EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR AGRICULTURE AND RURAL DEVELOPMENT

Directorate B. Multilateral relations, quality policy
B.4. Organics

Expert Group for Technical Advice on Organic Production

EGTOP

Final Report On Plant Protection Products (II)

The EGTOP adopted this technical advice at the 9th plenary meeting
of 28 – 30 April 2014

About the setting up of an independent expert panel for technical advice

With the Communication from the Commission to the Council and to the European Parliament on a European action plan for organic food and farming adopted in June 2004, the Commission intended to assess the situation and to lay down the basis for policy development, thereby providing an overall strategic vision for the contribution of organic farming to the common agricultural policy. In particular, the European action plan for organic food and farming recommends, in action 11, establishing an independent expert panel for technical advice. The Commission may need technical advice to decide on the authorisation of the use of products, substances and techniques in organic farming and processing, to develop or improve organic production rules and, more in general, for any other matter relating to the area of organic production. By Commission Decision 2009/427/EC of 3 June 2009, the Commission set up the Expert Group for Technical Advice on Organic Production.

EGTOP

The Group shall provide technical advice on any matter relating to the area of organic production and in particular it must assist the Commission in evaluating products, substances and techniques which can be used in organic production, improving existing rules and developing new production rules and in bringing about an exchange of experience and good practices in the field of organic production.

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The report of the Expert Group presents the views of the independent experts who are members of the Group. They do not necessarily reflect the views of the European Commission. The reports are published by the European Commission in their original language only.
http://ec.europa.eu/agriculture/organic/eu-policy/expert-advice/documents/final-reports/index_en.htm

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None

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1. EXECUTIVE SUMMARY

The EGTOP (thereafter called 'the Group') has evaluated a number of topics relevant for the use of plant protection products in organic production in accordance to the request set out in the second EGTOP plant protection product mandate. The Group concluded the following:

The use of potassium phosphonates is not in line with the objectives and principles of organic production as laid down in Council Regulation (EC) No 834/2007. If the objective is to reduce copper use by regulation at national or European level, then alternative options compatible with the regulation should be exploited. The Group underlines that copper use should be minimised.

The use of kieselgur for the control of stored product pests and poultry mites is in line with the objectives, criteria and principles of organic farming. 'Kieselgur (diatomaceous earth)' should therefore be included in Annex II without restrictions of target species. If a 'basic list of active substances' is established in Annex II (see chapter 4.10), kieselgur should be included there. When used in animal buildings, appropriate measures must be taken to avoid negative effects on animal health, in particular through inhalation.

The use of carbon dioxide for the control of stored product pests is in line with the objectives, criteria and principles of organic production. It should therefore be included in Annex II. No restrictions are necessary in the Group's opinion. If a 'basic list of active substances' is established in Annex II (see chapter 4.10), carbon dioxide should be included there.

The use of piperonyl butoxide is not in line with the objectives, criteria and principles of organic farming. It should therefore not be included in Annex II, and the tolerance of its use should be phased out.

The use of potassium bicarbonate as an insecticide is in line with the objectives, criteria and principles of organic farming. The Group recommends that the restriction 'fungicide' should be deleted. As a less preferred alternative, the use 'insecticide' could be added.
If a 'basic list of active substances' is established in Annex II (see chapter 4.10), potassium bicarbonate should be included there.

The use of soft soap for disease control is in line with the objectives, criteria and principles of organic farming as laid down in Council Regulation (EC) No 834/2007 and recommends appropriate modifications of the present listing of soft soap in Annex II, in accordance with pesticide registrations. The Group recommends to delete the restriction 'insecticide'. As a less preferred option, the use 'fungicide' could be added. The use as herbicide should not be authorised. If a 'basic list of active substances' is established in Annex II (see chapter 4.10), soft soap should be included there.

The Group does not recommend that substances authorised as 'basic substances' under Reg. 1107/2009 are automatically considered as included in Annex II of Reg. 889/2008.

The Group is against automatic approval of low risk substances in organic farming.

For the 'group substances' currently authorised for organic production, the Group sees no need for further specifications in Reg. 889/2008. On the contrary, there could be reflected on whether it would be appropriate to replace some of the current listings of individual substances by newly formed groups. Before bringing a new group on the list, it must be very carefully evaluated whether there are substances inside the group that do not comply with the principles of organic farming. Depending on this evaluation, it should be decided whether the group is included as a whole, or whether a further discrimination is required. For all groups, only the substances authorized under Reg. 540/2011 can be used.

In the Group's opinion, restrictions of use category in Annex II should be limited to those cases where further limitations are needed from an organic farming point of view, beyond the limitations already imposed by pesticide approval (Reg. 540/2011). For other cases, specifications of use category should be deleted. The Group recommends to include a 'basic list of active substances' (as shown in chapter 4.10) in Annex II.

