PHC
Plant Health Cure

Myconate HB
Plant Health Cure

Version No: **0.3**
Safety Data Sheet (Conforms to Regulation (EU) No 2015/830)

Issue Date: **18/12/2020**
Print Date: **18/12/2020**
S.REACH.GBR.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

1.1. Product Identifier

Product name	Myconate HB
Chemical Name	formononetin
Synonyms	Not Available
Chemical formula	C16-H12-O4
Other means of identification	Not Available
CAS number	485-72-3*
EC number	207-623-9
REACH registration number	01-2120770469-41-XXXX

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Biostimulant
Uses advised against	Not Applicable

1.3. Details of the supplier of the safety data sheet

Registered company name	**Plant Health Cure**
Address	Veldweg 7 Oisterwijk Netherlands
Telephone	+31 137 200 300
Fax	Not Available
Website	www.phc.eu
Email	info@phc.eu

1.4. Emergency telephone number

Association / Organisation	**Plant Health Cure**
Emergency telephone numbers	+31 137 200 301
Other emergency telephone numbers	+31 651 328 508

SECTION 2 Hazards identification

2.1. Classification of the substance or mixture

Classification according to regulation (EC) No 1272/2008 [CLP] and amendments [1]	H335 - Specific target organ toxicity - single exposure Category 3 (respiratory tract irritation), H315 - Skin Corrosion/Irritation Category 2, H319 - Eye Irritation Category 2
Legend:	*1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI*

2.2. Label elements

Hazard pictogram(s)	
UFI:	FFV3-907X-M00X-23AQ
Signal word	**Warning**

Hazard statement(s)

H335	May cause respiratory irritation.
H315	Causes skin irritation.
H319	Causes serious eye irritation.

Supplementary statement(s)

Not Applicable

Precautionary statement(s) Prevention

P271	Use only outdoors or in a well-ventilated area.
P261	Avoid breathing dust/fumes.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Precautionary statement(s) Response

P321	Specific treatment (see advice on this label).
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
P337+P313	If eye irritation persists: Get medical advice/attention.
P302+P352	IF ON SKIN: Wash with plenty of water and soap.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.

Precautionary statement(s) Storage

P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.

2.3. Other hazards

REACH - Art.57-59: The mixture does not contain Substances of Very High Concern (SVHC) at the SDS print date.

SECTION 3 Composition / information on ingredients

3.1.Substances

1.CAS No **2.EC No** **3.Index No** **4.REACH No**	**%[weight]**	**Name**	**Classification according to regulation (EC) No 1272/2008 [CLP] and amendments**
1.485-72-3 2.207-623-9 3.Not Available 4.01-2120770469-41-XXXX	>97	formononetin	Skin Corrosion/Irritation Category 2, Eye Irritation Category 2, Specific target organ toxicity - single exposure Category 3; H315, H319, H335 [3]

Legend: *1. Classified by Chemwatch; 2. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 3. Classification drawn from C&L; * EU IOELVs available*

3.2.Mixtures

See 'Information on ingredients' in section 3.1

SECTION 4 First aid measures

4.1. Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor, without delay.

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Ingestion	‣ Immediately give a glass of water. ‣ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

4.2 Most important symptoms and effects, both acute and delayed

See Section 11

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

5.1. Extinguishing media

- Foam.
- Dry chemical powder.
- Carbon dioxide.
- Water spray or fog - Large fires only.

