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Dyeing process for textile materials

Description

5 The present invention relates to a method for dyeing textile materials.

In known dyeing systems, among other things, salt is added to the drum of a washing machine and after about 5 minutes a dyeing agent is added to a rinsing compartment of the washing machine. The delayed addition of the dyeing agent is intended to ensure that it reaches a washing machine drum
10 filled with water and does not act on the textile material in a way that is too concentrated at individual points.

The consequence of such dyeing systems is that the dyeing agent in the rinsing compartment may remain there even during a recommended final wash cycle, which is disadvantageous for subsequent
15 wash cycles because the dyeing agent may have an unwanted effect on their laundry. Furthermore, the delayed addition of the dye into the rinsing compartment does not provide an automated process, as manual intervention is unavoidable after about 5 minutes. A possible consequence is that the dye is added incorrectly in terms of time and the subsequent dyeing result becomes unacceptable. It is also possible to accidentally forget to add the dyeing agent.

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In order to prevent the dye from remaining in the rinsing compartment, in other known dyeing systems the salt is added to the washing machine drum together with the dyeing agent. If the dyeing agent is released prematurely from a container into the washing machine drum, it may happen that the salt is not yet sufficiently distributed in the washing machine drum and the dyeing agent reacts
25 with the water in the drum and not with the fibre of the textile material. A so-called dye hydrolysate that results from this reaction is worthless in terms of dyeing technology, as it does not contribute to the dyeing process. Hydrolysate is the product of hydrolysis, which is the splitting of a chemical compound by reaction with water. Furthermore, more and more washing machines have a so-called jet system, which allows water to trickle evenly through nozzles into the washing machine drum and
30 reduces the water consumption of the washing machine. The dyeing agent, which is added to the washing machine drum at the same time as the salt, may then be too concentrated compared to the amount of water in the drum, causing cloud-like discolouration or dye stains on the textile materials, especially with light-coloured dyes.

35 Document DE 601 23 120 T2 describes a dispenser for laundry washing products, in particular fabric softening products, but not for dyeing textiles, and for use in a laundry dryer, wherein the dispenser

is designed in the form of a hollow ball with many product dispensing openings. The ball also has a product entry opening in which a measuring cup is mounted in fluid communication with the product entry opening.

- 5 DE 694 11 707 T2 discloses a dosing and dispensing device consisting of a hollow body for dispensing a liquid detergent for pre-treating and washing fabrics in a washing machine, wherein the detergent emerges through a so-called passage opening and an orifice, wherein a ball is rotatably mounted between the latter. This device is not suitable for dyeing textiles.
- 10 In DE 100 03 429 A1, a detergent or cleaning agent portion, which may be packaged in a bag or pouch, is proposed for feeding a washing machine or dishwasher, the portion containing a first and a second measured quantity of a washing or cleaning-active preparation for two washing or rinsing cycles which are carried out at staggered times. Dyeing of textiles cannot be carried out with this.
- 15 A pouch for packaging a finely powdered dyeing agent can be taken from DE 295 00 168.2 U1, which has a water-insoluble but water-permeable substrate and a water-sensitive seal, so that the contents of the pouch are released by contact of the pouch with water and under mechanical movement.
- DE 100 33 827 A1 concerns dimensionally stable hollow bodies that contain a washing, cleaning or
20 rinsing agent portion and disintegrate under washing, cleaning or rinsing conditions. Dyeing of textiles cannot be carried out with these either.
- A water-soluble detergent product in the form of a water-soluble sachet comprising at least two compartments, each compartment containing a different ingredient of a composition, wherein the
25 first ingredient comprises a liquid matrix and a peracid source, is described in DE 600 35 902 T2. Dyeing of textiles cannot be performed with this.
- EP 0 236 136 A2 discloses a product for delivering active treatment agents into the washing liquid of an automatic washing or dishwashing machine, comprising a pouch having at least two chambers
30 comprising: (i) a first chamber of water-insoluble material containing a first treatment agent, the first chamber having at least one opening seal and/or being formed of porous, water-permeable material and being capable of releasing the first treatment agent into the wash liquid of an automatic washing or dishwashing machine within a period of 3 minutes after the start of the wash cycle; and (ii) a second, unopened compartment containing a second, water-soluble or water-dispersible treatment
35 agent in particulate form, the second compartment being formed at least in part of porous, water-permeable material through which the second treatment agent can be released by the wash liquid,

the second compartment being provided with means for delaying release by at least 5 minutes from the start of the washing cycle and/or for delaying release, the delaying and/or delaying means comprising

(a) a substantially completely pore-sealing outer coating or layer which can be interrupted by the washing liquid, and/or

(b) the enclosure of the second chamber within another pouch compartment made of porous, water-permeable material.

The method disclosed from US 5,030,242 A for producing a random colouring of the fabric, the

method comprising the steps of: a) contacting the fabric with porous first elements containing a first solution in the pore spaces of the first elements to deposit the first solution on the fabric at the contact areas; and b) further contacting the fabric with porous second elements containing a second solution in the pore spaces of the second elements to deposit the second solution on the fabric at the contact areas, wherein one of the first and second solutions includes a dyeing solution and the other includes a colour fixing solution, thereby fixing a random dye pattern in the fabric.

EP 0 768 421 A1 relates to a method for the continuous dyeing of yarns made of cellulose fibres with reactive dyes and to an apparatus for carrying out this method. The method is characterised in that it fundamentally comprises the following steps: impregnation of the yarn carried by one or more carriers with reactive dyes in a method for continuously dyeing yarns of cellulosic fibres. It also relates to a device for carrying out this method. The method is characterised in that it fundamentally comprises the following steps: impregnation of the yarn continuously rapidly unwound from one or more carriers and rewound onto one or more carriers with at least one fibre-reactive dye in aqueous solution and at least one alkaline-acting agent in aqueous solution, and fixing of the dye.

WO 2014/006132 A1 discloses a solid dye product suitable for changing the colour of a fabric and for use in a domestic washing machine, the dye product comprising: (a) a water-permeable pouch formed of a non-woven, water-permeable material and containing a water-soluble dye composition comprising from about 40 to about 70% by weight of one or more reactive dyes and from about 30 to about 60% by weight of one or more salts or one or more alkalis or a mixture thereof, said percentages being by weight of the total dye composition in the water-permeable pouch; and (b) a water-impermeable container means containing a water-soluble dye-fixing composition comprising one or more alkalis, alone or in combination with one or more salts; wherein the weight ratio of the dye composition to the dye-fixing composition is from about 1:5 to about 1:20.

