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(54) **HUMIDIFYING DEVICE**

BEFEUCHTER

DISPOSITIF D'HUMIDIFICATION

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DescriptionField of the Invention

[0001] The present invention relates to a humidifying device for increasing the moisture content of tobacco.

Background to the Invention

[0002] Moisture content is an important parameter of the chemical composition of tobacco. The moisture content of tobacco may affect various properties of the material, including:

- Ease of particle size reduction, with drier materials being easier to mill into fine powders;
- Texture and density, with wetter materials being of higher density and more sticky; and
- Efficiency of vapour production upon heating, since the moisture content affects the time and energy required for the vaporisable material and/or components thereof to reach the desired vaporisation temperature.

[0003] The moisture content of tobacco can be controlled and optimised using a humidifying device, which transfers water vapour to the tobacco material. Such humidifying devices are known in the art and are commercially available in the form of pads, for example from Essentra™.

[0004] However, tobacco humidifying devices known in the art do not achieve optimal increases/control of tobacco moisture content, particularly in low- and mid-moisture tobacco blends. WO2008/148699 describes a heatable humidifying device for use with tobacco products.

Summary of the Invention

[0005] A first aspect of the invention provides a humidifying device for increasing the moisture content of tobacco, wherein the device comprises a porous wrapper arranged to form a pocket, wherein multiple water-evaporating pieces are located within said pocket, and wherein the porous wrapper allows for water retention within the pocket and fluid communication between the interior and exterior of the pocket.

[0006] A second aspect of the invention provides a pouch comprising tobacco and a humidifying device according to the first aspect of the invention wherein, in use, the humidifying device increases the moisture content of the tobacco.

Description of the Drawings

[0007]

Figure 1a is a graph showing changes in the moisture content (%) of tobacco resulting from daily application of water to the three test devices over a period of four days. Each device was tested in triplicate (Pouches P1-P3). The reference is a tobacco pouch with no humidifying device inserted. Figures 1b, 1c and 1d present these results for each of the three test devices, individually.

Figure 2 is a graph showing the daily tobacco moisture increases after water addition on days 2, 3 and 4 of the test period. Each of the three devices was tested in triplicate (Pouches P1-P3).

Figure 3 is a graph showing the changes in the weight of the each of the three humidifying devices before and after addition of water on each of the four days of the test period. Each of the three devices was tested in triplicate (Pouches P1-P3).

Figure 4 is a graph showing moisture loss from each of the three humidifying devices over a period of 7 hours from the point at which water is added to each device. Each of the three devices was tested in triplicate (Pouches P1-P3).

Detailed Description of the Invention

[0008] The first aspect of the present invention provides a humidifying device for increasing the moisture content of tobacco. In particular, the device is suitable for increasing the moisture content of low- and mid-moisture tobacco blends, such as blends used in Roll Your Own (RYO) and Make Your Own (MYO) tobacco products. The aim of the device of the present invention is to achieve increases in tobacco moisture of 2-3 wt%.

[0009] Additive-free tobacco blends are produced at low moisture levels because producing these blends at normal RYO moisture (-18%) increases the propensity for mould. Allowing the customer to increase moisture after purchase reduces the potential for mould and provides a smoother smoke taste.

[0010] The humidifying device comprises a porous wrapper arranged to form a pocket and multiple water-evaporating

pieces are located within the pocket. The porous wrapper allows water to be retained within the pocket and also allows fluid communication between the interior and exterior of the pocket, such that water, or water vapour, can be transmitted to the environment outside the pocket which, when the device is in use, is where the tobacco is located.

[0011] Water can be applied directly to the water-evaporating pieces or water can be applied to the water-evaporating pieces indirectly, via the porous wrapper. Both the water-evaporating pieces and the porous wrapper are re-fillable with water (i.e. the device can be 'topped-up' with water as often as required).

[0012] As used herein, the term 'porous wrapper' refers to a porous material that forms a pocket that surrounds the water-evaporating pieces. The wrapper may be sealable or re-sealable. The porous wrapper adsorbs and evaporates water.

[0013] Preferably, the porous wrapper has a water capacity of at least 0.10 gsm, preferably at least 0.16 gsm.

[0014] The term 'water capacity' refers to the range or amount of water that can be stored in the porous wrapper and can be emitted via the process of evaporation.

[0015] The porous wrapper may be made from any suitable material, including, but not limited to, viscose, cellulosic fibres, polylactic acid fibres and/or thermoplastic fibres. In a preferred embodiment, the porous wrapper may be made from viscose.

[0016] Preferably the pocket has dimensions of approximately 40mm x 20mm.

[0017] As used herein, the term 'water-evaporating piece' refers to a material that is capable of absorbing water and from which water can be emitted by evaporation. The terms 'piece' and 'granule' are used interchangeably herein.

[0018] The water-evaporating piece preferably has a water capacity of at least 0.25 gsm, and more preferably at least 0.32 gsm. The term 'water capacity' refers to the range or amount of water that can be stored in the water-evaporating piece and can be emitted via the process of evaporation.

[0019] The water release rate of the device changes over time. Preferably, the device of the invention has a water release rate of around 0.2gms over a period of 4 hours. Preferably, around 40-45% of the moisture is released from the device during the first hour. The water release rate of the device can be determined by weighing the device at time intervals.

[0020] The water-evaporating piece can be made from any suitable material meeting the above mentioned requirements, such as natural and/or synthetic materials, comprising (but not exclusively) a polymer, in particular polyolefin, preferably polyethylene or polypropylene, a cellulosic material or a combination thereof. The water-evaporating piece may, for example, comprise polyethylene terephthalate (PET) and/or polylactic acid (PLA). The water-evaporating piece may comprise cellulose and/or paper and/or cotton. The water-evaporating piece may be porous. The water-evaporating piece may be sponge material. The water-evaporating piece may be continuous.

[0021] Preferably the pocket contains at least 10 water-evaporating pieces, and preferably at least 20 water-evaporating pieces.

[0022] The water-evaporating piece can be any suitable size or shape. In a preferred embodiment the water-evaporating piece has a uniform shape. Preferably, the water-evaporating piece has dimensions of approximately 2mm x 5mm, more preferably the water-evaporating piece has dimensions of 2.01mm diameter x 5.17mm length.