5.2. Special hazards arising from the substrate or mixture

Fire Incompatibility	‣ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

5.3. Advice for firefighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear breathing apparatus plus protective gloves. ‣ Prevent, by any means available, spillage from entering drains or water courses. ‣ Use water delivered as a fine spray to control fire and cool adjacent area. ‣ **DO NOT** approach containers suspected to be hot. ‣ Cool fire exposed containers with water spray from a protected location. ‣ If safe to do so, remove containers from path of fire. ‣ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	‣ Combustible solid which burns but propagates flame with difficulty; it is estimated that most organic dusts are combustible (circa 70%) - according to the circumstances under which the combustion process occurs, such materials may cause fires and / or dust explosions. ‣ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions). ‣ Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust (420 micron or less) may burn rapidly and fiercely if ignited - particles exceeding this limit will generally not form flammable dust clouds; once initiated, however, larger particles up to 1400 microns diameter will contribute to the propagation of an explosion. ‣ In the same way as gases and vapours, dusts in the form of a cloud are only ignitable over a range of concentrations; in principle, the concepts of lower explosive limit (LEL) and upper explosive limit (UEL) are applicable to dust clouds but only the LEL is of practical use; - this is because of the inherent difficulty of achieving homogeneous dust clouds at high temperatures (for dusts the LEL is often called the 'Minimum Explosible Concentration', MEC). ‣ When processed with flammable liquids/vapors/mists,ignitable (hybrid) mixtures may be formed with combustible dusts. Ignitable mixtures will increase the rate of explosion pressure rise and the Minimum Ignition Energy (the minimum amount of energy required to ignite dust clouds - MIE) will be lower than the pure dust in air mixture. The Lower Explosive Limit (LEL) of the vapour/dust mixture will be lower than the individual LELs for the vapors/mists or dusts. ‣ A dust explosion may release of large quantities of gaseous products; this in turn creates a subsequent pressure rise of explosive force capable of damaging plant and buildings and injuring people. ‣ Usually the initial or primary explosion takes place in a confined space such as plant or machinery, and can be of sufficient force to damage or rupture the plant. If the shock wave from the primary explosion enters the surrounding area, it will disturb any settled dust layers, forming a second dust cloud, and often initiate a much larger secondary explosion. All large scale explosions have resulted from chain reactions of this type. ‣ Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport. ‣ Build-up of electrostatic charge may be prevented by bonding and grounding. ‣ Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting. ‣ All movable parts coming in contact with this material should have a speed of less than 1-meter/sec. ‣ A sudden release of statically charged materials from storage or process equipment, particularly at elevated temperatures and/ or pressure, may result in ignition especially in the absence of an apparent ignition source. ‣ One important effect of the particulate nature of powders is that the surface area and surface structure (and often moisture content) can vary widely from sample to sample, depending of how the powder was manufactured and handled; this means that it is virtually impossible to use flammability data published in the literature for dusts (in contrast to that published for gases and vapours). ‣ Autoignition temperatures are often quoted for dust clouds (minimum ignition temperature (MIT)) and dust layers (layer ignition temperature (LIT)); LIT generally falls as the thickness of the layer increases. Combustion products include: carbon monoxide (CO) carbon dioxide (CO_2) other pyrolysis products typical of burning organic material. May emit poisonous fumes. May emit corrosive fumes.

SECTION 6 Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

See section 8

6.2. Environmental precautions

See section 12

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6.3. Methods and material for containment and cleaning up

Minor Spills	Clean up all spills immediately. Avoid breathing dust and contact with skin and eyes. Wear protective clothing, gloves, safety glasses and dust respirator. Use dry clean up procedures and avoid generating dust. Sweep up, shovel up or Vacuum up (consider explosion-proof machines designed to be grounded during storage and use). Place spilled material in clean, dry, sealable, labelled container.
Major Spills	Moderate hazard. **CAUTION**: Advise personnel in area. Alert Emergency Services and tell them location and nature of hazard. Control personal contact by wearing protective clothing. Prevent, by any means available, spillage from entering drains or water courses. Recover product wherever possible. **IF DRY:** Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. **IF WET**: Vacuum/shovel up and place in labelled containers for disposal. **ALWAYS:** Wash area down with large amounts of water and prevent runoff into drains. If contamination of drains or waterways occurs, advise Emergency Services.

