

(19) **DANMARK**

(10) **DK/EP 3478059 T3**



(12) **Oversættelse af
europæisk patentskrift**

Patent- og
Varemærkestyrelsen

-
- (51) Int.Cl.: **A 01 M 23/18 (2006.01)** **A 01 M 25/00 (2006.01)** **A 01 N 25/00 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2023-02-06**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2022-11-02**
- (86) Europæisk ansøgning nr.: **17735090.7**
- (86) Europæisk indleveringsdag: **2017-06-30**
- (87) Den europæiske ansøgnings publiceringsdag: **2019-05-08**
- (86) International ansøgning nr.: **EP2017066245**
- (87) Internationalt publikationsnr.: **WO2018002292**
- (30) Prioritet: **2016-06-30 AT 505892016** **2016-10-20 AT 509562016**
- (84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**
- (73) Patenthaver: **UK3M Green Rodenticide GmbH, Sommerpromenade 4, 39012 Meran (BZ), Italien**
- (72) Opfinder: **Gasser, Klaus, Feldweg 5, 39010 Gargazon, Italien**
- (74) Fuldmægtig i Danmark: **NORDIC PATENT SERVICE A/S, Bredgade 30, 1260 København K, Danmark**
- (54) Benævnelse: **RODENTICID OG ANVENDELSE AF ET MIDDEL TIL BEKÆMPELSE AF GNAVERE**
- (56) Fremdragne publikationer:
CN-A- 103 999 879
FR-A1- 2 901 455
FR-A1- 3 002 414
GB-A- 735 694
US-A- 5 027 548
US-A1- 2015 351 378
Unbekannt: "Vergiftungsfälle durch Grayanotoxine in Rhododendron-Honigen aus der türki- schen Schwarzmeerregion", , 3. September 2010 (2010-09-03), XP055410737, Gefunden im Internet: URL:http://www.bfr.bund.de/cm/343/vergiftu_ngsfaelle_durch_grayanotoxine_in_rhododendron_honigen_aus_der_tuerkischen_schwarzmee_rregion.pdf [gefunden am 2017-09-27]
Unbekannt: "Vergiftungsfälle durch Grayanotoxine in Rhododendron-Honigen aus der türki- schen Schwarzmeerregion", , 3 September 2010 (2010-09-03), XP055410737, Retrieved from the Internet: URL:http://www.bfr.bund.de/cm/343/vergiftu_ngsfaelle_durch_grayanotoxine_in_rhododendron_honigen_aus_der_tuerkischen_schwarzmee_rregion.pdf [retrieved on 2017-09-27]

The invention relates to an agent for controlling pests, in particular rodents, such as mice. The invention further relates to the use and application of the agent for pest control and to a device for applying this agent with a bait box.

Rodents, such as mice and rats, are synanthropes of humans and forage directly in food storage places, for example. Further, rodents also preferably stay in areas used for food production, where they eat the crops or damage roots and tubers of the plants as a result of living underground. In Indonesia, 17 % of the rice harvest is lost due to rodents, for example. All of this means huge material damage as well as collateral damage, such as damage to insulating materials, power supply lines and water pipes, etc.

In addition to the material damage caused by the rodents, some species are also known as transmitters of diseases, thus being a threat to humans. Through bites, pasteurellosis and rabies can be transmitted, among others. The rodents' faeces can lead to the transmission of salmonellosis and leptospirosis, as well as haemorrhagic fever. Probably the best-known diseases are those transmitted by fleas parasitizing on rodents, such as murine typhus and the plague.

Therefore, the control or at least containment of the rodent population is an objective of pest control and also of plant protection and represents an important element of hygiene provision.

Mouse control agents with edible bait have been known for a long time. Widely used active substances are coumarins, which are anticoagulants from the group of vitamin K antagonists that inhibit blood clotting. They have the advantage that the toxic effect does not occur immediately after ingestion, but only at a later time when the rodents being controlled retreat; therefore, they do not die next to the edible bait. Such mixtures are known from FR 3 002 414 A1 or GB 735 649 A, for example.

The responsible authorities now assess anticoagulants as rodenticides very critically. On the one hand, resistance can develop in the rodent population being controlled. On the other hand, environmentally hazardous properties may occur, such as persistence or bioaccumulation. Furthermore, internal bleeding can cause severe animal suffering lasting several days. Moreover, these active substances do not only affect rodents, but also predators such as owls, common buzzards, golden eagles, foxes and polecats, which prey on mice. Furthermore, seed- and grain-eating birds may also be affected if they eat this edible bait directly.