2. BACKGROUND

In recent years, several Member States have submitted dossiers under Article 16(3)(b) of Council Regulation (EC) No 834/2007[1] concerning the possible inclusion of a number of substances in Annex II to Commission Regulation (EC) No 889/2008[2] or, in general, on their compliance with the above mentioned legislation.

In 2012, Belgium introduced a request on potassium bicarbonate and Germany submitted a dossier on diatomaceous earth. In 2013, Sweden requested the evaluation of fatty acid potassium salt (soft soap) and Germany presented a dossier on the use of potassium phosphonates (Potassium phosphite) as an alternative of using copper compounds. The Commission also would like to have the Group's advice on automatic authorization of basic substances, low risk substances, on the need for further specification of group substances, and on the use of carbon dioxide and piperonyl butoxide.

Therefore, the Group is requested to prepare a report with technical advice on the matters included in the terms of reference.

3. TERMS OF REFERENCE

In the light of the most recent technical and scientific information available to the experts, the Group is requested to answer if the use of the below listed substances are in line with the objectives, criteria and principles as well as the general rules laid down in Council Regulation (EC) No 834/2007 and, hence, can be authorised to be used in organic production under the EU organic farming legislation.

Substances:

- BE dossier (2012): Potassium bicarbonate (Potassium hydrogen carbonate).
- DE dossier (2012): Diatomaceous earth.
- DE dossier (2013): Potassium phosphonates (Potassium phosphite).
- SE dossier (2003 and 2012): Fatty acid potassium salt (soft soap).
- SL dossier: the use of synergist substances, in particular piperonyl butoxide.
- Com: the use of carbon dioxide in storage.

The Commission would like to get also the advice from the group as regards the following:

- The authorisation of the so called, "basic substances" according to with article 23 of Regulation 1107/20093 has been pointed out by some Member States during discussion of the latest amendments of Annex II at the Standing Committee of Organic

[1] Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91.(O.J. L 189, 20/07/2007, p. 1.)

[2] Commission Regulation (EC) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control, 5OJ L 250, 18.9.2008, p. 1–84.

[3] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC, (OJ L 309, 24.11.2009, p. 1–50)91/414/EEC, (OJ L 309, 24.11.2009, p. 1–50).

Farming. It was asked whether the basic substances such as the recently authorised Horsetail, could be automatically considered as included into the Annex II to Commission Regulation 889/2008 once they have been authorised under Regulation 1107/2009 (Link with the discussion under the third indent below).

- The automatic authorization of "low risk substances", similar to the basic substances.
- -Authorisation of group substances: should the relevant rows of the Annex to Commission Implementing Regulation (EU) 540/20111 be specified in the organic legislation? Or is the mentioning of the general group name a better approach?
- Priority assessment of requests: due to the high number of dossiers presented to the Commission, transparent criteria should be developed for the assessment of the priority of requests, in light of the limitations of the EGTOP capacity.

In preparing its report the group is invited to examine technical dossiers provided to the Commission by the Member States and suggest amendments to the current list in Annex II of Regulation 889/2008.

4. CONSIDERATIONS AND CONCLUSIONS

4.1 Potassium phosphonates (potassium phosphite)

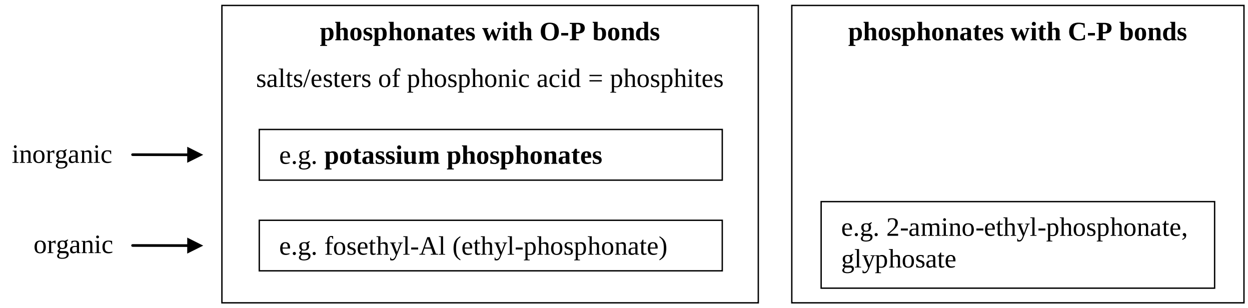
Introduction, scope of this chapter

This substance is known by several names. The active substance is a reaction mixture of phosphonic acid (H_3PO_3) and potassium hydroxide (KOH), containing a mixture of potassium hydrogen phosphonate (KH_2PO_3) and dipotassium phosphonate (K_2HPO_3). Under EU pesticides legislation, the latter two substances are collectively called ‘potassium phosphonates’ (EFSA 2012b); in the literature, they are mostly referred to as ‘potassium phosphonate’, ‘potassium phosphite’, ‘phosphonic acid’ or ‘phosphorous acid’. In aqueous solution, the substances dissociate into the potassium ion (K^+) and the ions hydrogen phosphonate ($H_2PO_3^-$) and phosphonate (HPO_3^{2-}).