6.4. Reference to other sections

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

7.1. Precautions for safe handling

Safe handling	Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. Prevent concentration in hollows and sumps. **DO NOT** enter confined spaces until atmosphere has been checked. **DO NOT** allow material to contact humans, exposed food or food utensils. Avoid contact with incompatible materials. When handling, **DO NOT** eat, drink or smoke. Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling. Work clothes should be laundered separately. Launder contaminated clothing before re-use. Use good occupational work practice. Observe manufacturer's storage and handling recommendations contained within this SDS. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions) Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame. Establish good housekeeping practices. Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds. Use continuous suction at points of dust generation to capture and minimise the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimise the probability of a 'secondary' explosion. According to NFPA Standard 654, dust layers 1/32 in.(0.8 mm) thick can be sufficient to warrant immediate cleaning of the area. Do not use air hoses for cleaning. Minimise dry sweeping to avoid generation of dust clouds. Vacuum dust-accumulating surfaces and remove to a chemical disposal area. Vacuums with explosion-proof motors should be used. Control sources of static electricity. Dusts or their packages may accumulate static charges, and static discharge can be a source of ignition. Solids handling systems must be designed in accordance with applicable standards (e.g. NFPA including 654 and 77) and other national guidance. Do not empty directly into flammable solvents or in the presence of flammable vapors. The operator, the packaging container and all equipment must be grounded with electrical bonding and grounding systems. Plastic bags and plastics cannot be grounded, and antistatic bags do not completely protect against development of static charges. Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source. Do NOT cut, drill, grind or weld such containers. In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.
Fire and explosion protection	See section 5
Other information	Phenylpropanoids are labile and after unsealing the container, they should be stored refrigerated or frozen under an inert gas such as nitrogen/argon. Phenylpropanoids are easily oxidised in the liquid state and should be used them within a short period of time after preparation. As long as no special remark is mentioned in the catalogues or labels, they can be stored at room temperature. Solids can be stored longer than liquid compounds or solutions. Compounds with phenolic hydroxy groups can gradually change colour from brown to black while being stored. Compounds with aldehyde groups are also apt to be oxidized to carboxylic acids. Store in original containers. Keep containers securely sealed. Store in a cool, dry area protected from environmental extremes. Store away from incompatible materials and foodstuff containers. Protect containers against physical damage and check regularly for leaks. Observe manufacturer's storage and handling recommendations contained within this SDS. For major quantities:

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	- Consider storage in bunded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams}. - Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.

7.2. Conditions for safe storage, including any incompatibilities

Suitable container	- Glass container is suitable for laboratory quantities - Polyethylene or polypropylene container. - Check all containers are clearly labelled and free from leaks.
Storage incompatibility	Polyphenols: · are generally easily oxidised (and hence act as antioxidants which quench free radicals in animals); oxidation products can be characterised using ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) in the TEAC Trolox equivalent antioxidant capacity) assay. · also characteristically possess a significant binding affinity for proteins, which can lead to the formation of soluble and insoluble protein-polyphenol complexes (thought to produce astringency) and particular amine-containing organics (e.g. particular alkaloid natural products) · engage in reactions related to both their core phenolic structures, their linkages, and types of glycosides they form: standard phenolic reactions include ionization (which contributes to solubility and complexation), oxidations to ortho- and para-quinones (which contributes to antioxidant characteristics), and underlying aromatic transformations related to the presence of the phenolic hydroxyl reactions related to their linkages include nucleophilic additions, and oxidative and hydrolytic bond cleavages. · form particular, characteristic metal complexes - Avoid reaction with oxidising agents

7.3. Specific end use(s)

See section 1.2

SECTION 8 Exposure controls / personal protection

8.1. Control parameters

Ingredient	DNELs Exposure Pattern Worker	PNECs Compartment
Not Available	Not Available	Not Available

* Values for General Population

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

Not Applicable

Emergency Limits

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
Myconate HB	Not Available	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
formononetin	Not Available	Not Available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard 'physically' away from the worker and ventilation that strategically 'adds' and 'removes' air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:

(a): particle dust respirators, if necessary, combined with an absorption cartridge;
(b): filter respirators with absorption cartridge or canister of the right type;
(c): fresh-air hoods or masks

- Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Air contaminants generated in the workplace possess varying 'escape' velocities which, in turn, determine the 'capture velocities' of fresh circulating air required to efficiently remove the contaminant.