Compositions that do not require the use of toxic agents are known, for example, from CN 103999879 A. The toxic effect of grayanotoxins is described, for example, in report no. 043/2010 of the German Federal Institute for Risk Assessment. Even in long-term experiments, a lethal effect could only be found in a few animals.

Devices for dispensing active substances and mixtures of active substances are known, for example, from US 5 027 548 A, US 2015/351378 A1 and FR 2 901 455 A1.

It is an object of the present invention to provide a safe acting agent and a device for controlling rodents, such as mice, which is biological, is derived from nature, is reliably effective, and causes limited or no environmental harm. A further objective is to that the agent is easy to use and inexpensive. The aforementioned object is solved by the use of an agent according to claim 1 and/or a rodenticide according to claim 16.

The agent used according to the invention is characterised in that it contains or consists of one or more active substances from the group of grayanotoxins. In addition to the active substance, the agent may contain a rodent-attracting edible bait and/or attractant. The edible bait may be or have an active substance carrier that entices the rodent to orally ingest the edible bait and the active substance.

In one variant, the active substance is applied to a wipe-off surface with an active substance carrier to transfer the active substance to the skin or fur of the rodent. In another variant, the edible bait may be enclosed in a wrapper such as a plastic sachet, such as nylon or bioplastic, which is openable by the pest.

Furthermore, the agent may be combined with an anticoagulant, such as bromadiolone.

Preferably, the agent is characterised in that the active substance carrier is selected from the group comprising natural oils, waxes and honey and mixtures, emulsions, solutions and dispersions thereof. Further preferably, the active substance carrier may contain the following ingredients (wt.-%):

- sugar, preferably 60 % to 85 %, in particular about 80 %,
- organic acids, preferably 0.2 % to 0.8 %, in particular about 0.6 %,
- enzymes, preferably 1 % to 3 %, in particular about 2 wt%,
- minerals, preferably potassium salt 0.1 % to 0.5 %, in particular about 0.2 % and
- water to 100 %, and optionally, attracting additives such as fragrances, flavourings, preservatives, colouring agents, etc.

Grayanotoxin may also be present in natural honey as an active substance carrier.

Preferably, the grayanotoxin is present in an amount of about 10 mg to 300 mg per kg of active substance carrier, in particular honey.

When using the agent, it may advantageously be provided that the agent is contained in a bait box, in particular as an edible bait and/or on a wipe-off surface.

Preferably, the bait box is configured in such a way that the entry of the pest is enabled and optionally the exit of the pest is prevented. The edible bait may be configured for direct oral

ingestion by the pest, in particular the rodent. Furthermore, the edible bait and/or the wipe-off surface may be used for indirect intake of the active substance by the pest, in particular by the rodent, especially by oral ingestion during grooming.

The device may be configured as a bait box with a base, side edges and a lid. Furthermore, the device has at least one access hole for the entry of the pest. The access hole may be equipped with a tilt door arrangement, allowing entry of the pest and preventing exit of the pest.

Preferably, a bait container is provided inside the bait box to hold the agent, in particular the edible bait. Inside the bait box, a wipe-off surface designed for indirect intake of the agent by the pest may be provided. As a development of the invention, the interior of the bait box may be protected against the entry of insects and small animals. Furthermore, the bait box may include air holes, optionally the air holes being covered by a fine mesh grid or fabric to prevent the entry of insects and small animals. Preferably, the bait box is designed with a waterproof base and the air holes are positioned high enough above the base to prevent water from entering.

The use of the agent may also comprise that the edible bait comprises bait grains, bait pellets or bait paste on which the active substance is applied with or without an additional active substance carrier.

Furthermore, it may be advantageous to condition the agent as a spray or foam. The active substance carrier is then to be formulated as a sprayable or foam-forming liquid. Therefore, the agent can be easily applied to contact surfaces or edible baits.

Further features can be found in the claims and the description.

Investigations and prolonged field trials have surprisingly shown that the active substance grayanotoxin has good properties as a rodenticide. Grayanotoxins are exhaustively described in the literature and the chemical formulae are known. It has been shown that effects of the agent occur even at low concentrations of the active substance. The lethal dose for grayanotoxin 1 in mice is about 5.1 mg per kg live weight and for grayanotoxin 3 about 4.9 mg per kg live weight.

The agent may contain natural and/or synthetic carrier substances or mixtures of substances as active substance carriers. Natural carrier substances may preferably be selected from the group of natural oils, waxes and honey and mixtures, emulsions, solutions or dispersions thereof.

