevenness due to poor disintegration of the pulp).

Table 2

<table>
<thead>
<tr>
<th>Proportion of talc in coating compound (%)</th>
<th>0</th>
<th>20</th>
<th>40</th>
<th>60</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Example 5

[0043] This example illustrates differences in the permeability properties of the coating when the same coating compound, which contains a polymer latex based on styrene butadiene and has a talc content of approx. 50 %, is applied onto board either once or twice so that the final thickness of the dry coat in each case is the same, approx. 14 µm. Table 3 shows the effect of the two different application concepts on both the water transmission and the water vapor transmission of the coat.

Table 3

<table>
<thead>
<tr>
<th>Number of coatings</th>
<th>1 coating</th>
<th>2 coatings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobb600 (g/m²)</td>
<td>1.2</td>
<td>0.6</td>
</tr>
<tr>
<td>WVTR (g/m²·d)</td>
<td>9.8</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Example 6

[0044] Onto a 285 g/m² board there was first applied a coating compound with a composition of a talc-containing polymer latex based on styrene butadiene 50 % and a polymer latex based on polyvinyl acetate/acrylate 50 %. On top of the first coat there was applied a second coat which contained a talc-containing polymer latex based on styrene butadiene, calcium carbonate and wax. The amounts of coating compound in both coats were approx. 10 g/m² solids. Table 4 shows the water transmission and water vapor transmission properties given to the coat by the combination of the said coating compounds.
Example 7

[0045] Onto a 285 g/m² board there was applied a coating compound having a composition of talc 50 % and, in varying proportions, a polymer latex based on styrene butadiene and a polymer latex (second order transition temperature +60 °C) based on butyl acrylate. The amount of coating compound was approx. 12 g/m² solids. Table 5 shows the water permeability properties given to the coat by the said combination of coating compounds.

Table 5

<table>
<thead>
<tr>
<th>Proportion of styrene butadiene in the polymer latex, %</th>
<th>0</th>
<th>10</th>
<th>20</th>
<th>40</th>
<th>60</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobb600 (g/m²)</td>
<td>2.1</td>
<td>1.5</td>
<td>2.6</td>
<td>2.7</td>
<td>5.0</td>
<td>10.3</td>
<td>20.1</td>
<td>32.6</td>
</tr>
</tbody>
</table>

Example 8

[0046] A coating compound which contained talc approx. 65 % and a polymer approx. 35 % was used for coating board at a speed of 450 m/min in a board machine. The coating was carried out both as a single coating and as a double coating. The transmissions of water, water vapor, fat, and oxygen were measured from the samples obtained. The fat resistance test was carried out according to the ASTM standard. The results obtained are compiled in Table 6.

Table 6

<table>
<thead>
<tr>
<th>Amount of coating compound (g/m²)</th>
<th>Cobb 900</th>
<th>WVTR</th>
<th>O2TR</th>
<th>Oil resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>30</td>
<td>41</td>
<td></td>
<td>no transmission</td>
</tr>
<tr>
<td>15</td>
<td>8</td>
<td>11</td>
<td>50-100</td>
<td>no transmission</td>
</tr>
</tbody>
</table>

Example 9

[0047] A coating compound which contained talc approx. 65 % and a polymer approx. 35 % was used for pilot coatings from which transmission rates were measured. Board was coated both on one side and on both sides. The results are in Table 7. The water vapor measurement conditions were: temperature 28 °C and relative humidity RH 50 %.

Table 7

<table>
<thead>
<tr>
<th>Board grade</th>
<th>(Amounts of coating (g/m²) on top side/back side</th>
<th>Cobb 600</th>
<th>WVTR</th>
<th>Pinholes</th>
<th>Fat resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking cup board</td>
<td>0/26</td>
<td>&lt;1</td>
<td>7.5</td>
<td>none</td>
<td>&gt; 1 d</td>
</tr>
<tr>
<td>CTMP-containing</td>
<td>0/20</td>
<td>2</td>
<td>16.5</td>
<td>none</td>
<td>&gt; 1 d</td>
</tr>
<tr>
<td>Other solid board</td>
<td>9/36</td>
<td>&lt;1</td>
<td>11</td>
<td>none</td>
<td>&gt; 1 d</td>
</tr>
</tbody>
</table>