[0023] The second aspect of the invention provides a pouch comprising tobacco and a humidifying device according to the first aspect, as defined above. When in use, the humidifying device increases the moisture content of the tobacco.

[0024] The pouch may be a paper insert pouch or any form of laminate pouch. Examples of materials used to produce laminate tobacco pouches include oriented polypropylene/polyethylene (OPP/PE) laminate plastic, nylon 11, high-density polyethylene (HDPE), polypropylene (PP), low-density polyethylene (LDPE) and polyethylene terephthalate (PET). The skilled person will be aware that such pouches are routinely used in the packaging of Roll Your Own (RYO) and Make Your Own (MYO) tobacco products.

[0025] As used herein, the term "moisture content" refers to the amount of moisture (i.e. water) present in a given material. In the context of the present invention, references to the moisture content may relate to the tobacco material or to the water-evaporating pieces. Values for moisture content are wt% values. For the avoidance of doubt, these wt% values are based on the total weight of the relevant component only. For example, if it is stated that the tobacco has a moisture content of 19.6wt%, this is based on the total weight of the tobacco component only.

[0026] In a preferred embodiment, when the pouch of the invention is in use, at least 55% of the water content of the humidifying device is transferred to the tobacco over a period of one hour. Preferably, the moisture content of the tobacco is increased by 1.2 wt% to 1.4 wt% over a period of 24 hours.

[0027] As used herein, the term 'tobacco' includes all forms of tobacco, including leaf, STEM, expanded tobacco blend and reconstituted tobacco blend. In a preferred embodiment, the tobacco is suitable for use in Roll Your Own (RYO) and Make Your Own (MYO) tobacco products. The device of the present invention is particularly suitable for increasing the moisture content of low-moisture or mid-moisture tobacco blends.

[0028] The invention will now be exemplified by the following, non-limiting example.

EXAMPLETest Method - Granulated pad in pouch variants

[0029] The water-evaporating pieces used in this experiment are granules prepared by shredding Essentra™ pads. Essentra™ pads are commercially available from <http://www.essentra.com>.

[0030] The objective of the experiment was to determine the increase in tobacco moisture when water is applied to devices containing (i) 20 Essentra granules and (ii) 10 Essentra granules, compared with (iii) an equivalent weight of unshredded pad.

[0031] The three test devices are summarised in Table 1.

Table 1

Test Device No.	Water-evaporating material	Pocket dimensions	No. of granules (pieces)	Weight of water-evaporating material (gm)	Water addition based on saturation level
i	Essentra™ Granules	40mm x 20mm	20	0.053	2 drops
ii	Essentra™ Granules	40mm x 20mm	10	0.027	2 drops
iii	25% Essentra™ pad in pouch	40mm x 20mm	N/A	0.05	2 drops

[0032] The quantity of material in (i) and (ii) is based on the weight of 25% and 12.5% of the shredded Essentra™ moisture pad, respectively.

[0033] On a daily basis water was applied to each of devices (i), (ii) and (iii) and the devices were then placed into metallised, laminated pouches containing 25gms of low-moisture blend tobacco.

[0034] On a daily basis (at the same time each day) 5gms of the tobacco was sampled from each pouch and submitted for moisture testing using the Hearson oven method (available from Astell™ - <http://www.astell.com/tobaccooven>).

Results

[0035] The tobacco used for this experimental work was a low-moisture additive-free blend with an average starting moisture of 15.7wt%.

[0036] On average during this testing 2 drops of water on each device = 0.21gms (0.21 mls of water)

[0037] The test period was four days and the results are shown in Figures 1-4.

Device 1 (20 Essentra™ Granules)

[0038] Addition of 2 drops of water to the 20 granule pad provided daily increases in the moisture content of the tobacco of between 0.5% and 1.8%. The average daily tobacco moisture increase was 1.2%. This is shown in Figure 2.

[0039] 24 hours after one application of water to the 20 granule pad, tobacco moisture increased to 17.6%. After 3 daily applications, the cumulative tobacco moisture increase to 19.5%. This is shown in Figure 1.

Device 2 (10 Essentra™ Granules)

[0040] Addition of 2 drops of water to the 10 granule pad provided daily increases in the moisture content of the tobacco of between 0.3% and 2%. The average daily moisture increase was 1.3%. This is shown in Figure 2.

[0041] 24 hours after one application of water to the 10 granule pad, tobacco moisture increased to 17.7%. After 3 daily applications, the cumulative tobacco moisture increased to 19.6%. This is shown in Figure 1.

Device 3 (25% Essentra™ pad in pouch)

[0042] Addition of 2 drops of water to a 25% pad provided daily moisture increases of between 0.6 and 3.4%. The average daily moisture increase was 1.4%. This is shown in Figure 2.

[0043] 24 hours after one application of water to a 25% pad, tobacco moisture increased to 17.5%. After 3 daily

applications, the cumulative tobacco moisture increased to 19.4%. This is shown in Figure 1.

[0044] Increased moisture as a result of the granular devices (Devices 1 and 2) resulted in a smoother smoke from this additive free blend.

[0045] In a separate test 2 drops of water were added to each of the three devices described above. The devices were placed in pouches containing tobacco. The devices were removed and weighed every hour to determine the rate of moisture loss from the device. The results of the test are shown in Figure 4.

Device 1 (20 Essentra™ Granules)

[0046] After 1 hour the 20 granule pads lost on average 41% moisture to the tobacco.

[0047] After 2 hours the 20 granule pads lost on average 60% moisture to the tobacco.

Device 2 (10 Essentra™ Granules)

[0048] After 1 hour the 10 granule pads lost on average 53% moisture to the tobacco.

[0049] After 2 hours the 10 granule pads lost on average 70% moisture to the tobacco.

Device 3 (25% Essentra™ pad in pouch)

[0050] After 1 hour 25% of the pads lost on average 25% moisture to the tobacco.

[0051] After 2 hours 25% of the pads lost on average 55% moisture to the tobacco.

[0052] Based on the initial tobacco moisture of the batch used in this test (15.7% $\pm$ 1%) daily use of humidifying devices according to the invention increased the tobacco moisture content.

[0053] On average daily moisture increase of 1.2% to 1.4% were recorded for all devices.