Potassium phosphonates are inorganic phosphonates, and the phosphorus is bound exclusively with O-P bonds. They have similar properties to the synthetic fungicide fosethyl-Al, which is also characterised by O-P bonds. There is scope for confusion, because the term ‘phosphonate’ is also used for another group of substances with quite different properties: the organic phosphonates characterised by C-P bonds. This latter group comprises a wide range of substances occurring in living organisms, but also synthetic substances such as the herbicide glyphosate (Guest and Grant 1991). The relationship between these groups is shown in figure 1. In this chapter, the term ‘potassium phosphonates’ is used in consistency with EU pesticide legislation. The evaluation is limited to potassium phosphonates, and does not include organophosphonates with C-P bonds. None of these substances should be confused with phosphate (PO_4^{3-}), phosphoric acid (H_3PO_4) or phosphine (PH_3). Other inorganic phosphonates such as calcium phosphonate would have a similar effect, but they are not registered as active substances in the EU, and are not discussed here.

This chapter focuses largely on grapevine, as only this use was requested by the applicant.

Figure 1: Overview over the various substances called ‘phosphonates’.



Authorization in general agriculture and in organic farming

Since October 2013, potassium phosphonates are registered at EU-level as active substances for fungicides. The representative use approved by the Commission is in grapevines, but the Group expects that uses on a number of other crops will be authorised at Member state level. For example, a product is registered in France for use not only on grapes, but also on various vegetables (lettuce, tomato, pepper, artichoke, chicory, *Cucurbita* spp.,), and uses on similar crops are registered in Switzerland.

Before October 2013 (i.e. before they were approved as fungicides), products based on potassium phosphonates were listed as plant strengtheners in Germany for many years. For some years, the contents of potassium phosphonates were declared, while later it was declared as algae extract. For a shorter time, such products were also listed as plant strengtheners in some other European countries (e.g. Austria, Czech Republic, Slovakia, Hungary).

There is also widespread marketing of fertilizers containing potassium phosphonates (Brunings et al. 2012; Leymonie, JP. 2007; Wollenweber et al. 2011). However, there is no evidence that plants can utilise phosphorus which is supplied in the form of phosphonate (Deliolopoulos et al. 2010). By calling such products ‘fertilisers’, they can be marketed without undergoing the costly and time-consuming procedures of pesticide registration (McDonald et al. 2001). The Group does not know whether the marketing of such fertilizers is still possible in the EU after October 2013. Other phosphonates (Na, NH_4, Ca) are also marketed as fertilizers.

Potassium phosphonates were never explicitly authorised for organic farming, neither as pesticide nor as fertilizer. However, products listed as plant strengtheners may be used in organic farming (Art. 16 of Reg. 834/2007). Thus, potassium phosphonates could be legally used in organic farming without explicit listing in Reg. 889/2008, but since October 2013 they can no longer be used like that.

Agronomic use, mode of action, physiological functionality for the intended use

Potassium phosphonates are effective against a number of fungal plant pathogens from the group of the oomycetes, especially against *Phytophthora* spp., *Plasmopara* and *Alternaria* spp. Examples of crops where phosphite salts are effective are given by Deliolopoulos (2010; Tab. 5). They include grapes, fruit and berries (apple, orange, papaya, strawberry), vegetables (cabbage, cucumber, pepper), arable crops (potato, maize) and some other crops (lupin, tobacco, *Banksia*).

Potassium phosphonates are most commonly applied as a foliar spray, but other application methods such as root drench, trunk injection or addition to irrigation water also occur (Deliolopoulos 2010). They are taken up by leaves and roots, and are translocated through the entire plant, and incorporated into cells as phosphonate ions. They are not significantly oxidised to phosphate within the plant (EFSA 2012b). Because the phosphonate anion has one oxygen atom less than phosphate, it does not act in the same manner as phosphate in plants. It does not appear to be involved in any phase of phosphorus metabolism. Potassium phosphonates have a dual mode of action: they have a direct impact on pathogens such as downy mildew, but they also stimulate the plants' natural defence system (France 2005; section B.3.1.5.1). Potassium phosphonates have a systemic mode of action (EFSA 2012b). Other substances allowed in organic farming (e.g. neem, quassia) also have a systemic mode of action. In the soil, phosphonate is converted to phosphate by bacteria, and can then be taken up and metabolised by plants. This conversion is slow and is not thought to be a very efficient means of phosphorus delivery to plants, when compared with phosphate fertilizers.