Lastly, DE 602 23 691 T2 discloses a water-soluble or water-dispersible packaging and a method for the controlled release of various agents such as agrochemical substances, cleaning agents and food components including food colourants. Thus, dyeing of textiles cannot be carried out with this either.

5 It is therefore the object of the present invention to provide a method for dyeing textile materials in which no residues are caused in the rinsing compartment and dyeing agent reacts with the fibres of the textile material to be dyed, but reacts only slightly or not at all with the water in the drum. During this process, no dye stains, in particular no dot-like dye stains (so-called "spots"), should be caused on the textile material to be dyed.

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Surprisingly, it has now been found that by physically separating the reagents or reactants required for the dyeing process, i.e. in particular of the at least one dye used, which is preferably in the form of a dye solution, which is further preferably salt-free, on the one hand, and of the salt and optionally of the fixing agent on the other hand, in separate containers, a reaction of the reagents among
15 themselves instead of on the fibre of the textile material to be dyed can be largely or almost completely suppressed or prevented, but nevertheless a sufficient quantity of reagents reaches the dye liquor and the textile materials, so that the intended dyeing takes place, preferably spot-free. The separate provision in different containers causes a delayed, but not too delayed, release of the reagents into the dye liquor, so that the dyeing of the fibres of the textile material can take place, but
20 no quantities of dye and salt and, if applicable, fixing agent large enough that undesired colour stains (spots) are produced impinge on the textile material.

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The stated object is therefore achieved according to the invention by a method according to claim 1. According to the invention, the object is achieved by means of a method for dyeing textile materials comprising the steps of:

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- (i) providing a dyeing system for textile materials comprising at least one salt in at least one first container and at least one dye in at least one second container, wherein the at least one first container has a first opening or a first group of multiple openings, and the at least one second container has a second opening or a second group of multiple openings, wherein the at least one second container is configured such that
30 the start of the dispensing of the dye(s) occurs temporally after the partial or complete dispensing of the salt from the at least one first container, wherein the temporal delay of the start of the dispensing of the dye relates to the start of the dispensing of the salt and is in a range of about 1 minute to about 10 minutes;
- (ii) transferring the containers obtained in step (i) into a third container;
- (iii) charging the third container with at least one textile material to be dyed; and

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- (iv) adding water to the third container charged as in steps (ii) and (iii), wherein
- (v) the at least one salt and/or the at least one fixing agent or the at least one fixing agent-salt mixture from the at least one first container and/or the at least one dye from the at least one second container are dispensed through the opening or
5 openings of the respective container in a time-delayed and/or metered manner,
- (vi) the at least one salt and/or the at least one fixing agent or the at least one fixing agent-salt mixture begins to flow out of the at least one first container (10) before the at least one dye begins to flow out of the at least one second container; and
- (vii) the salt and/or the fixing agent or the fixing agent-salt mixture and/or the at least
10 one dye as mentioned above under (vi) and (vii) are suspended and/or dissolved in water in the respective container.

The present invention relates to a method for dyeing textile materials comprising the steps:

- (i) providing a dyeing system for textile materials comprising at least one salt in at least
15 one first container and at least one dye in at least one second container, wherein the at least one first container has a first opening or a first group of multiple openings, and the at least one second container has a second opening or a second group of multiple openings, wherein the at least one second container is configured such that the start of the dispensing of the dye(s) occurs temporally after the partial or
20 complete dispensing of the salt from the at least one first container, wherein the temporal delay of the start of the dispensing of the dye relates to the start of the dispensing of the salt and is in a range of about 1 minute to about 10 minutes;
- (ii) transferring the containers obtained in step (i) into a third container;
- (iii) charging the third container with at least one textile material to be dyed; and
- (iv) adding water to the third container charged as in steps (ii) and (iii), wherein
25 (v) the at least one salt and/or at least one fixing agent or the at least one fixing agent-salt mixture from the at least one first container and/or the at least one dye from the at least one second container are dispensed through the opening or openings of the respective container in a time-delayed and/or metered manner,
- (vi) the at least one salt and/or the at least one fixing agent or the at least one fixing agent-salt mixture begins to flow out of the at least one first container (10) before the at least one dye begins to flow out of the at least one second container; and
- (vii) the salt and/or the fixing agent or the fixing agent-salt mixture and/or the at least
30 one dye as mentioned above under (vi) and (vii) are suspended and/or dissolved in water in the respective container.
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The invention can be realised with a first container, in particular when at least one salt, very particularly when, in addition to the at least one salt, at least one fixing agent is present therein, and even more preferably when only exactly one salt is used, and even more preferably when exactly one salt and exactly one fixing agent, apart from impurities, are added. Impurities in a small amount of about less than 0.2% by weight, in relation to the total amount of the amount contained in the first container, may be present in the first container, but are negligible with respect to the properties and effects of the at least one salt and/or at least one fixing agent comprised by the first container. A first container is particularly suitable when a fixing agent-salt mixture is used. Two first containers are particularly suitable in the case where at least one salt and at least one fixing agent are each used in their own first container, but are particularly suitable in the case where exactly one salt and exactly one fixing agent are each used in their own first container. The use of only one or two first containers, especially a single first container, has the advantage of limiting the amount of (packaging) material used in an environmentally friendly way and is also generally more cost-effective than the use of more than one first container.

For the dyeing process, the dyeing system is placed in a third container together with the textile material to be dyed. In the course of the dyeing process and the method according to the invention, the dye bath, also called dye liquor, is formed in the third container. Preferably, the third container is a laundry drum and further preferably a laundry drum of a washing machine (washing machine drum). As used herein, washing machine means in particular a washing machine or automatic washing machine for private households, in particular a washing machine or automatic washing machine with a laundry drum having a capacity of about 4 to about 8 kg, about 4 to about 7 kg or about 5 to about 6 kg of dry laundry. The dyeing system according to the invention is not introduced into a rinsing compartment of a washing machine. Therefore, a third container within the meaning of the present invention is not to be understood as a rinsing compartment of a washing machine.

If, in the context of the invention, the term "approximately" or "substantially" is used in relation to values or ranges of values, this is to be understood to mean what a person skilled in the art will regard as customary in the given context. In particular, deviations of the indicated values of +/- 10%, preferably +/- 5%, further preferably +/- 2%, are encompassed by the terms "approximately" and "substantially".