Type of Contaminant:	Air Speed:
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

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Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 metres distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

8.2.2. Personal protection

Eye and face protection

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]

Skin protection

See Hand protection below

Hands/feet protection

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
· Contaminated gloves should be replaced.
As defined in ASTM F-739-96 in any application, gloves are rated as:
· Excellent when breakthrough time > 480 min
· Good when breakthrough time > 20 min
· Fair when breakthrough time < 20 min
· Poor when glove material degrades
For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.
It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.
Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task.
Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:
· Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.
· Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene.
- nitrile rubber.
- butyl rubber.
- fluorocaoutchouc.
- polyvinyl chloride.

Gloves should be examined for wear and/ or degradation constantly.

Body protection

See Other protection below

Other protection

- Overalls.
- P.V.C apron.
- Barrier cream.
- Skin cleansing cream.

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	‣ Eye wash unit.

Respiratory protection

Particulate. (AS/NZS 1716 & 1715, EN 143:2000 & 149:001, ANSI Z88 or national equivalent)

- **Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.**
- **The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).**
- **Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.**
- **Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.**
- **Use approved positive flow mask if significant quantities of dust becomes airborne.**
- **Try to avoid creating dust conditions.**

8.2.3. Environmental exposure controls

See section 12

SECTION 9 Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	An isoflavonoid derivative. Isoflavonoids are a class of flavonoid phenolic compounds, many of which are biologically active. . While flavonoids (in the narrow sense) have the 2-phenylchromen-4-one backbone, isoflavonoids have the 3-phenylchromen-4-one backbone with no hydroxyl group substitution at position 2. Designated as an aromatic polyketide a compounds in which carbon chains are extended with malonyl-CoA onto phenylpropanoids. The polyketides are further categorised as: · Diarylheptanoids which are biosynthesized from two cinnamyl-CoA units and one malonyl-CoA. Their two aromatic rings are connected with an aliphatic seven-carbon chain. · Stilbenoids, chalconoids, flavonoids and isoflavonoids which are formed from a cinnamyl-CoA with three malonyl-CoA units. Chalconoids, flavonoids and isoflavonoids possess a C6-C3-C6 skeleton whereas stilbenoids have a C6-C2-C6skeleton which arises by decarboxylation during the biosynthesis. A phenylpropanoid derivative - a natural organic compound of plant origin biosynthesised via the shikimic acid pathway. Phenylalanine and tyrosine are their precursors. Phenylpropanoids comprise a group of compounds with side-chains of three carbons attached to a benzene ring. Phenylpropanoids are generally soluble in many organic solvents. They can be rather difficult to dissolve in non-polar solvents such as hexane but dissolve well in high polar solvents such as chloroform, methanol and DMSO. Compounds with carboxyl or phenolic hydroxy groups are soluble in aqueous alkaline solutions. They can be