On grapevines, potassium phosphonates could technically be applied throughout the growing season, and this is allowed in conventional farming. With the aim to minimise phosphonate residues, the recommendation in organic wine growing in Germany is to limit their use until close to the end of flowering (BBCH-scale : 68). The applicants state that 3 – 5 applications are foreseen, but do not specify the amounts applied. Based on Kauer (2011), a total of 3 – 7 kg/ha/year can be assumed for a minimised application strategy. Nevertheless, there was no legal obligation to follow this recommendation for plant strengtheners. For the newly registered plant protection products, there is no limitation of application time. Thus, applications after flowering are common in conventional farming and could potentially also happen in organic farming, unless if they are explicitly excluded by organic legislation.

Necessity for intended use, known alternatives

Downy mildew (*Plasmopara viticola*) is one of the most dangerous diseases of grapevines worldwide. In many areas, it can have a severe impact and needs to be managed.

The Group felt that the motivations for using potassium phosphonate can only be understood, if regional climatic conditions, available alternatives and copper regulation are considered. Therefore, a brief overview of these aspects is given here. However, the Group does not want to confuse the discussion on potassium phosphonate with the discussion on copper or on other substances.

There are management practices which can reduce the impact of downy mildew. There are grape cultivars which show some degree of field resistance to downy mildew (including traditional varieties, new varieties and interspecific hybrids). However, the introduction of new varieties is never easy, particularly in areas with traditional wines. The Group underlines that from an organic principles point of view, such practices are preferable to the use of any plant protection products. In grapes, however, resistant cultivars have limited potential and their effect is not sufficient in many cases.

Copper compounds are the most effective substances against downy mildew in organic farming. The substitution of copper compounds is a declared priority in the EU organic legislation (Reg. 473/2002). In the last 10 – 20 years, there has been a great technical development leading to a more efficient copper use, based on monitoring and forecasting systems (more efficient use of copper by choice of optimal application timing, and only in case of need), advanced spraying technology and advanced formulations of copper fungicides. As a result of copper minimization strategies (which included the use of alternative substances such as phosphonates or aluminium sulfate), it was possible to reduce the use of copper. Some practitioners are successfully managing vineyards with low amounts of copper, and in the most favourable areas even without copper (Mazzilli 2014). In parallel, the amounts of copper were limited in organic farming. The limitation process started in the year 2000, with a limitation of 8 kg/ha in the IFOAM basic standards. This limitation was taken up by the EU regulation (Reg. 473/2002). The limit was 8 kg/ha/year until 2005, and then reduced to 6 kg/ha/year (with the possibility to make an average over 5 years in perennial crops). In addition, the registration of copper compounds as pesticides is under pressure. In some countries (e.g. NL, DK), their use in agriculture is forbidden, and in other countries, there is a lower quantitative limit (e.g. 3 kg/ha/year in Germany that follows a previous limitation by private organic standards). Further quantitative limitations are likely for the future. The approval period for copper products in part A of the annex to Reg. 540/2011 expires 31 January 2018 (EC 2014).

There is research on alternative substances to copper[4], but complete alternatives are not available yet. Acidified clays (aluminium sulphate) were listed as plant strengtheners in Germany and as micro-nutrient fertilizers in Italy and had an important role in the past. They cannot be used at present, because they are not listed as plant strengtheners/fertilizers any more. They are authorised as fungicides in Switzerland, and are also authorised for organic farming. In Switzerland, they are important products for organic viticulture and apple growing, and have helped to limit copper to 4 kg/ha/year in grapes, and 1.5 kg/ha/year in apples. Laminarin is authorized for organic farming. It has been shown to reduce downy mildew in grapes (Aziz et al. 2003), and could therefore potentially be used in copper minimisation strategies. However, the Group found no evidence that it is currently authorized for use against downy mildew in grapes. Potassium phosphonates could be another alternative to copper fungicides. The applicants propose a plant protection strategy, in which grapevines are sprayed with potassium phosphonates until the end of flowering, and later with copper fungicides. It seems that such a strategy could do with 3 kg/ha/year of copper, which is one-half of the amount currently permitted by Reg. 889/2008.

The need for a product to control downy mildew, e.g. potassium phosphonates, is most pronounced in countries with a low limit for copper fungicides. In Germany, copper has been limited to 3 kg/ha/year for many years, and at the same time potassium phosphonates were available for organic wine growers. Organic viticulture without phosphonates would be a challenge under these conditions.