Preferably, the dyeing system is used in the third contained at a water temperature in a range from about 25°C to about 95°C, more preferably in a range from about 30°C to about 65°C, and particularly preferably in a range from about 30°C to about 40°C, and preferably for a period of time from about

15 minutes to about 300 minutes, more preferably for a period of time from about 30 minutes to about 90 minutes.

The at least one second container is configured such that the start of dispensing of the dye(s), optionally, and preferably together with at least one solvent and one or more additives, occurs temporally after the partial or complete dispensing of the salt from the at least one first container.

The temporal delay of the start of the dispensing of the dye relates to the start of the dispensing of the salt and/or fixing agent or fixing agent-salt mixture and is in a range of about 1 minute to about 10 minutes, more preferably in a range of about 2 minutes to about 8 minutes and particularly

preferably in a range of about 4 minutes to about 6 minutes. Preferably, complete or substantially complete dispensing of the salt and/or fixing agent or fixing agent-salt mixture from the first container is completed before dispensing of the dye from the second container starts. The dispensing of the dye from the second container can thus also start when the dispensing of the salt and/or fixing agent or fixing agent-salt mixture from the first container has not yet been fully completed.

Preferably, the first opening or the first group of multiple openings of the first container and the second opening or the second group of multiple openings of the second container have an opening width of about 0.5 μm to about 14 cm, more preferably to about 11 cm, even more preferably to about 10 cm. In a particular embodiment, by suitable selection of the opening width of the openings of the first and second containers, in particular in the range of about 0.5 μm to about 14 cm, more preferably up to about 11 cm, still more preferably up to about 10 cm, preferably about 0.5 μm to about 10 mm and particularly preferably about 0.5 μm to about 1 mm, a temporal delay is achieved between the release of the at least one dye from the at least one second container and the release of the at least one salt and optionally fixing agent or fixing agent-salt mixture from the at least one first container of from about 1 minute to about 10 minutes, preferably from about 2 minutes to about 8 minutes and particularly preferably from about 4 minutes to about 6 minutes, wherein the discharge of the ingredients or reagents from the first container takes place earlier than from the second container, so that the precipitation of excessive amounts of dye on the fibre of the textile material and thus the formation of stains (spots) is avoided.

Textile materials according to the present invention are in particular those made from cotton, other natural fibres, in particular natural fibres of vegetable origin, in particular linen, jute, hemp, bast or flax, natural fibres of animal origin, in particular wool or silk, synthetic fibres, in particular polyamide or polyester, or mixtures of the aforementioned materials. According to the invention, substantive and direct dyes are particularly suitable for textile materials made of cotton, other natural fibres, in particular natural fibres of vegetable origin, in particular linen, jute, hemp, bast or flax, natural fibres

of animal origin, in particular wool or silk, synthetic fibres, in particular polyamide or polyester, or mixtures of the aforementioned materials. According to the invention, reactive dyes are particularly suitable for textile materials made of cotton, other natural fibres of plant origin, in particular linen, jute, hemp, bast or flax, wool, polyamide or mixtures of the aforementioned materials. Otherwise, reactive dyes are only suitable for synthetic fibres, such as polyester or silk, if these fibres are present in a mixture with other dyeable natural fibres, in particular selected from the group consisting of cotton, linen, wool, jute, hemp, bast and flax.

The salt and/or fixing agent or fixing agent-salt mixture is received in at least one first container and the at least one dye is received in at least one second container, for direct use in the third container. Direct use means that the at least one first container and the at least one second container are added to or placed in the third container prior to the start of a dyeing process. Accordingly, when a washing machine is used, prior to the start of a washing or dyeing program of a washing machine, the at least one first and second containers are added to or placed in the laundry drum together with at least one textile material to be dyed. Preferably, the at least one first container is in the form of a pouch or can and preferably the at least one second container is in the form of a pouch, can or bottle. In particular, both the first container and the second container are formed as a pouch or can, preferably as a pouch. Very preferably, the first container is formed as a pouch and the second container is formed as a bottle, wherein further preferably exactly one such first container and one such second container are present in the dyeing system according to the invention. The first container and the second container form a space substantially separating their contents from the environment. If the first container is in the form of a pouch, it is cut open prior to use, preferably prior to insertion into the laundry drum of a washing machine. If the second container is designed as a bottle, a screw cap or other closure of the bottle is removed before use, preferably before insertion into the laundry drum of a washing machine, and thus the at least one opening of the bottle is exposed.

Preferably, the first container and the second container are not nested within each other. This means that the at least one first container or the at least one second container is neither partially nor completely inserted into the respective other first or second container. Preferably, the first container and the second container are separate, i.e. not materially joined, parts or containers. Particularly preferably, the inner region of the first and the second container are separated from each other, in particular flow-separated or hydrodynamically separated, and/or not connected in a liquid-transferring manner, in such a way that no exchange of ingredients or of ingredients dissolved in water takes place between the two containers. This applies when the containers are closed.

The sizes of the openings of the two containers can be chosen in such a way that, when the closures of the openings of the containers are removed, their respective contents are released to the outside into the dye liquor, but a mixing of the contents of one container with a part of the contents of the respective other container in one of the containers takes place only to a small extent or not at all.

5 Thus, a direct reaction of the salt and/or fixing agent or fixing agent-salt mixture with the dye in an undesired side reaction (hydrolysis of the dye) without dyeing the textile material is greatly reduced or completely avoided. By a suitable choice of the size of the openings of the containers and/or a delayed removal of the closures of the openings of the second containers, the release of the ingredients from the containers into the water or the dye liquor is delayed in such a way that the
10 concentration of these ingredients (reactants) is sufficiently high on the textile material for the dyeing process desired there, but low enough to strongly reduce or completely avoid side effects, such as in particular side reactions like the dye hydrolysis, but especially the stain/spot formation.

Furthermore, the outer region of the first and the second container can additionally or alternatively
15 be separated from each other. The separation of the outer region enables an independent movement of the first container from the second container, and vice versa, in particular such an independent movement of the first and second container in the third container.

The opening or openings of the first and/or second container is or are closed in each case by means
20 of at least one closure selected from the group consisting of non-water-soluble closures, the non-water-soluble closures being selected in particular from the group consisting of flap closures, twist closures, closures with a predetermined breaking or tear-off seam, sealing seams and non-water-soluble layers, such as, in particular, plastic films. The closure is openable and/or removable. For multiple use of the second container, the closure is preferably designed to be re-closable. In one
25 embodiment, the closure is connected to the second container at one side and preferably at a bottle neck such that the closure can be hinged and/or can be detached. In a further embodiment of the second container, the closure has an internal thread and the second container has a corresponding counter or external thread around the second opening or the second group of multiple openings. The hinged function is preferably realised with a hinge and further preferably with an elastic intermediate
30 piece, between the closure and the bottle neck.