[0054] Daily water application at this rate (0.21mls) provided good moisturising of tobacco (2 - 3%).

[0055] The results confirm consistent moisture transfer from granular devices to pouches. This is shown in Figures 2, 3 and 4. Daily and total moisture transfer was more variable from 25% pad devices.

[0056] The rate of water transfer from granular devices according to the invention into pouched tobacco was quicker than from a 25% pad device (Device 3).

Claims

1. A humidifying device for increasing the moisture content of tobacco, wherein the device comprises a porous wrapper arranged to form a pocket, wherein multiple water-evaporating pieces are located within said pocket, and wherein the porous wrapper allows for water retention within the pocket and fluid communication between the interior and exterior of the pocket, **characterised in that** the porous wrapper is arranged such that water can be applied directly to the water-evaporating pieces or indirectly through the porous wrapper, said porous wrapper having a water capacity of at least 0.10 g/m² such that the porous wrapper adsorbs and evaporates water and is re-fillable with water, and water or water vapour can be transmitted to the environment outside the pocket, whereby the water capacity refers to the amount of water that can be stored in the porous wrapper and can be emitted via the process of evaporation.

2. A device according to claim 1, wherein the water-evaporating pieces are re-fillable with water.

3. A device according to claim 2, wherein the water-evaporating pieces are re-fillable through the porous wrapper.

4. A device according to any preceding claim, wherein the porous wrapper has a water capacity of at least 0.16 g/m².

5. A device according to any preceding claim, wherein the porous wrapper is made from any of the following materials: viscose, cellulosic fibres, polylactic acid fibres and/or thermoplastic fibres.

6. A device according to any preceding claim, wherein the water-evaporating piece has a water capacity of at least 0.25 g/m², preferably at least 0.32 g/m².

7. A device according to any preceding claim, wherein the device has a water release rate of around 0.2 g/m² over a period of 4 hours.

8. A device according to any preceding claim, wherein the water-evaporating piece is a granule.
9. A device according to any preceding claim, wherein the water-evaporating piece is made from a natural and/or synthetic polymer, a natural and/or synthetic cellulosic material, or a combination thereof.
10. A device according to any preceding claim, wherein the pocket contains at least 10 water-evaporating pieces, and preferably at least 20 water-evaporating pieces.
11. A pouch comprising tobacco and a humidifying device according to any of claims 1 to 9 wherein, in use, the humidifying device increases the moisture content of the tobacco.
12. A pouch according to claim 11, wherein at least 55% of the water content of the device is transferred to the tobacco over a period of one hour.
13. A pouch according to claims 11 or 12, wherein the moisture content of the tobacco is increased by 1.2% to 1.4% over a period of 24 hours.
14. A pouch according to any of claims 11 to 13, wherein the tobacco is a low- or mid-moisture blend.

Patentansprüche

1. Befeuchter zum Erhöhen des Feuchtigkeitsgehalts von Tabak, wobei die Vorrichtung eine poröse Umhüllung umfasst, die eingerichtet ist, eine Tasche zu formen, wobei sich multiple Wasser verdampfende Stücke innerhalb der Tasche befinden, und wobei die poröse Umhüllung Wasserrückhalt innerhalb der Tasche und Flüssigkeitskommunikation zwischen der Innenseite und der Außenseite der Tasche berücksichtigt, **dadurch gekennzeichnet, dass** die poröse Umhüllung derartig eingerichtet ist, dass sich Wasser direkt auf die Wasser verdampfenden Stücke oder indirekt durch die poröse Umhüllung anwenden lässt, wobei die poröse Umhüllung eine Wasserkapazität von zumindest 0,10 g/m² derartig aufweist, dass die poröse Umhüllung Wasser absorbiert und verdampft und mit Wasser auffüllbar ist, und Wasser oder Wasserdampf auf die Umgebung außerhalb der Tasche übertragen werden kann, wobei sich die Wasserkapazität auf die Wassermenge bezieht, die sich in der porösen Umhüllung speichern lässt und über den Verdampfungsprozess emittiert werden kann.
2. Vorrichtung nach Anspruch 1, wobei die Wasser verdampfenden Stücke mit Wasser auffüllbar sind.
3. Vorrichtung nach Anspruch 2, wobei die Wasser verdampfenden Stücke durch die poröse Umhüllung auffüllbar sind.
4. Vorrichtung nach irgendeinem vorhergehenden Anspruch, wobei die poröse Umhüllung eine Wasserkapazität von zumindest 0,16 g/m² aufweist.
5. Vorrichtung nach irgendeinem vorhergehenden Anspruch, wobei die poröse Umhüllung aus irgendeinem der folgenden Materialien hergestellt ist: Viskose, Zellulosefasern, Polymilchsäurefasern und/oder thermoplastischen Fasern.
6. Vorrichtung nach irgendeinem vorhergehenden Anspruch, wobei das Wasser verdampfende Stück eine Wasserkapazität von zumindest 0,25 g/m², vorzugsweise von zumindest 0,32 g/m² aufweist.
7. Vorrichtung nach irgendeinem vorhergehenden Anspruch, wobei die Vorrichtung eine Wasserfreisetzungsrate von ca. 0,2 g/m² über einen Zeitraum von 4 Stunden aufweist.
8. Vorrichtung nach irgendeinem vorhergehenden Anspruch, wobei das Wasser verdampfende Stück ein Körnchen ist.
9. Vorrichtung nach irgendeinem vorhergehenden Anspruch, wobei das Wasser verdampfende Stück aus einem natürlichen und/oder synthetischen Polymer, einem natürlichen und/oder synthetischen Zellulosematerial oder einer Kombination davon hergestellt ist.
10. Vorrichtung nach irgendeinem vorhergehenden Anspruch, wobei die Tasche zumindest 10 Wasser verdampfende Stücke und vorzugsweise zumindest 20 Wasser verdampfende Stücke enthält.