Origin of raw materials, methods of manufacture

Potassium phosphonates for commercial use are synthetically manufactured.
Because phosphonates with O-P bonds are not stable under normal atmospheric conditions, their occurrence in nature is rare. A literature review concluded that they seem to occur on meteorites, and that they might also have occurred on the earth in geological times (Hofmann 2012). Recently, phosphite has been found in pristine geothermal pools in California (Pech et al. 2009), and in the eutrophic lake Taihu in China (Han et al. 2012). In conclusion, the group recognises that phosphonates have been detected in extraordinary, rare natural environments.

The discussion regarding the natural occurrence has sometimes been misled by the fact that the term ‘phosphonates’ refers to the salts/esters of phosphonic acid and/or to the organophosphorous substances with C-P bonds (see figure 1). The latter group occurs widely in nature (for a review see Hilderbrand and Henderson, 1983), but is not relevant for the evaluation of potassium phosphonates, because it has different chemical properties.

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[4] For example the EU-funded research project ‘CO-FREE’ (http://www.co-free.eu/index.html) and nationally funded projects (http://kupfer.jki.bund.de/index.php?menuid=33).

Environmental issues, use of resources, recycling

Potassium phosphonates are relatively stable in the soil, but are finally oxidised to phosphate (Adams & Conrad 1953; EFSA 2012b). The Group has not identified inacceptable negative impacts on the environment.

The group believes that reduction/elimination of copper fungicides would be beneficial for soil health. Various methods (not only potassium phosphonates) could contribute to this goal.

Animal welfare issues

No issues identified.

Human health issues

Potassium phosphonates have shown low toxicity in rodents after oral administration as well as after dermal administration and inhalatory exposure. No safety concerns were identified for operators and bystanders, nor for consumers. Potassium phosphonates are neither skin sensitizers nor skin or eye irritants (EFSA, 2012).

Food quality and authenticity

Organic wine is a new market product, defined by EU legislation only since 2012. In the last decade, the market has grown rapidly[5].

The application of potassium phosphonates usually leads to phosphonate residues in wine, but their level depends on the application strategy. Early on-farm trials were carried out in Switzerland from 1988 and 92 (Speiser et al. 2000). In these trials, two applications per season were made on average, and a total of 7 kg/ha phosphonate was applied. Although residues varied greatly, they were mostly in the range of 6 – 20 mg/kg. Later trials in Germany were designed to minimise residues (Kauer 2011). When phosphonate was applied until the beginning of ripening of berries (BBCH 80), residues were above 20 mg/kg, but when application was limited to the end of flowering (BBCH 68), residues were 2 – 5 mg/kg. According to preliminary results, phosphonates are persistent in grapevines, and can be found one or two years after treatment (Kauer 2011). Residues in wine are somewhat higher than those in grapes (processing factor = 1.3; EFSA 2012b).

There has been an intensive debate, mainly among German organic wine growers, whether phosphonate residues are acceptable in organic wines (for an example, see the conference dedicated to phosphonates held in 2010; Kühne 2011). The authorization criteria in the organic regulation (Art. 16 of Reg. 834/2007) gives limited guidance on the issue of pesticide residues. Recital no 6 of Reg. 889/2008 states ‘The use of pesticides, which may have detrimental effects on the environment or result in the presence of residues in agricultural products, should be significantly restricted. Preference should be given to the application of preventive measures in pest, disease and weed control’. The Group underlines that the discussion of residues is not limited to potassium phosphonate. Some other, authorised substances such as spinosad, pyrethrum or azadirachtin also regularly cause residues (Bienzle 2013). However, spinosad, pyrethrum or azadirachtin are quickly degraded, while phosphonates are very stable, and persist within plants for up to several years.

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5 For an example, see http://www.winemonitor.it/en/follow-wine-monitor-en/item/510-organic-wines-sales-keep-growing-in-the-italian-and-us-markets.html (accessed on May 7, 2014).

Fosethyl-Al (a closely related synthetic fungicide used in conventional farming) has been used as a fungicide for many years. Inside plants, it breaks down to phosphonate. Therefore, maximum residue limits (MRLs) have been set for phosphonates as part of the registration of fosethyl-Al. Fosethyl and phosphonates can be detected separately, but for the moment, residues have to be expressed as fosethyl (=sum fosethyl + phosphorous acid and their salts). If potassium phosphonates are authorised for organic farming, this will cause a problem, because the residues of an authorised substance would have to be expressed as a non-authorised substance. In the case that potassium phosphonate is allowed for organic farming, the Group recommends to revise the residue definition.