In one embodiment, the second container, which is further preferably designed as a bottle, has a dosing cap at an upper end of the bottle neck. The dosing cap covers the preferably cylindrical bottle neck substantially at the top. Preferably centrally on the dosing cap, the bottle neck has the at least
35 one second opening. The at least one second opening is preferably round. It preferably extends completely through the dosing cap.

Preferably, the closure, which is further preferably designed as a flap closure or twist closure, has at least one pin centred on a closure upper side and extending into a cavity of the closure. The pin of the closure preferably has a closing function or a plugging function. Preferably, the opening width of the at least one second opening of the second container is selected such that it corresponds approximately to a width of the at least one pin. If the closure is screwed to the second container or plugged onto it, the pin closes the second opening of the second container over its width. If several second openings are provided, a corresponding number of pins are to be provided which engage in these second openings.

In a further preferred embodiment, the second opening or second openings of the second container are closed with such closures that are water-soluble and/or alkali-soluble. Alkali-soluble means soluble in an aqueous medium having a pH greater than 7, i.e. in the alkaline range. In a further embodiment, the second container has, as closure for the second opening or the second group of multiple openings, water-soluble and/or alkali-soluble closures selected from the group consisting of water-soluble and/or alkali-soluble layers and stoppers, in particular water-soluble and/or alkali-soluble layers and stoppers comprising one or more fatty acids. The alkali soluble layer may preferably comprise carboxylated acrylic polymer. An alkaline-acting substance such as NaOH or KOH is preferably present in the first container together with the salt and/or fixing agent or in the fixing agent-salt mixture.

In a further embodiment, the closure for the second opening or the second group of multiple openings is the layer or castable stopper that dissolves upon reaching the melting point and/or upon contact with water or alkaline medium.

The layer or the castable stopper are preferably selected from one or more fatty acids selected from the group consisting of saturated fatty acids, in particular selected from the group consisting of decanoic acid ($C_9H_{19}COOH$), undecanoic acid ($C_{10}H_{21}COOH$), dodecanoic acid ($C_{11}H_{23}COOH$), tridecanoic acid ($C_{12}H_{25}COOH$), tetradecanoic acid ($C_{13}H_{27}COOH$), pentadecanoic acid ($C_{14}H_{29}COOH$), hexadecanoic acid ($C_{15}H_{31}COOH$), heptadecanoic acid ($C_{16}H_{33}COOH$), octadecanoic acid ($C_{17}H_{35}COOH$), nonadecanoic acid ($C_{18}H_{37}COOH$) and eicosanic/icosanoic acid ($C_{19}H_{39}COOH$).

Particularly preferably, the second opening or the second group of multiple openings of the second container each have an opening width of from about 0.5 mm to about 10 mm, more preferably from about 1 mm to about 5 mm, and particularly preferably from about 1.5 mm to about 2.5 mm.

The at least one first container for the salt and/or fixing agent or fixing agent-salt mixture is preferably made of plastic, in particular polyethylene and/or polypropylene. In one embodiment, the first container is made of fibrous materials such as polyester fabric and/or, at least in partial regions, a water-permeable fibrous pouch. In a further embodiment, the first container and the second

5 container are made of fibre-like materials and/or are each formed, at least in partial regions or completely, as a water-permeable fibrous pouch.

In a preferred embodiment, the at least one first container is formed as a pouch and has at least one first and optionally at least one second sealing seam. Preferably, the at least one first sealing seam is

10 arranged at an upper end of the pouch and seals the contents of the pouch tightly from the environment. The at least one second seal seam is arranged substantially parallel to the one first seal seam. The one second sealing seam is arranged starting from the upper end of the pouch slightly below the one first sealing seam and closer to a lower end of the pouch than the one first sealing seam. The distance between the one first sealing seam and the one second sealing seam running

15 substantially parallel thereto is accordingly selected so that, after severing the one first sealing seam, preferably by means of scissors, the one second sealing seam is not damaged. The one second sealing seam is arranged significantly closer to the upper end of the pouch than to the lower end of the pouch. Preferably, the at least one second seal seam is in contact with and immediately adjacent to the contents. Preferably, the first container has only one first sealing seam, which is preferably

20 arranged over the entire width of the pouch at the upper end thereof, and which is preferably opened over the entire width of the pouch by cutting.

Preferably, the first opening or the first group of multiple openings of the first container is an interruption or at least one interruption of the at least one second seal seam and is exposed by

25 removing the at least one first seal seam. Without the removal of the one first seal seam, the interior of the first container remains separated from the environment. The distance between the one first seal seam and the one second seal seam is chosen to be suitably small so that substantially no contents of the first container collect between the one first seal seam and the one second seal seam. The first opening or the preferred one interruption of the one second sealing seam is preferably

30 arranged approximately in the centre of a longitudinal extent of the one second sealing seam and forms a defined opening width.

In an alternative embodiment, the first sealing seam and the second sealing seam do not have a gap and run directly adjacent to each other and form a common sealing surface. Preferably, the first

35 opening, which is preferably arranged between or in the at least one second sealing seam, forms a groove. The groove is preferably rectangular and further preferably triangular in shape and

converges substantially to a point adjacent to the one first seal seam, and preferably with the point facing the first seal seam. When the first sealing seam is cut off, in the direction of the longitudinal extent of the first sealing seam, a part of the second sealing seam is preferably also cut off. The preferred cut is made slightly further in the direction of one of the contents of the pouch. Depending on the contents, the triangular design of the first opening allows a variable choice of the position of the cut line when severing the sealing seams and thus the size of the first opening. The triangular design makes the first opening larger the more of the second sealing seam is cut off.

In a further embodiment, the first and/or second container is formed as a water-permeable fibrous pouch at least in partial regions. The water-permeable fibrous pouch preferably has a first group of multiple openings in the form of pores between the fibres. Preferably, the first and/or the second container are formed substantially entirely as a water-permeable fibrous pouch. Further preferably, the region of fibres extends only over a pouch front or a pouch back extending substantially between the top end and the bottom end of the pouch. The pouch front and pouch back, which extend over the top and bottom ends of the pouch, and two lateral ends of the pouch, are connected to each other via the two lateral ends of the pouch. Preferably, the front or back of the pouch that is not made with fibres is made of plastic and is impermeable to water. Further preferably, the other side of the pouch that is made with fibres is covered with a transport film that is also impermeable to water, which is removable, and is removed before the pouch is placed in the third container.