further subdivided into groups described as: · Cinnamic acid and esters · Cinnamic acid derivatives · Cinnamaldehydes · Phenylpropenes · Coumarins Phytoestrogen is a general definition that has been applied to any plant substance or metabolite that induces biological responses in vertebrates and can mimic or modulate the actions of endogenous estrogens usually by binding to oestrogen receptors (ERs) in some tissues such as bone and cardiovascular tissue. Phytoestrogens are a large group of compounds with different chemical structures and multiple mechanisms of action. Based on their chemical structure, phytoestrogens can be classified into several main groups, i.e., isoflavonoids (such as genistein, daidzen, coumestrol and equol), flavonoids (including several prenylated flavonoids, such as 8-prenylnaringenin -hopein- and triterpenes), stilbenes (such as resveratrol), anthraquinones, lignans (a group of dimeric phenylpropanoids derived typically from matairesinol and secoisolariciresinol) and several saponins Oestrogens (typically 17beta-estradiol) prevent heart diseases, atherosclerosis, and vascular diseases, so it is expected that phytoestrogens probably act similarly. However, there is no direct evidence in this regard. Phytooestrogens nonsteroidal, naturally occurring phenolic compounds that can be divided into two groups: firstly, the flavonoids specifically isoflavones, coumestans, and prenyl flavonoids; and secondly, the nonflavonoids, comprising the some lignans, saponins and anthraquinones. All are polyphenols that have a structural similarity to estradiol and possess estrogenic activity due to having a similar ring as that of estradiol and possessing two hydroxyl groups at positions that afford the correct distance between them to facilitate binding to the ER. Phytoestrogens share the basic frame of other steroid hormones, although their potencies are estimated to be approximately 1000-fold weaker than that of 17-alpha-estradiol. To date, more than 300 plants have been found that possess compounds with estrogenic activity. Several classes of phytoestrogens have been identified and studied: the hormone-like bis-phenolic phytoestrogens, the isoflavonoids daidzein and genistein, coumestrol, and the lignans and matairesinols are of great interest because of their respective estrogenic, antiestrogenic, anticarcinogenic, and antioxidant activities. Several phytoestrogens have been reported to exert various non-ER-related effects in vitro. These effects include antiproliferative activity, inhibition of tyrosine kinase, protein kinase C, DNA topoisomerase II, antioxidant activity, inhibition of angiogenesis, and inhibition of prostaglandin synthase. All of these actions require high concentrations, generally over 10 mM, and it is still questionable whether such concentrations are ever reached in vivo. In theory, these actions could play a role in cancer prevention, but they need to be confirmed in vivo before any conclusions on their biological relevance can be made http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3210008/ http://enzysante.be/resources/Isoflavones.pdf Free phytosterols extracted from oils are insoluble in water, relatively insoluble in oil, and soluble in alcohols. Phytosterols, which encompass plant sterols and stanols, are phytosteroids similar to cholesterol which occur in plants and vary only in carbon side chains and/or presence or absence of a double bond. Stanols are saturated sterols, having no double bonds in the sterol ring structure. More than 200 sterols and related compounds have been identified. Poeder (wit tot bruin)