Example 10

[0048] The pulpability and stickiness of a dispersion coating compound which contained talc approx. 65 % and a polymer approx. 35 % were studied in a pilot paper machine pulper and with wet end recycling. The amounts of coating were within a range of 20-40 g/m², and the boards used were boards according to Example 9. The pulping temperature was 40-60 °C and the pulping time was 1-3 hours. The pulp thus obtained was run through the pilot paper machine for a total of 15 hours during three days while minimizing the water consumption of the paper machine. According to the results the pulping was very successful and no sticky substances accumulated on the wire during the entire time. The analysis of the tail water yielded results corresponding to normal waste pulp.
Example 11

[0049] A coating compound containing talc approx. 12 g/m², the proportion of talc being approx. 35 % and the proportion of polymer approx. 65 %, was applied onto the surface of board by means of a pilot coating machine. This coat was heat sealed against itself, against a fiber material and against PE. Table 8 shows the sealing results, 0 standing for a poor seal and 5 a perfect seal.

<table>
<thead>
<tr>
<th>Sealing temperature °C</th>
<th>80</th>
<th>100</th>
<th>120</th>
<th>140</th>
<th>160</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coating-Coating</td>
<td>0</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coating-fiber</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coating-PE</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example 12

[0050] A coating which contained talc approx. 65 % and a polymer approx. 35 % was used for coating a three-layer board (Enso Natura L 240 g/m²) both on one side and both sides of the board. In the middle layer of the board, CTMP was used in addition to chemical pulp. The reference samples were an uncoated board and boards pigment-coated on one side and on both sides. The estimated amount of coating compound in each coat was approx. 10 g/m².

[0051] The board was subjected to a Cobb test (5 min), whereafter the stiffness was measured from the samples wetted in the Cobb test. According to the results, the stiffness of a board coated with a coating compound of the type of Example 2 was approx. 90 % of the original stiffness, whereas the stiffness of the pigment-coated board and the uncoated board was only 25 % of the original stiffness.

[0052] The results of the measurements are shown in Table 9.

<table>
<thead>
<tr>
<th>Board</th>
<th>Cobb 5 min (g/m²)</th>
<th>Bending resistance (mN) before</th>
<th>after</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board</td>
<td>40</td>
<td>211</td>
<td>75</td>
</tr>
<tr>
<td>Board + pigment</td>
<td>54.5</td>
<td>227</td>
<td>60</td>
</tr>
<tr>
<td>Board + pigment on both sides</td>
<td>57.6</td>
<td>250</td>
<td>61</td>
</tr>
<tr>
<td>Board + coating of Example 2</td>
<td>3.3</td>
<td>212</td>
<td>181</td>
</tr>
<tr>
<td>Board + coating of Example 2 on both sides</td>
<td>2.5</td>
<td>224</td>
<td>214</td>
</tr>
</tbody>
</table>

Example 13

[0053] 35 g of oxidized starch Raisamyl 302P was slurried in 150 g of water and was transferred to a pressure-resistant reactor vessel. The temperature of the mixture was raised to 100 °C and was kept at that for 20 min to dissolve the starch grains. Thereafter the mixture was cooled to 70 °C, and a solution which contained 2.5 g of sodium lauryl sulfate in 50 ml of water was added to it. To this mixture there was added gradually in the course of two hours from a pressure burette a monomer blend which contained 117 g of styrene and 74 g of butadiene washed with a lye solution, as well as 3 g of acrylic acid. From another pressure burette, an initiator solution was added which contained 3 g of ammonium persulfate in 70 g of water. The polymer reaction was allowed to continue for 12 hours. The product obtained was a white dispersion having a solids content of 46 % and a viscosity of approx. 900 mPas, measured by using a Brookfield LVT viscometer with measuring head No. 2, at a rotation speed of 100 r/min. The measurements were carried out after the product had been neutralized with NaOH to a pH of 7. The calculated starch content of the product was approx. 13 %.

[0054] 95.2 g of a talc slurry according to Example 1 was mixed with 304.3 g of a polymer dispersion according to the above method. The talc slurry was added to the polymer dispersion gradually for 10 min by using relatively high rotation speeds. 4 g of an organomodified polysiloxane was added to the 399.5 g of coating compound obtained. The solids content of the final coating compound was approx. 50 %. The obtained polymer-dispersion-based coating compound was applied by means of a laboratory coating machine once onto a 265 g/m² board and was dried by using an IR drier to a final moisture content of 6 %. The dry weight of the coat was approx. 12 g/m². The water vapor transmission
rate (WVTR) was measured from the dispersion-coated board at a temperature of 23 °C and a relative air humidity of 50 %. The water vapor transmission rate obtained by a gravimetric method was approx. 32 g/m², 24 h.