A preferred active substance carrier may contain the following ingredients (% by weight):

- sugar, preferably 60 % to 85 %, in particular about 80 %,
- organic acids, preferably 0.2 % to 0.8 %, in particular about 0.6 %,
- enzymes, preferably 1 % to 3 %, in particular about 2 wt%,
- minerals, preferably potassium salt 0.1 % to 0.5 %, in particular about 0.2 % and
- water to 100 %,

- active substance content as described above,
and optionally, attracting additives such as fragrances, flavourings, preservatives, colouring agents, etc.

The sugar content may be selected from the group consisting of fructose, glucose, saccharides, disaccharides. The organic acids are preferably selected from the group consisting of gluconic acid, citric acid, malic acid, succinic acid and formic acid, and the enzymes from the group consisting of invertase, diastase, catalase, phosphatase and inhibins. Preferably, the mineral is primarily a potassium salt.

A natural source of grayanotoxins is honey from areas with high populations of rhododendrons. The agent according to the invention may be this naturally formed honey containing grayanotoxin. The content of grayanotoxin may vary, for example 10 mg to 300 mg per kg of honey.

In experiments, it was found that mice rarely develop resistance to grayanotoxin, which is apparently related to the fact that grayanotoxin and the different variants of this active substance target different target receptors.

When sourced naturally, grayanotoxin is present in amounts of about 10 mg to 300 mg per kg of honey. Honey is also an attractant for mice, which encourages them to eat it. Furthermore, carrier substances, such as honey, remain on the rodents' fur and the active substance can enter the body orally during natural grooming. Preferably, the edible bait will be contained in a bait box. Bait boxes are widely known as mouse traps. They enable the rodent to enter and prevent it from exiting. In any case, this ensures that damage to the environment and to predators, such as birds, foxes, etc., is avoided. However, it is also possible to place edible baits with the active substance in the rodents' tunnels. The application directly at the mouse hole is also possible.

The edible bait may be in any suitable form, such as for direct ingestion, e.g. in the form of cereal grains as bait grains coated with the active agent and optionally with a carrier substance. If grayanotoxin is contained in a sticky fluid, such as honey, then a surface may also be coated with it as a wipe-off surface, which is licked off by the rodent or transferred to the fur for oral ingestion. The quantity of edible bait shall be such that the rodent is able to ingest it, i.e. that at least the lethal dose is ingested to ensure the safe death of the animal without prolonged suffering.

If the pest control agent is to be used in particular as a plant protection agent, it is mainly those plants that are subject to frequent root feeding or feeding on the fruits formed that are protected. Field tests were carried out in South Tyrol on an area of approx. 7 hectares of orchards with apple trees. The targeted mouse species included field mouse, water vole, field vole, bank vole, and others. Honey was used as the active substance carrier with a grayanotoxin content of

between 10 and 300 mg per kg of honey. Grayanotoxins consisted predominantly of the variants grayanotoxin 1 and 3. However, all grayanotoxins 1 to 8 may be used.

In addition to agricultural areas, storage areas, public parks, buildings, etc. are also suitable areas of application for the agent according to the invention.

5 In the field trials, the effectiveness of the agent was confirmed over several years on an area of about 7 ha of orchards - mainly apple orchards. Resistance was not detected in any case. The application was made in a bait box with a minimum amount of 1 mg grayanotoxin on or in the bait.

10 The rodents also gained access to the bait if it was enclosed in plastic packaging such as nylon, bioplastic, paper, plastic of all kinds or gelatine capsules.

The agent was applied both in sachets and without wrapping in bait boxes. The application was carried out on a trial basis over all months of the year from 2013 to May 2017. In almost 100 % of all observable cases, the rodents died within a short time.

15 Resistance was not detected. The preferred active substance carrier was honey, which allowed the rodents to ingest the product in larger quantities. The animals also gained access to the agent when it was contained in sealed sachets, such as those made of plastic film (e.g. nylon). Contact of the baits by humans had no negative influence. Even wrapping them in three sachets could not stop the rodents from eating the agent.

20 When the agent was combined with bromadiolone, both in a bait box and directly in mouse tunnels, the desired effect also occurred within a short time, wherein mainly the agent with honey as active substance carrier was consumed, but less the bromadiolone.

25 Preferably, the agent is applied by means of a bait box into which an active substance pouch can be inserted, which contains the active substance in the active substance carrier - such as honey - in an appropriate quantity. The active ingredient pouches may, for example, be in the form of sachets made of the above-mentioned materials and filled with the agent.

Fig. 1 shows a view of a bait box diagonally from the front.