Physical state	Solid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	>360

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Melting point / freezing point (°C)	256-257	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	268
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	None
Flammability	Not Available	**Oxidising properties**	None
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Applicable
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Immiscible	**pH as a solution (1%)**	Not Applicable
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

9.2. Other information

Not Available

SECTION 10 Stability and reactivity

10.1.Reactivity	See section 7
10.2. Chemical stability	‣ Unstable in the presence of incompatible materials. ‣ Product is considered stable. ‣ Hazardous polymerisation will not occur.
10.3. Possibility of hazardous reactions	See section 7
10.4. Conditions to avoid	See section 7
10.5. Incompatible materials	See section 7
10.6. Hazardous decomposition products	See section 5.3

SECTION 11 Toxicological information

11.1. Information on toxicological effects

Inhaled	The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled. If prior damage to the circulatory or nervous systems has occurred or if kidney damage has been sustained, proper screenings should be conducted on individuals who may be exposed to further risk if handling and use of the material result in excessive exposures.
Ingestion	The material has **NOT** been classified by EC Directives or other classification systems as 'harmful by ingestion'. This is because of the lack of corroborating animal or human evidence.
Skin Contact	This material can cause inflammation of the skin on contact in some persons. The material may accentuate any pre-existing dermatitis condition Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	This material can cause eye irritation and damage in some persons.
Chronic	Long-term exposure to respiratory irritants may result in airways disease, involving difficulty breathing and related whole-body problems. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure. Human and animal exposures to the phytooestrogens (for example, the isoflavones, some flavonoids, saponin, coumestans and lignans) can be high because these compounds are found in many foods. Although small amounts in the diet apparently protects against cancer, heart disease and osteoporosis, high levels over extended periods may produce toxic effects. < Selective Estrogen Receptor Modulators (SERMs) may produce reproductive effects in females. Effects of exposure with therapeutic use in post-menopausal women, not taking oestrogen replacement therapy, may include blood clots in veins, leg cramps and hot flushes. This class of drugs is also known to increase the risk of uterine cancers A characteristic that distinguishes these substances from pure receptor agonists and antagonists is that their action is different in various tissues, thereby granting the possibility to selectively inhibit or stimulate oestrogen-like action in various tissues. Oestrogenic compounds span a spectrum of activity ranging from: ‣ full agonists (agonistic in all tissues) such as the natural endogenous hormone oestrogen ‣ mixed agonists/antagonistics (agonistic in some tissues while antagonist in others) such as tamoxifen (a SERM) ‣ pure antagonists (antagonistic in all tissues) such as fulvestrant (ICI-182780). The mechanism of mixed agonism/antagonism may differ depending on the chemical structure of the SERM, but for at least for some SERMs, it appears to be related to (1) the ratio of co-activator to co-repressor proteins in different cell types and (2) the conformation of the oestrogen receptor induced by drug binding which in turn determines how strongly the drug/receptor complex recruits co-activators (resulting in an agonist

Continued...

response) relative to co-repressors (resulting in antagonism). For example, the prototypical SERM tamoxifen acts as an antagonist in breast and conversely an agonist in uterus. The concentration of steroid receptor co-activator 1 (SRC-1; *NCOA1*) is higher in uterus than in breast, therefore SERMs such as tamoxifen are more agonistic in uterus than in breast. In contrast, raloxifene behaves as an antagonist in both tissues. It appears that raloxifene more strongly recruits co-repressor proteins and consequently is still an antagonist in the uterus despite the higher concentration of co-activators relative to co-repressors

Phytosterols and stanols are similar in structure to cholesterol. The difference is the presence of a methyl or ethyl group in their side chains. This difference means that, in comparison to cholesterol, phytosterols and stanols are not absorbed, or only minimally absorbed.

Phytosterols (or plant sterols) are an essential component of cell membranes and are produced by plants but not the human body. Stanols are saturated sterols; they have no double bond in the sterol ring, and are much less abundant.

Phytosterol esters have been considered to be “generally regarded as safe” (GRAS), and no unpredicted side effects were reported. There are no reported adverse effects from daily consumption of foods enriched by phytosterol or stanol, although long-term safety information is not available.

Consuming phytosterol/stanol enriched foods causes blood carotenoids (notably beta-carotene) to be reduced. An additional serving of fruit and vegetables high in carotenoids is effective in maintaining blood carotenoid concentrations.

Individuals with the rare, inherited metabolic disease “homozygous sitosterolaemia (phytosterolaemia)” affecting about one in 6 million of the general population have high blood phytosterol levels and premature hardening of the arteries and xanthomatosis (deposits of yellowish, cholesterol-rich material that can appear anywhere in the body in various disease states). However, studies of large populations have shown no association between plasma phytosterol levels and cardiovascular disease (CVD). Sitosterolaemia may share several clinical characteristics with the well-characterised familial hypercholesterolaemia (FH) such as the development of tendon xanthomas (a condition in which fatty growths develop underneath the skin) in the first 10 years of life and the development of premature hardening of arteries.

Studies indicate the toxicity of phytosterols is very low. In animal studies, intakes as high as 4 grams per kilogram of body weight per day were observed to have no adverse effect.

The effects of phytosterols on reproductive parameters have now been investigated in depth. Studies using some highly purified phytosterols have shown no female sex hormone-like activity, contradicting earlier findings. No effect on reproductive performance of high doses of phytosterols was observed in animal studies. Some phytosterols, however, are described as phytooestrogens, and there may well be effects on the reproductive cycle produced by these.