11. Beutel, der Tabak und einen Befeuchter nach einem der Ansprüche 1 bis 9 umfasst, wobei der Befeuchter, im Gebrauch, den Feuchtigkeitsgehalt des Tabaks erhöht.
12. Beutel nach Anspruch 11, wobei zumindest 55% des Wassergehalts der Vorrichtung über einen Zeitraum von einer Stunde auf den Tabak übertragen wird.
13. Beutel nach Ansprüchen 11 oder 12, wobei der Feuchtigkeitsgehalt des Tabaks um 1,2% bis 1,4% über einen Zeitraum von 24 Stunden erhöht wird.
14. Beutel nach irgendeinem der Ansprüche 11 bis 13, wobei der Tabak eine Mischung mit niedriger oder mittlerer Feuchtigkeit ist.

Revendications

1. Un dispositif d'humidification conçu pour augmenter la teneur en humidité du tabac, et ce dispositif comporte un élément poreux d'emballage en forme de pochette, et des accessoires multiples d'évaporation de l'eau sont implantés dans ladite pochette et cet élément poreux d'emballage permet de retenir l'eau à l'intérieur de cette pochette et l'acheminement de ce fluide entre l'intérieur et l'extérieur de cette pochette, et **se caractérisant par le fait que** l'élément poreux d'emballage est disposé de manière à pouvoir appliquer l'eau directement sur les accessoires d'évaporation de l'eau ou indirectement par le biais de l'élément poreux d'emballage, et ledit élément poreux d'emballage a une capacité en eau s'élevant à au moins 0,10 g/m², ce qui permet à cet élément poreux d'emballage d'adsorber et évaporer cette eau et de recevoir des compléments de plein d'eau, et cette eau ou la vapeur d'eau peut être transmise à l'atmosphère extérieure à proximité immédiate de la pochette, et cette capacité en eau se réfère au volume d'eau que peut emmagasiner l'élément poreux d'emballage et qui peut être émis par un processus d'évaporation.
2. Le dispositif que décrit la revendication 1, si ce n'est que les accessoires d'évaporation de l'eau peuvent recevoir des compléments de plein d'eau.
3. Le dispositif que décrit la revendication 2, si ce n'est que les accessoires d'évaporation de l'eau peuvent recevoir des compléments de plein d'eau par le biais de l'élément poreux d'emballage.
4. Le dispositif que décrit l'une ou l'autre des revendications précédentes, si ce n'est que l'élément poreux d'emballage a une capacité en eau d'au moins 0,16 g/m².
5. Le dispositif que décrit l'une ou l'autre des revendications précédentes, si ce n'est que l'élément poreux d'emballage est dans l'un des matériaux suivants : viscoses, fibres cellulosiques, fibres d'acide polylactique et (ou) fibres thermoplastiques.
6. Le dispositif que décrit l'une ou l'autre des revendications précédentes, si ce n'est que l'accessoire d'évaporation de l'eau a une capacité en eau d'au moins 0,25 g/m² et, de préférence, d'au moins 0,32 g/m².
7. Le dispositif que décrit l'une ou l'autre des revendications précédentes, si ce n'est que ce dispositif offre un taux de rejet d'eau d'environ 0,2 g/m² par tranche de 4 heures.
8. Le dispositif que décrit l'une ou l'autre des revendications précédentes, si ce n'est que l'accessoire d'évaporation de l'eau se compose d'un granulé.
9. Le dispositif que décrit l'une ou l'autre des revendications précédentes, si ce n'est que l'élément d'évaporation de l'eau est réalisé en polymère naturel et (ou) synthétique, en matériau cellulosique naturel et (ou) synthétique ou en une combinaison de ces matériaux.
10. Le dispositif que décrit l'une ou l'autre des revendications précédentes, si ce n'est que la pochette contient au moins 10 accessoires d'évaporation de l'eau et, de préférence, au moins 20 accessoires d'évaporation de l'eau.
11. Une pochette qui contient du tabac et un dispositif d'humidification que décrit l'une ou l'autre des revendications 1 à 9, si ce n'est que ce dispositif d'humidification, lors de son utilisation, augmente la teneur en humidité du tabac.

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12. La pochette que décrit la revendication 11, si ce n'est qu'au moins 55% de la teneur en eau de ce dispositif sont transférés au tabac durant une période d'une heure.
13. La pochette que décrit la revendication 11 ou 12, si ce n'est que la teneur en humidité du tabac augmente de 1,2 à 1,4% durant une période de 24 heures.
14. La pochette que décrit l'une ou l'autre des revendications 11 à 13, si ce n'est que le tabac est un mélange dont l'humidité est faible ou moyenne.