Claims

1. A food container in the shape of a cup, tub or tray, the container being made of a coated packaging board which consists of a fiber board base and at least one polymer-based coat on the inner surface of the container, said coat forming a barrier to transmission of liquids and gases, wherein the coat is formed from a polymer dispersion applied on the board during the manufacturing process in a board machine, talc particles having been added to the polymer dispersion so that talc constitutes 30 - 80 % of the total weight of the dried coat.

2. A food container according to claim 1, characterized in that the fiber board base has a weight of 170 - 500 g/m².

3. A food container according to Claim 1 or 2, characterized in that the weight of the talc-containing coat on the board is 2-40 g/m², preferably 5-40 g/m², and most preferably 8-20 g/m².

4. A food container according to any one of the above claims, characterized in that the polymer contained in the coating is a styrene butadiene, styrene acrylate, acrylate or vinyl acetate polymer or copolymer.

5. A food container according to any one of claims 1-3, characterized in that the polymer contained in the coating is biodegradable.

6. A food container according to any one of the above claims, characterized in that the coat contains, in addition to talc, at least one other mineral or pigment in an amount of at maximum 30 % of the total weight of the coat.

7. A food container according to any one of the above claims, characterized in that the coat has been produced by applying a talc-containing dispersion onto the same side of the board in two or more successive steps, the dispersion applied in a preceding step being dried before the subsequent application step.

8. A food container according to any one of the above claims, characterized in that the board is provided on both sides with a talc-containing coat.

9. A food container according to any one of the above claims, characterized in that the board is a multi-layer board comprising two or more fiber-based layers.

10. A food container according to Claim 9, characterized in that the fiber layers of the board comprise a thicker middle layer which is formed in part or entirely from mechanical pulp, such as CTMP or recycled pulp, and thinner outer layers formed from sulfate pulp on both sides of the middle layer.

11. A food container according to any one of the above claims, characterized in that the container is a heat-sealed container made of a board having a talc-containing coat on one side and a polymer on the opposite side, said polymer being sealed together with said coat at the heat seal.

12. A food container according to claim 11, characterized in that it is a disposable drinking mug.

13. A food package, characterized in that it is a frozen food package comprising a container according to any one of claims 1 - 11 and frozen food contained therein.

14. A food package, characterized in that it comprises a container according to any one of claims 1 - 10, said container being closed and having processed food contained therein.

Patentansprüche

1. Behälter für Lebensmittel in Form eines Bechers, eines Fasses oder einer Schale, wobei der Behälter aus einem beschichteten Verpackungskarton hergestellt ist, welcher aus einer Faserkartonbasis und zumindest einer polymerisierten Beschichtung auf der Innenseite des Behälters besteht und die Beschichtung eine Barriere für den
Durchtritt von Flüssigkeiten und Gasen bildet, wobei die Beschichtung aus einer Polymerdispersion gebildet ist, welche während des Herstellungsprozesses in einer Kartonmaschine auf den Karton aufgebracht wird und Talcumpartikel zu der Polymerdispersion hinzugefügt worden sind, so daß Talkum 30 - 80% des Gesamtgewichthes der getrockneten Beschichtung bildet.

2. Behälter für Lebensmittel nach Anspruch 1, dadurch gekennzeichnet, daß die Faserkartonbasis ein Gewicht von 170 - 500 g/m² aufweist.

3. Behälter für Lebensmittel nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Gewicht der Talkum enthaltenden Beschichtung auf dem Karton 2 - 40 g/m², vorzugsweise 5 - 40 g/m² und am bevorzugtesten 8 - 20 g/m² beträgt.


5. Behälter für Lebensmittel nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß das in der Beschichtung enthaltene Polymer biodegradabel ist.


7. Behälter für Lebensmittel nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Beschichtung durch Aufbringen einer Talkum enthaltenden Dispersion in zwei oder mehr aufeinanderfolgenden Schritten auf die gleiche Seite des Kartons hergestellt worden ist, wobei die in einem vorhergehenden Schritt aufgebrachte Dispersion vor dem nachfolgenden Aufbringungsschritt getrocknet wurde.


10. Behälter für Lebensmittel nach Anspruch 9, dadurch gekennzeichnet, daß die Faserschichten des Kartons eine dickere mittlere Schicht, die teilweise oder vollständig aus mechanischer Pulpe wie CTMP oder recycelter Pulpe gebildet ist, und dünnere äußere Schichten, gebildet aus Sulfatpulpe auf beiden Seiten der mittleren Schicht, umfassen.