Wine is stored for several years. The group assumes that a number of organic winegrowers, wine sellers and consumers have stocks of wine from organic grapes which contain phosphonate residues caused by legal application of potassium phosphonates in the past. A solution needs to be found for the future marketing of such stocks.

Traditional use and precedents in organic production

In Germany, potassium phosphonates have been traditionally used as plant strengtheners in organic viticulture since the 1980ies. For a shorter time, they were also used in some other Central and Eastern European countries.

Aspects of international harmonization of organic farming standards

Potassium phosphonates are neither authorised according to the Codex Alimentarius Guidelines for the production, processing, labelling and marketing of organically produced foods, nor for organic production in the USA. They are also not mentioned in the IFOAM standards.

Other relevant issues

If potassium phosphonates are to be authorised for organic farming, it should be clarified whether the authorization is limited to grapes (table and/or wine grapes). However, in case of such a limitation the Group expects that uses on other crops will be requested in the near future. There are other crops which have huge problems with downy mildew and other disease which could be controlled by phosphonates (tomatoes, potatoes, apples, citrus, some vegetables etc.). Although large parts of this evaluation apply to all crops, need and residues must be assessed separately for other crops.

The use of potassium phosphonates is a source of synthetic potassium and (after oxidation by soil microorganisms) of synthetic phosphate. The Group thinks that the amounts of P and K brought into the soil are not high. For a minimised application strategy in grapes, the Group assumes application of 3 – 7 kg/ha/a potassium phosphonates, which is equal to about 1.6 – 3.8 kg K/ha and 0.43 – 1.0 kg P/ha.

Phosphonates are potent fungicides, and their availability could reduce the motivation for the development of other copper alternatives.

Reflections of the Group / Balancing of arguments in the light of organic farming principles

The evaluation of potassium phosphonates involves a trade-off between their agronomic advantages and their negative impact mainly on product quality/public perception (persistence in plants, residues). This is complicated by the fact that both advantages and disadvantages can be seen differently from different viewpoints, and that the advantages are linked to the availability of copper fungicides, which are themselves under discussion.

Necessity may be seen differently, depending mainly on climatic conditions and on copper authorization. The advantages can be seen as follows: (1) In countries where a severe quantitative restriction of copper is imminent, or where copper fungicides have already been restricted, potassium phosphonates are one important tool (among others) for the maintenance of organic viticulture. (2) In other countries, potassium phosphonates can be seen as one tool (among others) for ensuring yield security. (3) From an environmental perspective, potassium phosphonates can be seen as one tool (among others) which allows to reduce (but not to replace) the use of copper fungicides. The use of copper has a negative public perception.

A disadvantage is that potassium phosphonates cause residues in wine. The presence of pesticide residues is a major concern of European consumers and a major motivation to buy organic food. The Group is concerned that the presence of phosphonate residues could put the market potential of organic wine at risk. The same is true for other crops, if phosphonates would be allowed for use on them.

Another argument against allowing potassium phosphates in organic production is that this will make it difficult for consumers and others to distinguish the organic growing practice from conventional farmers using other systemic and synthetic fungicides.

The acceptance of potassium phosphonate as a fungicide in organic agriculture is not consistent with the organic regulation in so far as it is a synthetic, systemic chemical substitute for copper fungicides and does not comply with Article 5 and Article 12 of reg. 834/2007 which emphasise the maintenance of plant health by preventive measures, such as the choice of appropriate species and varieties resistant to pests and diseases, appropriate crop rotations, mechanical and physical methods and the protection of natural enemies of pests.

Its adoption may delay the development of such agro-ecological solutions.

Conclusions

The Group underlines that copper use should be minimised, but in the Group's opinion, the use of potassium phosphonates is not in line with the objectives and principles of organic production as laid down in Council Regulation (EC) No 834/2007. If the objective is to reduce copper use by regulation at national or European level, then alternative options compatible with the regulation should be exploited.

4.2 Kieselgur (diatomaceous earth)

Introduction, scope of this chapter

The Group was asked whether diatomaceous earth should be re-authorised as an insecticide. Diatomaceous earth is also known as 'diatomite' or as 'kieselgur'; the latter term is used in EU pesticides legislation. Kieselgur consists of fossilised remains of diatoms, a type of hard-shelled algae which are among the most common types of phytoplankton. These shells consist of amorphous (non-crystalline) silicon dioxide (SiO_2; also known as 'silica'). Kieselgur for use in pest control should be 'a highly pure amorphous silica, having particles of equal diameter (< 10 µm), pH<8.5, containing the least possible number of clay particles and less than 1 % crystalline silica' (Korunic 1998). Commercial products used today typically contain more than 96 % kieselgur (Erb-Brinkmann 2000). Diatomaceous earths from different sources have different biological effects. It seems that this is related to the type and structure of skeletons of which they consist.