Preferably, the pores of the fibrous pouch have an opening width in a range from about 0.5 μm to about 1 mm, more preferably in a range from about 1 μm to about 150 μm and particularly preferably in a range from about 10 μm to about 50 μm .

When the term "opening width" is used in the context of the invention, it is understood to mean the diameter of the opening in the case of substantially round openings and the distance between the two furthest opposite points on the edges of the opening in the case of ellipsoidal or non-circular openings such as rectangular openings.

The dye may be in powder form or preferably dissolved in at least one, preferably exactly one, solvent. The fixing agent-salt mixture may be in the form of lumps, chunks or powder and may have a particle size with an equivalent diameter of about 0.01 mm to about 1 cm.

The powdered dye and/or the powdered fixing agent-salt mixture preferably have a particle size with an equivalent diameter in a range of from about 0.01 mm to about 2 mm, preferably in a range of from about 0.1 mm to about 1 mm and particularly preferably in a range of from about 0.3 mm to

about 0.7 mm. The advantage of small particle sizes lies in improved solubility behaviour for faster production of the dye liquor. Here, according to the invention, it is possible and advantageous for the fixing agent-salt particles to escape from the first container into the surrounding water or the dye liquor. Conversely, it is advantageous for the dye particles or dye solution to remain in the second container for as long as possible, and if necessary until dissolution or dilution in the water entering the second container or in the dye liquor entering the second container, in order to avoid the formation of dye stains or spotting/spot formation on the textile material.

In a preferred embodiment, the fixing agent-salt mixture has a particle size that is preferably substantially less than or equal to the opening width of the first opening or openings of the first container. In a particularly preferred embodiment, the dye has a particle size that is larger than the opening width of the second opening or openings of the second container. This ensures that the dye only flows out of the second container when it has dissolved in the water that has entered the second container.

Preferably, the fixing agent of the powdered fixing agent-salt mixture is selected from a group consisting of sodium metasilicate, potassium metasilicate, sodium carbonate, potassium carbonate, ammonium carbonate, sodium hydroxide and potassium hydroxide, preferably consisting of sodium metasilicate, sodium carbonate and sodium hydroxide. Preferably, the salt is selected from a group consisting of sodium chloride, potassium chloride, ammonium chloride, sodium sulphate, potassium sulphate, ammonium sulphate, preferably consisting of sodium chloride, ammonium chloride, sodium sulphate and ammonium sulphate, more preferably consisting of sodium chloride and sodium sulphate. Particularly preferably, the fixing agent-salt mixture comprises sodium metasilicate or sodium carbonate as fixing agent and sodium chloride as salt. Preferably, the fixing agent-salt mixture comprises from about 15% by weight to about 85% by weight of a fixing agent and from about 15% by weight to about 85% by weight of a salt, in each case in relation to the fixing agent-salt mixture.

In one embodiment, preferably for colour dyeing of textile materials, the fixing agent-salt mixture comprises the fixing agent in an amount in a range from about 65% by weight to about 85% by weight and the salt in an amount in a range from about 15% by weight to about 35% by weight, preferably sodium metasilicate and/or sodium carbonate in an amount in a range from about 65% by weight to about 85% by weight and sodium chloride or sodium sulphate in an amount in a range from about 15% by weight to about 35% by weight, in each case in relation to the fixing agent-salt mixture.

In another embodiment, preferably for colouring dark shades of textile materials such as, for example, black, midnight blue, ruby red and/or espresso, the fixing agent-salt mixture comprises the salt in an amount in a range from about 65% by weight to about 85% by weight and the fixing agent in an amount in a range from about 15% by weight to about 35% by weight, preferably sodium chloride or sodium sulphate in an amount in a range from about 65% by weight to about 85% by weight and sodium metasilicate and/or sodium carbonate in an amount in a range from about 15% by weight to about 35% by weight, in each case in relation to the fixing agent-salt mixture.

In a preferred embodiment with a combined fixing agent-salt mixture, sodium carbonate is preferably present in an amount in a range from about 65% by weight, preferably about 75% by weight, to about 100% by weight, preferably to about 85% by weight, sodium metasilicate is present in an amount in a range from about 0% by weight, preferably from about 15%, to about 50% by weight, and sodium chloride in an amount in a range from about 0% by weight, preferably from about 15% by weight, to about 80% by weight, preferably to about 50% by weight, in each case in relation to the fixing agent-salt mixture. The combined fixing agent-salt mixture is preferably usable for colour dyeing and dyeing of dark shades.

For the dyeing system, its use and the method, in particular, and most particularly for use in washing machines or automatic washing machines for private households, in particular those having a laundry drum with a capacity of about 4 to about 8 kg, about 4 to about 7 kg or about 5 to about 6 kg of dry laundry, - when using the salt in at least one first container, in particular a first container, a total quantity of about 50 g to about 350 g, preferably up to about 200 g, further preferably about 150 g, of salt is provided, or
- when using the salt and fixing agent in at least two, in particular in two separate first containers or the fixing agent-salt mixture in at least one, in particular one first container, a total quantity of salt and fixing agent or of fixing agent-salt mixture of about 200 to about 600 g, preferably about 350 to about 450 g, particularly preferably about 400 g is provided.

Preferably, depending on the desired dyeing result, the second container contains at least one further substance selected from the group consisting of dyes, solvents and additives, preferably the dye or dyes in the form of a dye solution in the solvent, particularly preferably the dye or dyes in the form of a dye solution together with at least one additive in the solvent. Furthermore, a chemical for the softening of water and/or a mixture for the container preservation of aqueous polymer emulsions and sensitive aqueous products may be included.

Preferably, the at least one dye according to the invention is selected from the group consisting of direct dyes, substantive dyes and reactive dyes. Particularly preferably, the at least one dye according to the invention is selected from a range at least comprising Remazol Yellow RR gran., Levafix Brilliant Yellow CA gran., Levafix Yellow CA gran., Remazol Orange RR gran., Remazol Orange BN, Remazol Brilliant Red F3B gran., Remazol Deep Red RGB, Remazol Red RB gran. 133%, Remazol Ultra Red RGB, Remazol Red RGB, Remazol Turquoise Blue G 133% -Z, Remazol Navy Blue GG gran. 133%, Levafix Navy Blue E-BNA gran., Levafix Navy CA gran., Remazol Brilliant Blue RN gran., Remazol Brilliant Violet 5R, Remazol Deep Black N gran. 150%, Remazol Black B gran. 133% and/or Remazol Deep Black FHD-R fl 66% and/or mixtures of said dyes and dye solutions. The at least one dye is present in the dye mixture in an amount in a range from about 1% by weight to about 22% by weight, preferably in a range from about 1.5% by weight to about 19.5% by weight, in the case of a black colouring in a range from about 55% by weight to about 75% by weight, in each case in relation to the total amount of the dye mixture.