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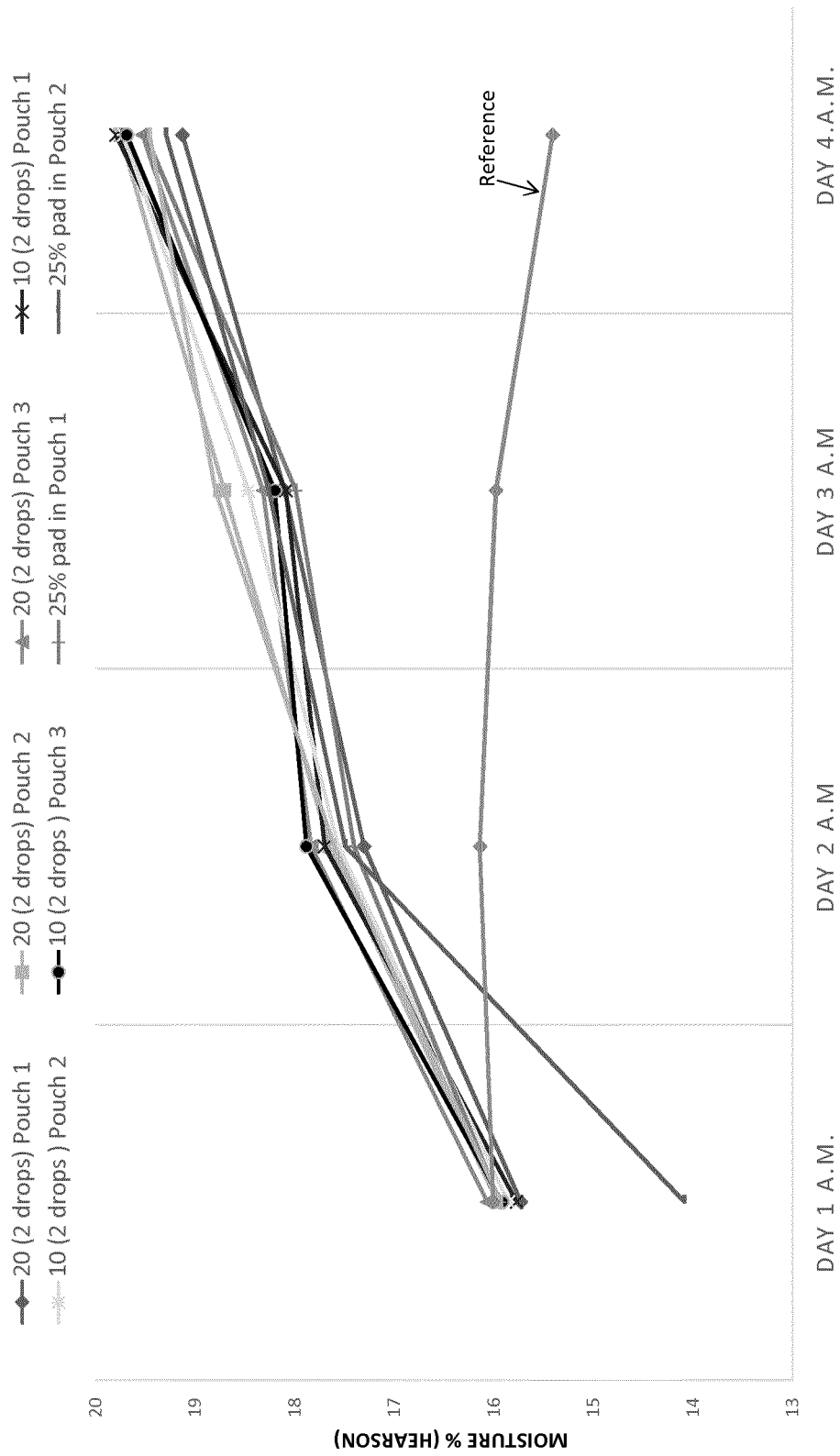