There are also other forms of silica: Kieselgur chemically resembles quartz, which is also silicon dioxide. However, quartz has a crystalline structure, while kieselgur has an amorphous structure. Quartz is the second most abundant mineral in the earth's continental crust, and the main constituent of sand. Quartz can be used as a repellent for mammals.
Amorphous silica can also be manufactured synthetically. This is called 'silica gel', and is a widely used desiccant. It has the same chemical composition as kieselgur (SiO_2), but a different structure. The term kieselgur, as used in this chapter, does not include synthetic forms of silica.
The applicants requested only the use in stored products, but the use in animal husbandry is also briefly discussed in this chapter.

Authorization in general agriculture and in organic farming

Silicates were reported to have been used in historic grain storages from around 1250 AD. The Slavic tribes inhabiting a village, located today in the southwest of Berlin (Museumsdorf Dueppel) used the dusts to protect their stored grains (oral comm., Prof. Plarre, Freie Univ. Berlin). A plant protection product based on kieselgur was authorised in Germany in 1996 and is commercially available in a number of EU countries. Before this, there already had been an authorization in Germany from around 1935 to 1942. Other products are authorised in Canada and the USA. It was authorised for many years in Germany for the control of cat lice.

Kieselgur is authorised under pesticide legislation for the control of insect and mite pests. The major use is for treatment of empty storage rooms and on grains. In addition, it is authorised under biocide legislation for the treatment of poultry stables, to control 'poultry mites' (*Dermanyssus gallinae*). It is also used to control stable flies. Further uses, e.g. on greenhouse crops, are under development.

In 1991, when the first EU organic regulation (Reg. 2092/91) was adopted, 'diatomaceous earth' was explicitly listed. In 1997, the list of pesticides was revised by Reg. 1488/97, and diatomaceous earth was no longer listed. At the same time, a number of new pesticides were added to the list, including quartz sand. The Group is not aware that there has been a discussion on kieselgur (diatomaceous earth), and Reg. 1488/97 gives no clear explanation in the recitals.
Under today's organic regulation, substances authorised as pesticides can also be used for the elimination of insects and other pests in buildings and other installations where livestock is kept (Reg. 889/2008, Art 23(4)).

Agronomic use, technological or physiological functionality for the intended use

Kieselgur is used as desiccant against arthropods on surfaces in empty rooms (dosage: of 10 g/m^2 surface). It can also be applied directly to the grain (max. dosage 1 – 2 kg/t of grains). Usually, only the top layer in a silo is treated, to prevent pests from migrating into the stored cereal. For a comprehensive review, see Subramanyam and Roesli (2000).

Kieselgur is active against a wide range of insect and mite pests. Among stored product arthropods, the Confused flour beetle *Tribolium confusum* is described as most tolerant to desiccation by kieselgur, with lethal exposure times of 3 – 5 days (Mewis and Reichmuth 1999). Kieselgur is removed from the grains during cleaning in the mill.

Kieselgur has a simple physico-chemical mode of action. If an insect comes into contact with kieselgur, the latter sticks to the wax layer on the epicuticle, removes it partly, and increases the external surface. Increased evaporation leads to desiccation and mortality. In addition, particles of kieselgur penetrate into various articulations. As a reaction, the pests make cleaning movements, but this allows more particles to enter the articulations. Fine particles of up to 50µm are described to have a stronger insecticidal effect than coarser ones. Lipophilic kieselgur is more effective than hydrophilic one. Kieselgur is very stable and can have a long-lasting effect, particularly inside inaccessible gaps or cracks.

As a secondary use, kieselgur is used in animal husbandry against the red bird mite (*Dermanyssus gallinae*) in poultry. Poultry houses are treated in the absence of poultry, to reduce the risk of inhalation.

Necessity for intended use, known alternatives

Protection of stored products against pests is of high importance form a hygienic and economic point of view, and to avoid food waste.

Prevention and control methods include insect-proof storage sites/packaging, cooling, sanitation (cleaning of sites and equipment), product drying, controlled/modified atmosphere, biological control, physical control (freezing, heating, mechanical percussion). Direct control includes the use of pyrethrum. Monitoring is done by trapping, thermometry, visual inspection or acoustics.
Because there are many different stored products, different storage conditions and different pests (over 100 important species), different methods are needed. For the treatment of empty rooms (prevention) and for long-term storage, kieselgur is preferable to these alternatives, because it has a long-term effect and is cheap. For storage rooms which are not gas-tight, kieselgur is a good preventive method. This is the case for most on-farm storage of organic grains.