Preferably, at least one dye is a reactive dye such as Remazol®. Reactive dyes are, viewed in structural form, "normal" dyes that additionally carry at least one reactive anchor group. The reactive anchor group is chemically fixedly bonded to the dye molecules, is chemically very reactive and is activated by the addition of alkali. Preferably, alkali is contained in the fixing agent or fixing agent-salt mixture. During the dyeing process, the activated anchor group forms a firm chemical bond with the so-called hydroxy groups (OH groups) of the textile.

Potential solvents used in the second container for dissolving one or more dyes according to the invention and optionally additives are, besides water, an aqueous urea solution and polyethers, in particular selected from polyethylene glycol (abbreviated to "PEG") of the formula $H(OC_2H_4)_nOH$ with n from 1 to 4 and polypropylene glycol (abbreviated to "PPG") of the formula $H(OCH_2(CH_3)CH_2)_mOH$ with m from 1 to 4, or mixtures thereof. Preferably, the solvent is water, preferably in the form of softened tap water.

A preferred additive for container preservation is preferably composed of chloromethyl isothiazolinone and/or methyl isothiazolinone and is preferably a colourless to slightly yellowish liquid. Preferably, the additive has a pH in a range from about 1.5 to about 5.5, more preferably in a range from about 2.5 to about 4.5 and particularly preferably in a range from about 3 to about 4. A conventional amount used as a function of the dye is preferably between about 0.05% to about 0.4%, preferably up to about 0.1% by weight, and further preferably between about 0.08% to about 0.1%.

Particularly preferably, a dye solution according to the invention contains at least one of the
aforementioned dyes, optionally at least one additive, preferably exactly one additive, preferably in
the form of an additive for container preservation or a softening agent, and incidentally water, in
particular in the form of softened tap water. The dye solution thus contains no salt, alkali or the like,
5 in particular no alkali or alkaline earth salts, in particular no sodium chloride and/or no potassium
chloride.

In a particularly preferred embodiment of the dyeing system according to the invention, exactly one
first container in the form of a pouch and exactly one second container in the form of a bottle are
10 provided. The first container has a plurality of first and a plurality of second sealing seams, the
second sealing seams having at least one interruption for providing at least one opening after
cutting. Preferably, exactly one interruption is provided in the second sealing seams. In the preferred
embodiment, the first container contains at least one salt and at least one fixing agent, preferably
exactly one salt and one fixing agent, in the form of a fixing agent-salt mixture. The salt is preferably
15 sodium and/or potassium chloride, the fixing agent is sodium carbonate and/or sodium or potassium
metasilicate. The second container preferably has exactly one opening. This is preferably arranged in
the neck of the bottle. The opening in the second container is opened by unscrewing a closure, in
particular in the form of a hinged or screw cap. The second opening preferably has a smaller opening
width than would be possible through an inner diameter of a bottle neck. Therefore, a plate is
20 provided in the opening region of the bottle neck, preferably flush with an upper edge thereof, which
preferably has the opening approximately in the middle. The at least one first opening in the first
container preferably has an opening width in a range from about 0.4 cm to about 2.5 cm. The second
opening in the second container has an opening width from about 1 mm to about 3 mm. The second
container contains an aqueous dye solution comprising at least one dye, optionally one of the
25 additives mentioned above, and otherwise water. The dye solution has no salt or alkali, it is in
particular salt-free. Preferably, the fixing agent-salt mixture and the dye solution have those
compositions which have already been mentioned above as preferred or particularly preferred.

Depending on the embodiment, the first opening or the first group of multiple openings of the first
30 container with the fixing agent-salt mixture and/or the second opening or the second group of
multiple openings of the second container with the dye, before the containers are placed in the third
container, are exposed. The exposing is preferably achieved in the case of the first container
preferably by removing at least one first seal seam. Due to the removal of the one first sealing seam,
the preferred one first opening, which forms a defined opening and is arranged between or
35 interrupts at least one second sealing seam, is exposed. In a further embodiment, the preferred first
container is, at least in partial regions, a water-permeable fibrous pouch, and pores forming the

preferred first group of multiple openings are covered by a layer, preferably transport film, particularly preferably plastic film. To expose the preferred first group of multiple openings, the layer or film is removed. The second opening or the second group of multiple openings of the second container for the dye is preferably closed by means of a closure selected from the group consisting of a flap closure, a twist closure, a closure with a predetermined breaking or tear-off seam, a sealing seam and a non-water-soluble layer, in particular plastic film, and a water-soluble or alkali-soluble layer or stopper, which in one embodiment is removed and/or opened to expose the second opening or the second group of multiple openings.

Preferably, a dispensing of the fixing agent-salt mixture is started prior to a start of the dispensing of the dye from its container into the third container. Preferably, the dye comprises the reactive dye having the at least one reactive anchor group. The reactive-anchor group is chemically very reactive and is activatable in combination with the fixing agent-salt mixture. During the dyeing process, the activated anchor group forms a firm bond with the so-called hydroxy groups (OH groups) of the textile material without losing the bond to the reactive dye. An important prerequisite is that the fibres of the textile material have groups such as hydroxy or also amine or amino functions that form a bond with the reactive anchor groups. If the dye is placed in the third container at the same time or without the fixing agent-salt mixture and a washing or dyeing program is started, only a very small proportion of the reactive dye reaches the fibres of the textile material. The reactive dye reacts with the water in the drum and not with the hydroxy functions of the fibres. The salt of the preferred fixing agent-salt mixture causes a reduction in the solubility of the reactive dye, which is in itself very soluble in water, and improves the affinity of the dye to the fibres. Due to these properties, the sequence, concentration and temperature play an important role in the dyeing process.

Preferably, the start of the dispensing of the fixing agent-salt mixture from the first container into the third container is delayed after the start of a washing or dyeing program. This means that not only is the start of dispensing the dye delayed after the start of dispensing of the fixing agent-salt mixture, but also preferably the start of dispensing of the fixing agent-salt mixture after the start of the washing or dyeing program. The advantage is that the fixing agent-salt mixture is dispensed into the third container with a larger amount of water already flushed in. The fixing agent-salt mixture is evenly distributed in the drum and does not affect the textile material selectively.