Fig. 2 shows an inner view of the tilt door of the bait box.

The bait box 1 is box-shaped with a base 2, side edges 3, 4 and a lid 5 which is removable or pivotable to allow access to the inside.

30 The access hole 6 enables the animal to enter the inside of the bait box 1. The air openings 7 allow air access and are preferably covered by fine mesh grids or fabrics in order to prevent entry of insects and small animals.

Accordingly, the mesh size of the grid or fabric must be chosen to be small.

Fig. 2 shows the tilt door arrangement 8 inside the bait box 1 in a position rotated by 90°.

The tilt door 9 acts as a trap door that opens when the animal climbs on it and lifts up again when the animal leaves the trap door to get to the bait inside the bait box 1.

For receiving the bait in the form of the active ingredient pouch, a bait container is preferably provided inside the bait box 1, in which the bait can be inserted and replaced. The air openings 5 7 of the bait box 1 are preferably arranged high enough above the base 2 to prevent water from entering in case of rain. In practice, a minimum distance of about 2 cm or higher has been shown to be advantageous. The bait container in the bait box 1 may also be arranged at a distance from the base 2 for this purpose, so that the bait is kept away from the water if water has penetrated. This ensures that the bait remains effective even in the event of water penetration or, if worse 10 comes to worst, that the active substance does not leak out into the environment. Easy maintenance of the bait box 1 is guaranteed.

The agent with the active substance carrier, such as honey, may be filled into the above-mentioned sachets as active substance pouches for better handling and placed closed in the bait box 1 or its bait container.

15 The rodents open the sachets and thus come into contact with the agent. The active substance pouch may also be opened by the operator. The agent may be liquid or applied to a carrier substance.

Patentkrav

1. Anvendelse af et middel som gnaverbekæmpelsesmiddel, **kendetegnet ved, at** midlet indeholder eller består af et eller flere virksomme stoffer fra gruppen af grayanotoxiner i en effektiv mængde.
5
2. Anvendelse ifølge krav 1, **kendetegnet ved, at** midlet ud over det virksomme stof omfatter en spiselig madding og/eller et lokkemiddel, som lokker gnavere til.
3. Anvendelse ifølge krav 2, **kendetegnet ved, at** den spiselige madding er eller har en bærer
10 af det virksomme stof, som tilskynder gnaveren til oralt indtag af den spiselige madding og det virksomme stof.
4. Anvendelse ifølge krav 1, **kendetegnet ved, at** det virksomme stof er påført med en bærer af
15 det virksomme stof på en skrabeblade for at overføre det virksomme stof til gnaverens hud eller pels.
5. Anvendelse af et af kravene 1 til 4, **kendetegnet ved, at** den spiselige madding er indesluttet i en indpakning, såsom en eller flere små poser af plast, såsom nylon eller bioplast, der kan åbnes af gnaveren.
20
6. Anvendelse af et af de foregående krav, **kendetegnet ved, at** den spiselige madding omfatter kerner, pellets eller pasta, hvorpå det virksomme stof med eller uden yderligere bærer af det virksomme stof er påført.
- 25 7. Anvendelse ifølge et af kravene 1 til 6, **kendetegnet ved, at** midlet er kombineret med et antikoaguleringsmiddel, som bromadiolon.
8. Anvendelse ifølge et af kravene 1 til 7, **kendetegnet ved, at** bæreren af det virksomme stof er valgt fra gruppen af naturlige olier, voks og honning og blandinger, emulsioner, opløsninger
30 og dispersioner heraf.

9. Anvendelse ifølge et af kravene 1 til 8, **kendetegnet ved, at** grayanotoxin er indeholdt i en mængde på cirka 10 mg til 300 mg pr. kg bærer af det virksomme stof, særligt honning.
10. Anvendelse ifølge et af kravene 1 til 9, **kendetegnet ved, at** midlet har en bærer af det virksomme stof, som kan sprayes eller skummes, og er indeholdt i en spray- eller skumbeholder.
11. Anvendelse ifølge et af de foregående krav i kombination med en anordning, som er udformet som en maddingkasse (1), hvor anordningen mindst har et tilgangshul (6) til indgang af skadedyret, der skal fanges.
12. Anvendelse ifølge krav 11, **kendetegnet ved, at** maddingkassen er udformet med bund (2), sidekanter (3, 4) og låg (5).
13. Anvendelse ifølge krav 11 eller 12, **kendetegnet ved, at** tilgangshullet (6) er udstyret med en vippedørsindretning (8), igennem hvilken gnaveren har mulighed for indgang, og hvor gnaverens udgang forhindres.
14. Anvendelse ifølge et af kravene 11 til 13, **kendetegnet ved, at** der i det indre af maddingkassen (1) er tilvejebragt en maddingbeholder til optag af midlet, særligt den spiselige madding.
15. Anvendelse ifølge et af kravene 11 til 13, **kendetegnet ved, at** der i det indre af maddingkassen (1) er tilvejebragt en skrabeblade til skadedyrets indirekte optag af midlet.
16. Rodenticid, **kendetegnet ved, at** det har et eller flere virksomme stoffer fra gruppen af grayanotoxiner i en effektiv mængde og en spiselig madding og/eller et lokkemiddel, foretrukket honning, der tiltrækker gnaveren.
17. Rodenticid ifølge krav 16, **kendetegnet ved, at** midlet er kombineret med et antikoaguleringsmiddel, som bromadiolon.