Myconate HB

TOXICITY	IRRITATION
Not Available	Eye: no adverse effect observed (not irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

formononetin

TOXICITY	IRRITATION
Not Available	Eye: no adverse effect observed (not irritating)[1]
	Skin: no adverse effect observed (not irritating)[1]

Legend: *1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*

Myconate HB	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.
FORMONONETIN	No significant acute toxicological data identified in literature search.

Acute Toxicity	✘	**Carcinogenicity**	✘
Skin Irritation/Corrosion	✔	**Reproductive toxicity**	✘
Serious Eye Damage/Irritation	✔	**STOT - Single Exposure**	✔
Respiratory or Skin sensitisation	✘	**STOT - Repeated Exposure**	✘
Germ cell mutagenicity	✘	**Aspiration Hazard**	✘

Legend: ✘ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 Ecological information

12.1. Toxicity

Myconate HB

Endpoint	Test Duration (hr)	Species	Value	Source
LC50	96	Fish	>1000mg/L	2
EC50	48	Crustacea	>1000mg/L	2
NOEC	504	Fish	0.000414-mg/L	4

formononetin

Endpoint	Test Duration (hr)	Species	Value	Source
LC50	96	Fish	>1000mg/L	2
EC50	48	Crustacea	>1000mg/L	2
NOEC	504	Fish	0.000414-mg/L	4

Continued...

Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

12.2. Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
formononetin	HIGH	HIGH

12.3. Bioaccumulative potential

Ingredient	Bioaccumulation
formononetin	LOW (LogKOW = 3.1088)

12.4. Mobility in soil

Ingredient	Mobility
formononetin	LOW (KOC = 1737)

12.5.Results of PBT and vPvB assessment

	P	B	T
Relevant available data	Not Available	Not Available	Not Available
PBT Criteria fulfilled?	Not Available	Not Available	Not Available

12.6. Other adverse effects

No data available

SECTION 13 Disposal considerations

13.1. Waste treatment methods

Product / Packaging disposal	‣ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ‣ It may be necessary to collect all wash water for treatment before disposal. ‣ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ‣ Where in doubt contact the responsible authority.
Waste treatment options	Not Available
Sewage disposal options	Not Available

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

14.1. **UN number**	Not Applicable
14.2. **UN proper shipping name**	Not Applicable
14.3. **Transport hazard class(es)**	Class: Not Applicable Subrisk: Not Applicable
14.4. **Packing group**	Not Applicable
14.5. **Environmental hazard**	Not Applicable
14.6. **Special precautions for user**	Hazard identification (Kemler): Not Applicable Classification code: Not Applicable Hazard Label: Not Applicable Special provisions: Not Applicable Limited quantity: Not Applicable Tunnel Restriction Code: Not Applicable

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

14.1. **UN number**	Not Applicable
14.2. **UN proper shipping name**	Not Applicable

Continued...

<table>
<tr><td>14.3. Transport hazard class(es)</td><td><table><tr><td>ICAO/IATA Class</td><td>Not Applicable</td></tr><tr><td>ICAO / IATA Subrisk</td><td>Not Applicable</td></tr><tr><td>ERG Code</td><td>Not Applicable</td></tr></table></td></tr>
<tr><td>14.4. Packing group</td><td>Not Applicable</td></tr>
<tr><td>14.5. Environmental hazard</td><td>Not Applicable</td></tr>
<tr><td>14.6. Special precautions for user</td><td><table><tr><td>Special provisions</td><td>Not Applicable</td></tr><tr><td>Cargo Only Packing Instructions</td><td>Not Applicable</td></tr><tr><td>Cargo Only Maximum Qty / Pack</td><td>Not Applicable</td></tr><tr><td>Passenger and Cargo Packing Instructions</td><td>Not Applicable</td></tr><tr><td>Passenger and Cargo Maximum Qty / Pack</td><td>Not Applicable</td></tr><tr><td>Passenger and Cargo Limited Quantity Packing Instructions</td><td>Not Applicable</td></tr><tr><td>Passenger and Cargo Limited Maximum Qty / Pack</td><td>Not Applicable</td></tr></table></td></tr>
</table>