Preferably, the fixing agent-salt mixture begins to flow out of the first container when it comes into contact with, mixes with, or dissolves in water. In one embodiment, the powdered fixing agent-salt mixture exits the first opening or the first group of multiple openings only insignificantly or in a small amount without exposure to water. Only when sufficient water is distributed in the third container,

whether by a conventional induction system or the so-called jet system, does it penetrate through the first opening or the first group of multiple openings and mix with or dissolve the fixing agent-salt mixture. Preferably, the flowing out of the fixing agent-salt mixture is enhanced by a rotation of the third container. When mixed with or dissolved in water, the fixing agent-salt mixture is substantially
5 no longer present in powder form. In another embodiment, the water enters a water-permeable fibrous pouch through the pores forming the first group of multiple openings, mixes with or dissolves the fixing agent-salt mixture, flows out through the pores, and disperses into the third container together with the fixing agent-salt mixture.

10 Because the washing or dyeing program of the washing machine preferably first opens a water inlet after the start and water enters the third container, the fixing agent-salt mixture is already mixed with the water. Only through the subsequent rotation of the drum does the dye emerge from the second container through the second opening or the second group of multiple openings in one embodiment.

15 In another embodiment, which further delays the flow the dye out from the second container, the second container comprises a closure formed as a castable stopper made of a material having a sufficiently low melting point. The stopper closes the second opening or the second group of openings and dissolves when it reaches a certain temperature near or at its melting point. The
20 material from which the castable stopper is made is adapted to the optimum effective temperature of the fixing agent-salt mixture and the dye. Accordingly, the stopper dissolves when the effects of the mixtures have reached their maximum.

In a preferred embodiment, the second container is provided with a closure formed as an alkali-
25 soluble layer. This layer covers the second opening or the second group of multiple openings and dissolves as soon as it comes into contact with the alkali-containing fixing agent-salt mixture. This ensures that a certain amount of the fixing agent-salt mixture is already contained in the third container. This is particularly advantageous for washing machines in which the water trickles into the third container by means of a jet system, as it does not matter at what point in time sufficient water
30 is contained in the drum. The first container only releases its contents when the water has mixed with or dissolved the fixing agent-salt mixture, whereupon the alkali-soluble layer of the second container dissolves.

Preferably, the fixing agent-salt mixture and/or the dye is dispensed in a metered manner. This
35 metered delivery is given by the shape and design of the first container and the second container. In one embodiment, the first container relies on a certain amount of water to mix the powdered fixing

agent-salt mixture over time or to dissolve the fixing agent-salt mixture and allow it to flow out of the first container via the first opening or the first set of multiple openings. The second container has a metered or time-delayed release of the dye due to the diameter of the second opening or the second group of multiple openings. The second opening or group of openings has an opening defined with respect to the viscosity of the dye.

In one embodiment, the fixing agent-salt mixture and the dye are each contained in a fibrous pouch and preferably flow out through the pores of the fibrous pouch into the third container. The pores of the pouch containing the fixing agent-salt mixture are equal to or larger than the particle size of the fixing agent-salt mixture. It is possible for the fixing agent-salt mixture to flow out even without water entering the pouch, although this does have an enhancing effect. The pores of the pouch containing the dye are smaller than the grain size of the dye. The dye cannot flow out in undissolved form.

Lastly, the present invention relates to a use of a dyeing system according to the invention for dyeing textile materials made of preferably cotton, natural fibres and/or polyamide. The use preferably takes place in such a way that a dyeing system according to the invention, comprising at least one fixing agent-salt mixture in at least one first container and at least one dye, in particular in the form of a dye solution, in at least one second container, is placed in a third container together with a textile material to be dyed. The use of the dyeing system in the third container, which is preferably a laundry drum of a washing machine, takes place without the diversion via a rinsing compartment of a washing machine.

The method according to the invention provides a product for dyeing textile materials that is easy to handle for the end user. The method defines a so-called controlled-release system. Based on the embodiments of the first and second containers, salt or fixing agent-salt mixture and dye are released in a delayed and/or metered manner. According to the invention, the salt or the fixing agent-salt mixture and the dye are not dispensed into the third container at the same time, but are dispensed with a temporal delay relative to each other. Preferably, the washing or dyeing program of the washing machine starts first, before the salt or the fixing agent-salt mixture leaves the first container in a further step and then the dye leaves the second container in a further step.

PATENTKRAV

1. Fremgangsmåde til farvning af tekstilmaterialer, omfattende trinnene

- 5 (I) tilvejebringelse af et farvningssystem (1) for tekstilmaterialer, omfattende mindst et salt i mindst én første beholder (10) og mindst eet farvestof i mindst én anden beholder (40, 50), hvorved den mindst ene første beholder (10) omfatter en første åbning eller en første gruppe med en flerhed af åbninger (12), og den mindst ene anden beholder
- 10 (40, 50) omfatter en anden åbning eller en anden gruppe med en flerhed af åbninger (42, 52), hvorved den mindst ene anden beholder (40, 50) er dannet således, at påbegyndelsen af dispenseringen af farvestoffet eller farvestofferne tidsmæssigt sker efter den delvise eller hele dispensering af saltet fra den mindst ene første beholder (10), hvorved
- 15 den tidlige forsinkelse af påbegyndelsen af dispenseringen af farvestoffet relaterer til påbegyndelsen af dispenseringen af saltet og er i et interval fra cirka 1 minut til cirka 10 minutter;
- (II) overføring af den i trin (I) opnåede beholder til en tredje beholder;
- (III) lastning af den tredje beholder med mindst et tekstilmateriale, der
- 20 skal farves; og
- (IV) tilsætning af vand til den tredje beholder, som er lastet i trin (II) og (III), hvorved
- (V) det mindst ene salt og/eller mindst ene fikseringsmiddel eller mindst ene fikseringsmiddel-saltblanding fra den mindst ene første beholder
- 25 og/eller det mindst ene farvestof fra den mindst ene anden beholder dispenseres gennem åbningen eller åbningerne i den respektive beholder tidsligt forsinket og/eller doseret,
- (VI) det mindst ene salt og/eller det mindst ene fikseringsmiddel eller den mindst ene fikseringsmiddel-salt-blanding begynder at strømme ud
- 30 af den mindst ene første beholder (10), før det mindst ene farvestof begynder at strømme ud af den mindst ene anden beholder (40, 50); og

(VII) saltet og/eller fikseringsmidlet eller fikseringsmiddel-saltblandingen og/eller det mindst ene farvestof som nævnt i det foregående under (VI) er suspenderet og/eller opløst i vand.