FIGURE 1a

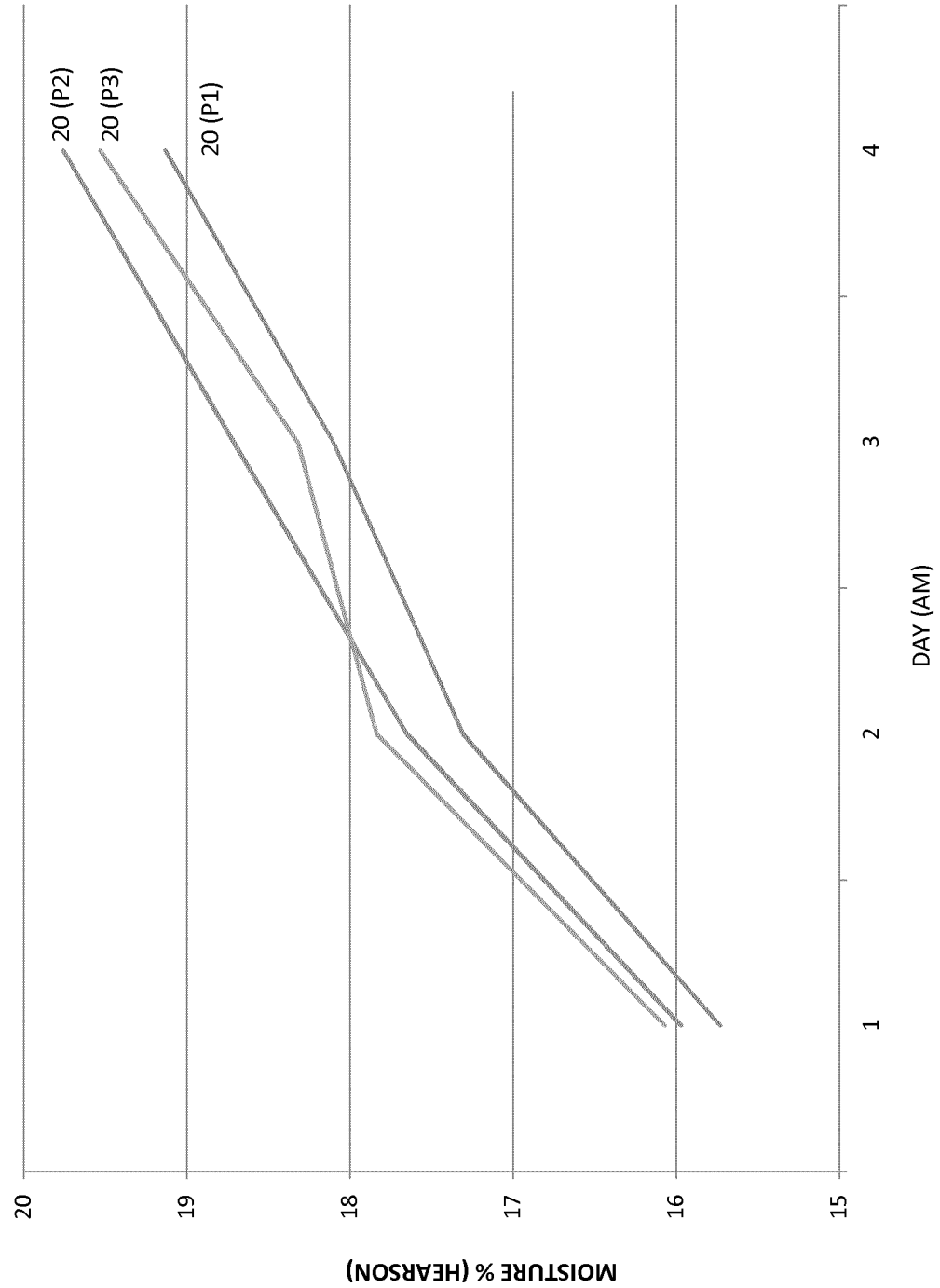


FIGURE 1b

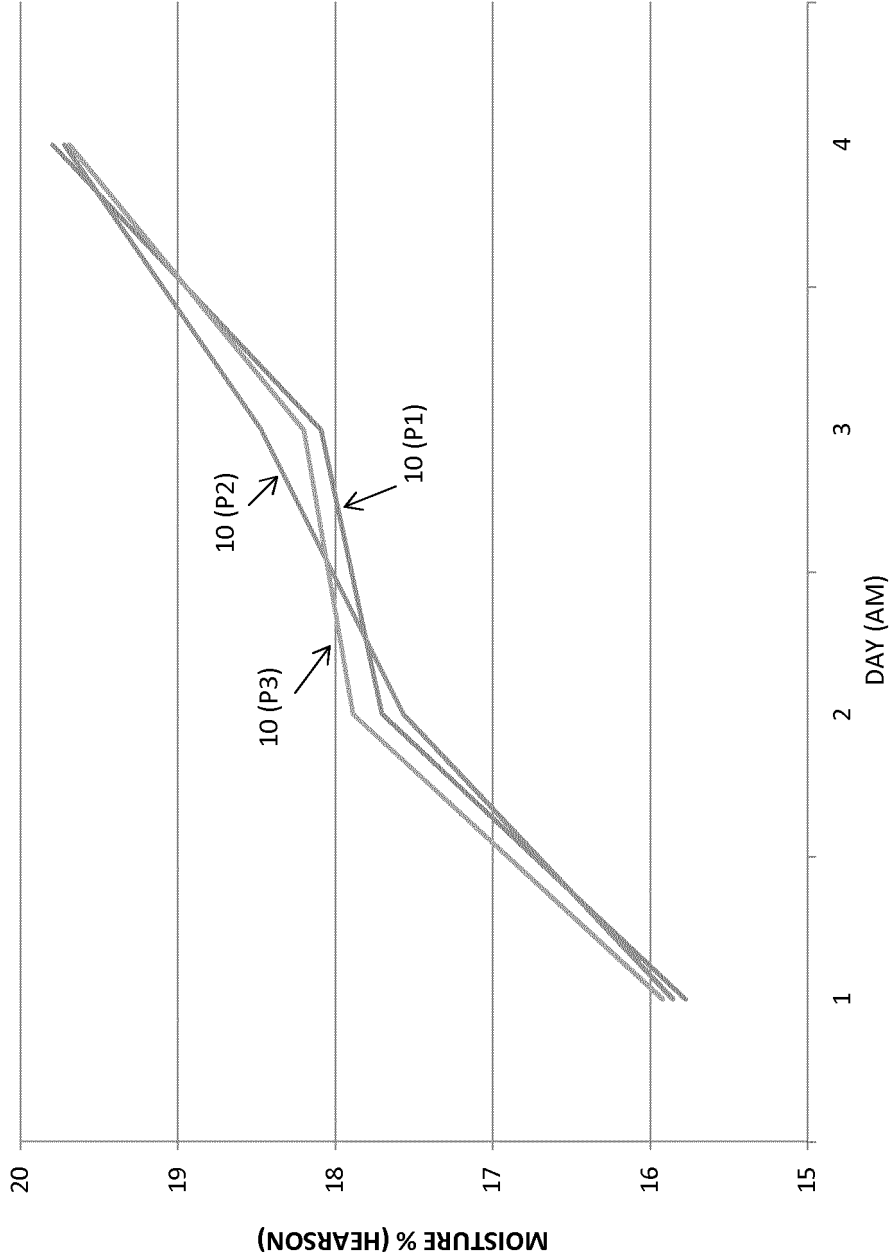


FIGURE 1c

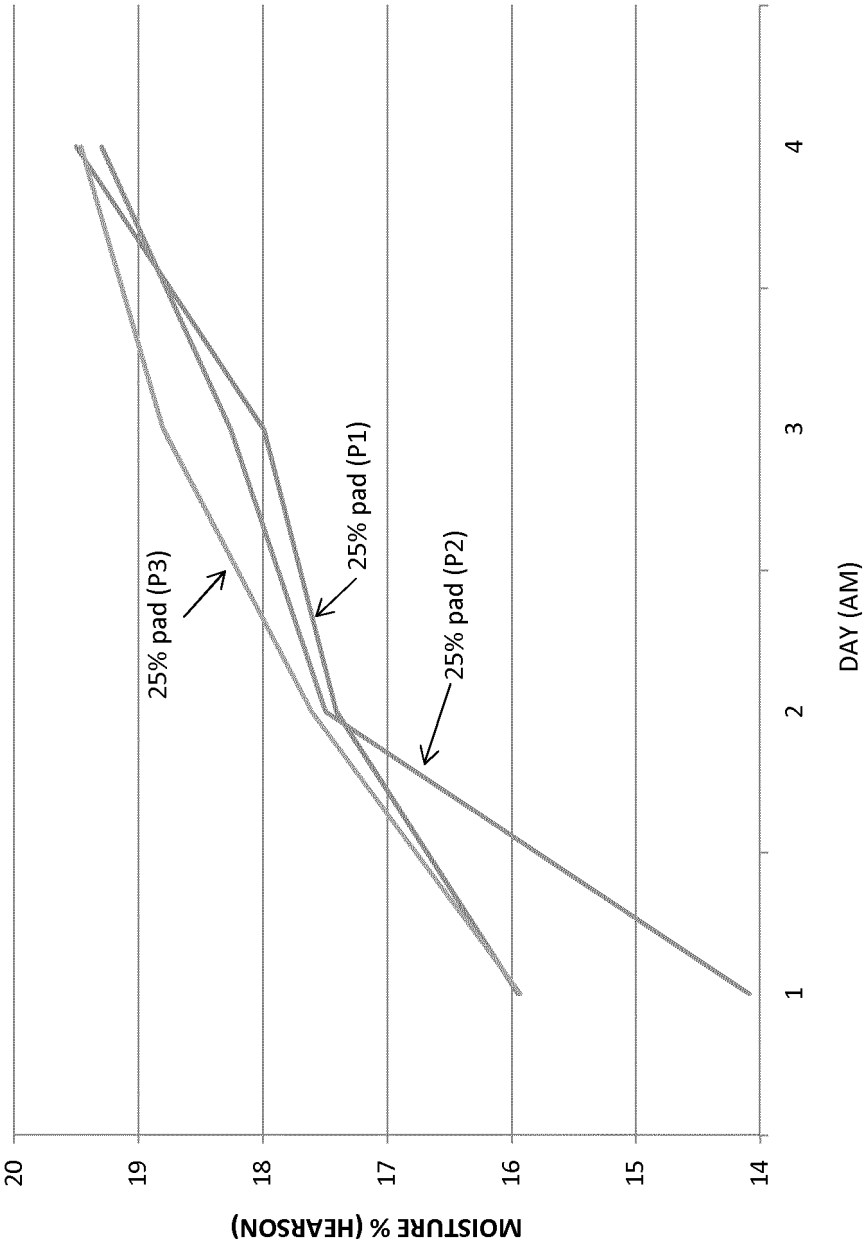