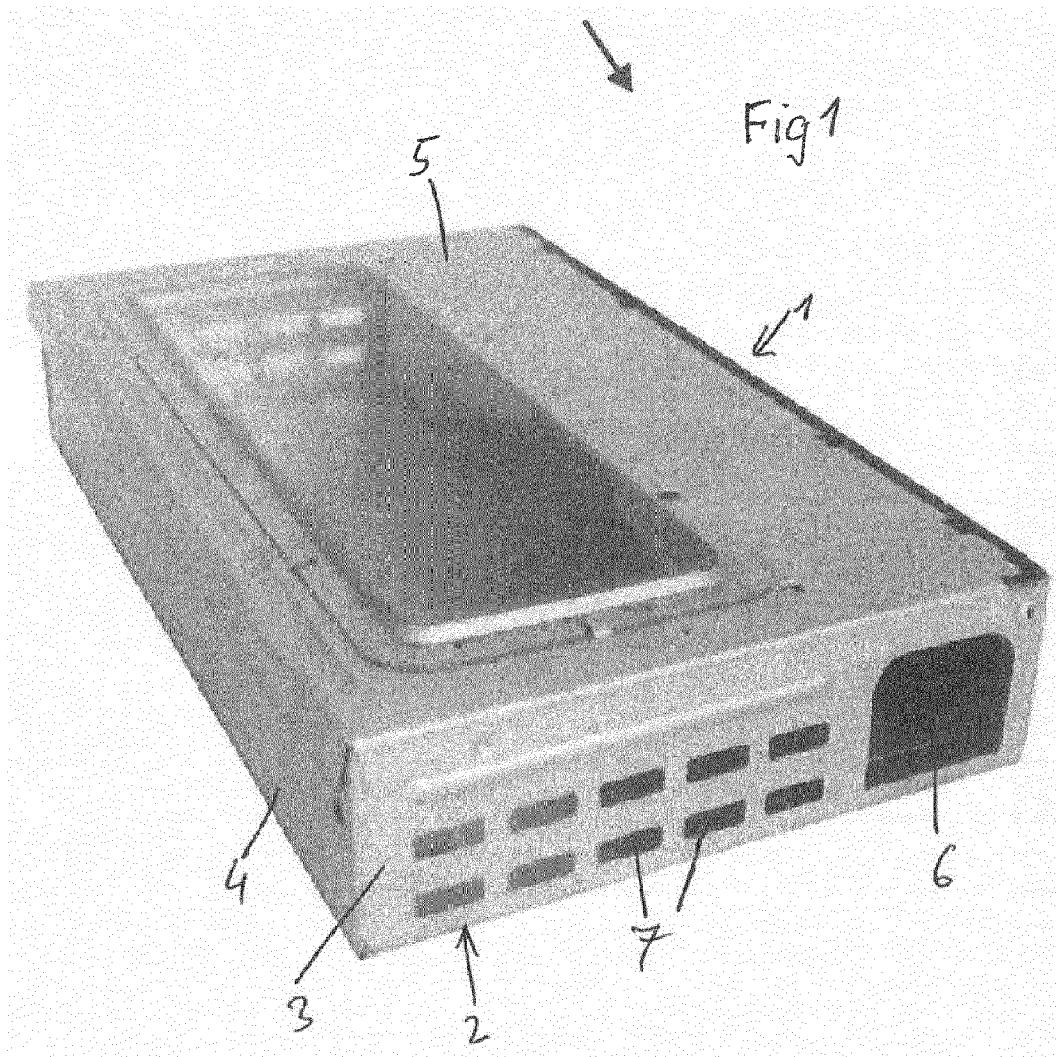


Fig. 2