5 2. Fremgangsmåde ifølge krav 1, hvorved

10 (VIII) i trin (I) er farvningssystemet defineret som et farvningssystem (1) for tekstilmaterialer, omfattende mindst et salt i mindst en første beholder (10) og mindst et farvestof i mindst en anden beholder (40, 50), hvorved den mindst ene første beholder (10) har en første åbning eller en første gruppe af en flerhed af åbninger (12), og den mindst ene anden beholder (40, 50) har en anden åbning eller en anden gruppe af en flerhed af åbninger (42, 52), hvorved den mindst ene anden beholder (40, 50) er konfigureret således, at påbegyndelsen af dispenseringen af farvestoffet (farvestofferne) sker midlertidigt efter den delvise eller hele dispensering af stoffet fra den mindst ene første beholder (10), hvorved den tidlige forsinkelse af påbegyndelsen af dispenseringen af farvestoffet relaterer til påbegyndelsen af dispenseringen af saltet og ligger i et interval fra cirka 1 minut til cirka 10 minutter,

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- (a) ydermere omfattende mindst eet fikseringsmiddel i mindst én yderligere første beholder (10); eller
- (b) ydermere omfattende mindst eet fikseringsmiddel sammen med det mindst ene salt i mindst én fikseringsmiddel-saltblanding i den mindst ene første beholder (10); og/eller
- 25 (c) hvorved den anden beholder indeholder mindst eet yderligere stof, som er udvalgt fra gruppen, som består af farvestoffer, opløsningsmidler og additiver, og fortrinsvis indeholder farvestoffet eller farvestofferne i form af en farvestofopløsning i opløsningsmidlet, navnlig med fordel indeholder farvestoffet eller
- 30 farvestofferne i form af en farvestofopløsning sammen med mindst et additiv i opløsningsmidlet; og/eller

- (IX) i trin (I) sker der ydermere en åbning af lukninger for alle disse tilvebragte beholdere (10, 40, 50), hvis lukninger er udvalgt fra gruppen, som består af ikke-vandopløselige lukninger, der er udvalgt fra gruppen, som består af klaplukninger, drejelukninger, lukninger med forudbestemt brud- eller afrivningssøm, tætningssøm og ikke-vandopløselige lag såsom navnlig plastfolier, hvorved åbningen eller åbningerne i den anden beholder (40, 50) fortrinsvis er lukket med sådanne lukninger, der er vandopløselige og/eller alkali-opløselige, og hvorved de vandopløselige og/eller alkali-opløselige lukninger navnlig er udvalgt fra gruppen, som består af vand-opløselige og/eller alkali-opløselige lag og lukninger, navnlig vand-opløselige og/eller alkali-opløselige lag og lukninger, der omfatter en eller flere fedtsyrer, som er udvalgt fra gruppen, der består af mættede fedtsyrer, især udvalgt fra gruppen, der består af
- | | | |
|----|---|----------------|
| | (C ₉ H ₁₉ COOH), | decansyre |
| 15 | (C ₁₀ H ₂₁ COOH), | undecansyre |
| | (C ₁₁ H ₂₃ COOH), | dodecansyre |
| | (C ₁₂ H ₂₅ COOH), | tridecansyre |
| | (C ₁₃ H ₂₇ COOH), | tetradecansyre |
| | (C ₁₄ H ₂₉ COOH), | pentadecansyre |
| 20 | (C ₁₅ H ₃₁ COOH), | hexadecansyre |
| | (C ₁₆ H ₃₃ COOH), | heptadecansyre |
| | (C ₁₇ H ₃₅ COOH), | octadecansyre |
| | (C ₁₈ H ₃₇ COOH), | nonadecansyre |
| | (C ₁₉ H ₃₉ COOH); | eicosansyre |
| 25 | og/eller | |
- (x) i trin (IV), ved begyndelsen, bliver åbningen eller åbningerne af den mindst ene anden beholder (40, 50) henholdsvis udvalgt ved hjælp af vand-opløselige og/eller alkali-opløselige lukninger fra gruppen, som består af klap-lukninger, dreje-lukninger, lukninger med forudbestemt brud- eller oprivningssøm, forseglingsøm og ikke-vandopløselige lag, såsom især plastfolier, hvorved åbningen eller åbningerne i den anden beholder (40, 50) fortrinsvis er lukket med sådanne lukninger, der er vand-opløselige og/eller alkali-opløselige, og hvorved de vand-
- 30

	opløselige og/eller alkali-opløselige lukninger navnlig er udvalgt fra gruppen, der består af vand-opløselige og/eller alkali-opløselige lag og propper, navnlig vand-opløselige og/eller alkali-opløselige lag og popper, omfattende en eller flere fedtsyrer fra gruppen, som består af mættede fedtsyrer, især udvalgt fra gruppen, som består af	
5	(C ₉ H ₁₉ COOH),	decansyre
	(C ₁₀ H ₂₁ COOH),	undecansyre
	(C ₁₁ H ₂₃ COOH),	dodecansyre
	(C ₁₂ H ₂₅ COOH),	tridecansyre
10	(C ₁₃ H ₂₇ COOH),	tetradecansyre
	(C ₁₄ H ₂₉ COOH),	pentadecansyre
	(C ₁₅ H ₃₁ COOH),	hexadecansyre
	(C ₁₆ H ₃₃ COOH),	heptadecansyre
	(C ₁₇ H ₃₅ COOH),	octadecansyre
15	(C ₁₈ H ₃₇ COOH),	nonadecansyre
	(C ₁₉ H ₃₉ COOH);	eicosansyre

3. Fremgangsmåde ifølge krav 2 eller 3, hvorved

- 20 (XI) det mindst ene farvestof dispenseres gennem åbningen eller åbningerne i den respektive beholder med en tidsforsinkelse, sammenlignet med det mindst ene salt og/eller det mindst ene fikseringsmiddel eller den mindst ene fikseringsmiddel-saltblanding; og/eller
- 25 (XII) den mindst ene salt og/eller det mindst ene fikseringsmiddel eller den mindst ene fikseringsmiddel-saltblanding er i det mindste delvist undveget fra den mindst ene første beholder (10), før det mindst ene farvestof, navnlig farvestofopløsningen, begynder at undvige fra den mindst ene anden beholder (40, 50).

- 30 4. Fremgangsmåde ifølge et eller flere af kravene 1 til 3, hvorved den tredje beholder er en vasketromle i en vaskemaskine.