FIGURE 1d

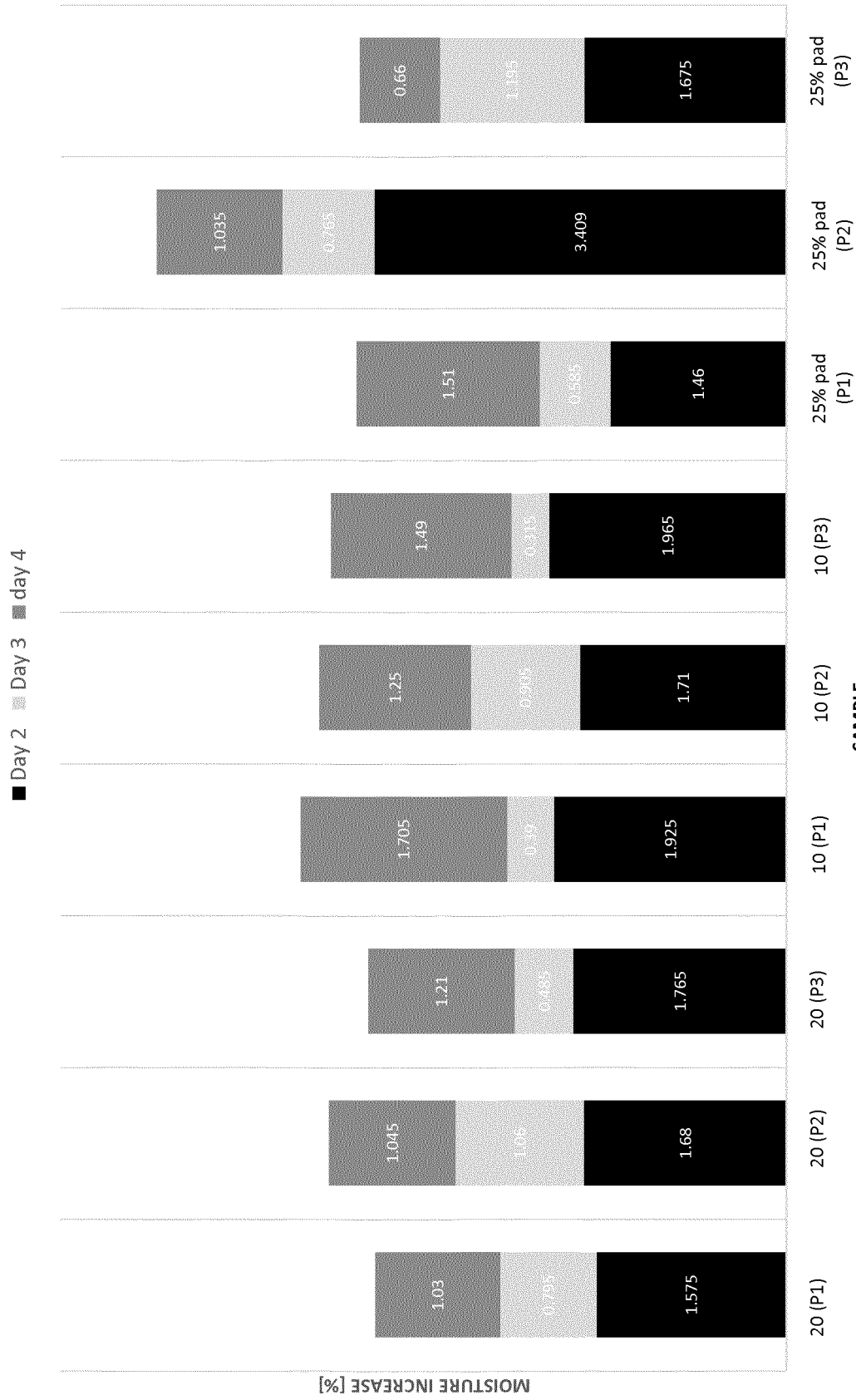


FIGURE 2

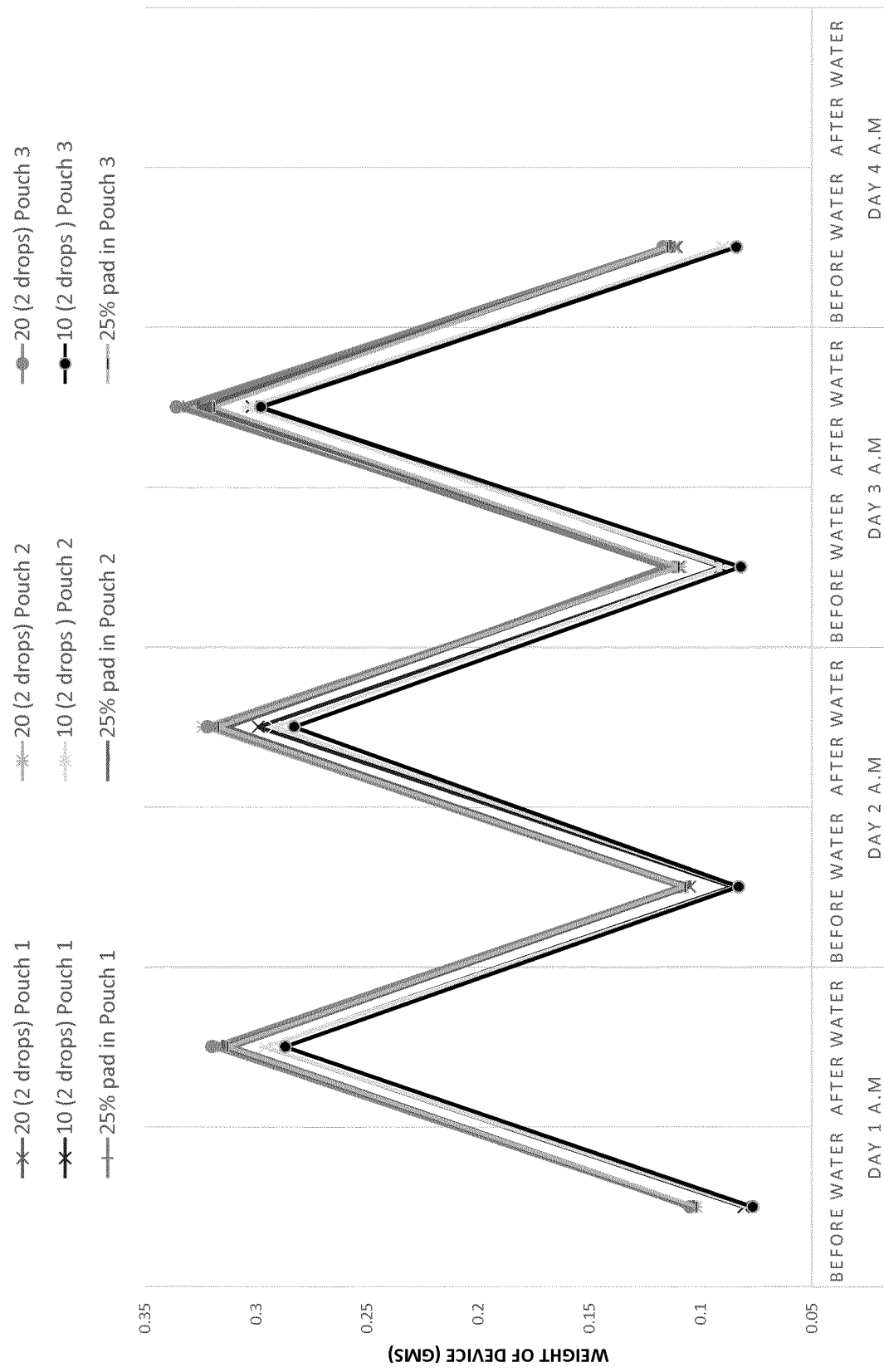


FIGURE 3