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

<table>
<tr><td>14.1. UN number</td><td>Not Applicable</td></tr>
<tr><td>14.2. UN proper shipping name</td><td>Not Applicable</td></tr>
<tr><td>14.3. Transport hazard class(es)</td><td><table><tr><td>IMDG Class</td><td>Not Applicable</td></tr><tr><td>IMDG Subrisk</td><td>Not Applicable</td></tr></table></td></tr>
<tr><td>14.4. Packing group</td><td>Not Applicable</td></tr>
<tr><td>14.5. Environmental hazard</td><td>Not Applicable</td></tr>
<tr><td>14.6. Special precautions for user</td><td><table><tr><td>EMS Number</td><td>Not Applicable</td></tr><tr><td>Special provisions</td><td>Not Applicable</td></tr><tr><td>Limited Quantities</td><td>Not Applicable</td></tr></table></td></tr>
</table>

Inland waterways transport (ADN): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

<table>
<tr><td>14.1. UN number</td><td>Not Applicable</td></tr>
<tr><td>14.2. UN proper shipping name</td><td>Not Applicable</td></tr>
<tr><td>14.3. Transport hazard class(es)</td><td><table><tr><td>Not Applicable</td><td>Not Applicable</td></tr></table></td></tr>
<tr><td>14.4. Packing group</td><td>Not Applicable</td></tr>
<tr><td>14.5. Environmental hazard</td><td>Not Applicable</td></tr>
<tr><td>14.6. Special precautions for user</td><td><table><tr><td>Classification code</td><td>Not Applicable</td></tr><tr><td>Special provisions</td><td>Not Applicable</td></tr><tr><td>Limited quantity</td><td>Not Applicable</td></tr><tr><td>Equipment required</td><td>Not Applicable</td></tr><tr><td>Fire cones number</td><td>Not Applicable</td></tr></table></td></tr>
</table>

14.7. Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 Regulatory information

15.1. Safety, health and environmental regulations / legislation specific for the substance or mixture

formononetin is found on the following regulatory lists

Europe EC Inventory	European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : Directives 98/24/EC, - 92/85/EEC, - 94/33/EC, - 2008/98/EC, - 2010/75/EU; Commission Regulation (EU) 2015/830; Regulation (EC) No 1272/2008 as updated through ATPs.

15.2. Chemical safety assessment

For further information please look at the Chemical Safety Assessment and Exposure Scenarios prepared by your Supply Chain if available.

ECHA SUMMARY

Ingredient	CAS number	Index No	ECHA Dossier
formononetin	485-72-3	Not Available	01-2120770469-41-XXXX

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)

Continued...

Harmonisation (C&L Inventory)	Hazard Class and Category Code(s)	Pictograms Signal Word Code(s)	Hazard Statement Code(s)
1	Skin Irrit. 2; Eye Irrit. 2; STOT SE 3	GHS07; Wng	H315; H319; H335

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	No (formononetin)
Canada - DSL	No (formononetin)
Canada - NDSL	No (formononetin)
China - IECSC	No (formononetin)
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (formononetin)
Korea - KECI	No (formononetin)
New Zealand - NZIoC	No (formononetin)
Philippines - PICCS	No (formononetin)
USA - TSCA	No (formononetin)
Taiwan - TCSI	Yes
Mexico - INSQ	No (formononetin)
Vietnam - NCI	Yes
Russia - ARIPS	No (formononetin)
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 Other information

Revision Date	18/12/2020
Initial Date	03/12/2020

Full text Risk and Hazard codes

SDS Version Summary

Version	Issue Date	Sections Updated
0.3.1.1.1	18/12/2020	Ingredients, Physical Properties, Supplier Information

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.
For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:
EN 166 Personal eye-protection
EN 340 Protective clothing
EN 374 Protective gloves against chemicals and micro-organisms
EN 13832 Footwear protecting against chemicals
EN 133 Respiratory protective devices

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