11. Behälter für Lebensmittel nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Behälter ein heißgesiegelter Behälter, hergestellt aus einem Karton mit einer Talkum enthaltenden Beschichtung auf einer Seite und einem Polymer auf der gegenüberliegenden Seite ist und das Polymer mit der Beschichtung an der Heißsiegelung verbunden ist.


13. Lebensmittelpackung, dadurch gekennzeichnet, daß sie eine gefrorene Lebensmittelpackung enthaltend einen Behälter gemäß einem der Ansprüche 1 bis 11 und darin enthaltenes gefrorenes Lebensmittel ist.

14. Lebensmittelpackung, dadurch gekennzeichnet, daß sie einen Behälter gemäß einem der Ansprüche 1 bis 10 enthält und der Behälter geschlossen ist und darin enthaltenes verarbeitetes Lebensmittel aufweist.

Revendications

1. Conteneur alimentaire ayant la forme d’une tasse, d’un pot ou d’un plateau, le conteneur étant réalisé en carton d’emballage enduit qui consiste en une base en carton à fibres et au moins un revêtement à base de polymère sur la surface intérieure du conteneur, ledit revêtement formant une barrière à la transmission de liquides et de...
gaz, dans lequel le revêtement est formé par une dispersion de polymère appliquée au carton pendant l'opération de fabrication dans une machine à carton, des particules de talc ayant été ajoutées à la dispersion de polymère de façon que le talc constitue 30 à 80 % du poids total du revêtement séché.

2. Conteneur alimentaire selon la revendication 1, caractérisé en ce que la base en carton à fibres a un poids de 170 - 500 g/m².

3. Conteneur alimentaire selon la revendication 1 ou 2, caractérisé en ce que le poids du revêtement contenant du talc sur le carton est de 2 - 40 g/m², de préférence de 5 - 40 g/m² et plus préférentiellement de 8 - 20 g/m².

4. Conteneur alimentaire selon l'une quelconque des revendications précédentes, caractérisé en ce que le polymère contenu dans le revêtement est un polymère ou un copolymère de butadiène/styrène, d'acrylate styrolénique, d'acrylate ou d'acétate de vinyle.

5. Conteneur alimentaire selon l'une quelconque des revendications 1 à 3, caractérisé en ce que le polymère contenu dans le revêtement est biodégradable.

6. Conteneur alimentaire selon l'une quelconque des revendications précédentes, caractérisé en ce que le revêtement contient, en plus du talc, au moins un autre minéral ou pigment en une quantité d'au maximum 30 % du poids total du revêtement.

7. Conteneur alimentaire selon l'une quelconque des revendications précédentes, caractérisé en ce que le revêtement a été produit en appliquant une dispersion contenant du talc sur le même côté du carton en deux étapes successives ou plus, la dispersion appliquée au cours d'une étape précédente étant séchée avant l'étape d'application suivante.

8. Conteneur alimentaire selon l'une quelconque des revendications précédentes, caractérisé en ce que le carton est pourvu des deux cotés d'un revêtement contenant du talc.

9. Conteneur alimentaire selon l'une quelconque des revendications précédentes, caractérisé en ce que le carton est un carton multicouche comprenant deux couches à base de fibres ou plus.

10. Conteneur alimentaire selon la revendication 9, caractérisé en ce que les couches de fibres du carton comprennent une couche centrale plus épaisse qui est constituée en partie ou totalement de pâte mécanique, telle que de la pâte chimico-thermomécanique ou de la pâte recyclée, et des couches extérieures plus minces constituées de pâte au sulfate des deux cotés de la couche centrale.

11. Conteneur alimentaire selon l'une quelconque des revendications précédentes, caractérisé en ce que le conteneur est un conteneur thermosoudé réalisé en un carton comportant un revêtement contenant du talc sur un côté et un polymère sur le côté opposé, ledit polymère étant soude audit revêtement au niveau de la soudure à chaud.

12. Conteneur alimentaire selon la revendication 11, caractérisé en ce qu'il s'agit d'une chope pour boire jetable.

13. Conditionnement alimentaire, caractérisé en ce qu'il s'agit d'un conditionnement de nourriture congelée comprenant un conteneur selon l'une quelconque des revendications 1 à 11 et un aliment congelé à l'intérieur de celui-ci.

14. Conditionnement alimentaire, caractérisé en ce qu'il comprend un conteneur selon l'une quelconque des revendications 1 à 10, ledit conteneur étant fermé et contenant de la nourriture traitée à l'intérieur de celui-ci.
Fig 6.

Fig 7.