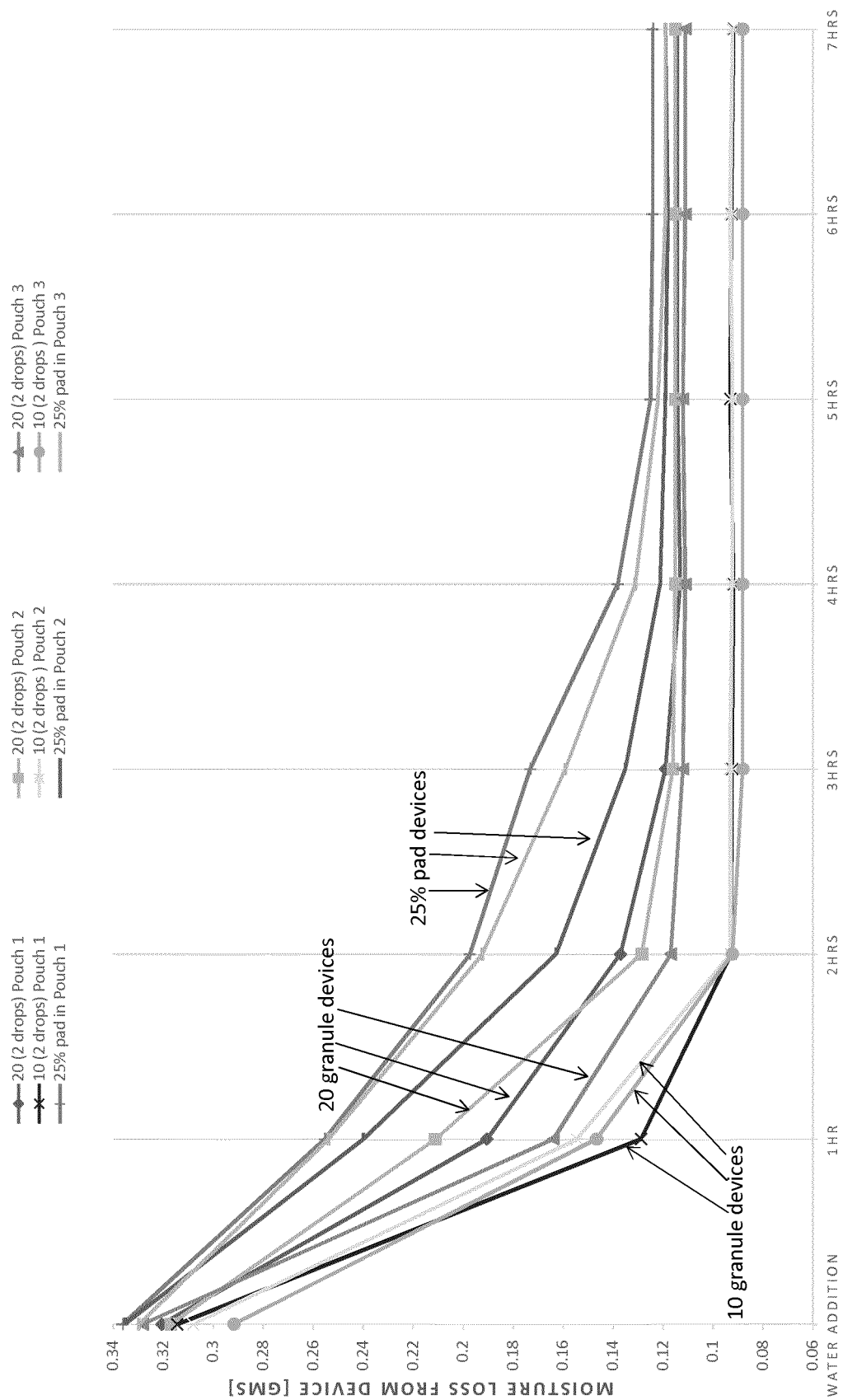


FIGURE 4

REFERENCES CITED IN THE DESCRIPTION

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