Origin of raw materials, methods of manufacture

Kieselgur is of natural origin. It consists of the fossil remains of diatoms, which lived in lakes as phytoplankton and sedimented to the lake bottom after death. There are many deposits of kieselgur. Commercially utilized kieselgur originates mainly from northern and south-eastern Europe, as well as South America. Kieselgur is harvested by surface or deep mining. Afterwards, it is mechanically treated (crushed, dried and purified by air separation). It may contain a proportion of particles in the nanometre scale (‘nanoparticles’).
Kieselgur has a wide range of technical and industrial applications. For example, it is used as a filtering agent for drinking water, waste water, swimming pools, oils and beers, as an additive for concrete, paints, plastic paper and tablets, as a feed, as a carrier for fertilizers, pesticides and biocides and in the production of margarine and fats. It is a food additive (E 551), the abrasive agent in tooth paste, the carrier agent for medication in pills, and for ink in overhead slides.
Thus, the amounts used for insect control are tiny in comparison to the total worldwide usage.

Environmental issues, use of resources, recycling

As kieselgur is used indoors, the exposure of the environment is negligible (see EFSA 2012a). No negative effects on the environment are expected. Silicate dusts are very common but may be risky for young vertebrates or electronic equipment. They may stay effective for almost unlimited time.

Taking into account the small proportion of kieselgur used for plant protection, the Group has no concerns over the environmental impacts of mining and of waste disposal.

Animal welfare issues

As kieselgur is used indoors, the exposure of wild animals is negligible.

The treatment of poultry houses is positive for the welfare of poultry. Mortality has occasionally been reported in young poultry directly treated with kieselgur against red bird mite. However, this is an effect of overdose and inhalation of airborne dust due to wrong application, and may be minimised when kieselgur is applied correctly (i.e. only empty houses are treated).

Human health issues

Kieselgur can be purchased in drugstores to improve intestinal motility, bone structure and finger nails. In view of the widespread use of silica as a carrier and as a food additive (E 551), EFSA (2012) identified no concerns regarding oral exposure to kieselgur. Inhalation may have local lung effects, and dusts may affect the eyes. Impurities of crystalline silica are much more dangerous than kieselgur. Manufacturers must therefore ensure to use appropriate qualities of raw material. Kieselgur needs to be tested for residual levels of crystalline sands. Levels below 4 % are generally regarded as safe. Reg. 540/2011 requires a maximum of 0.1 % crystalline particles.

Because it is applied as an airborne dust and also because it is a desiccant, protective equipment (including a mask) is required for the application of kieselgur.

Impact on food quality

Grains treated with kieselgur contain residues of it. For high levels of residues, the following concerns apply: weight/volume ration is decreased; mild infestations by *Penicillium* cannot be detected (visual confusion with the kieselgur); retention of untypical smells; stated stronger abrasion of milling equipment.

To avoid these problems, grains must be cleaned as much as possible before processing, but complete removal is difficult. Levels below 100 g/ton grain can be achieved. At these levels, the above problems do not occur.

In any case, kieselgur is not of toxicological concern, and no MRL is set.

Traditional use and precedents in organic production

The use of kieselgur for control of stored products pests was authorised in EU organic production from 1991 – 97. It seems that most certifiers are still tolerating its use, assuming that it is indirectly covered by the listing of quartz sand, which has the same chemical composition.
Kieselgur is authorised as a feed additive (Annex VI), as a food additive as an anti-caking agent (Annex VIII A) and as a food processing aid for gelatine production (Annex VIII B).

Aspects of international harmonization of organic farming standards

According to the Codex Alimentarius Guidelines for the production, processing, labelling and marketing of organically produced foods, kieselgur may be used for plant protection, if the need is recognised by the certification body or authority. 'Non-synthetic' kieselgur (as discussed in this chapter) may be used in US organic production for 'processing pest control' in conjunction with facility pest management practices, and only if those practices are not effective to prevent or control pests, and for livestock health maintenance.

Reflections of the Group / Balancing of arguments in the light of organic farming principles

The Group sees a necessity for using kieselgur. The negative effects on product quality and worker health can be managed, and are of minor importance.

Conclusions

The Group concluded that the use of kieselgur for the control of stored product pests and poultry mites is in line with the objectives, criteria and principles of organic farming as laid down in Council Regulation (EC) No 834/2007. 'Kieselgur (diatomaceous earth)' should therefore be included in Annex II without restrictions of target species. If a 'basic list of active substances' is established in Annex II (see chapter 4.10), kieselgur should be included there.
When used in animal buildings, appropriate measures must be taken to avoid negative effects on animal health, in particular through inhalation.

4.3 Carbon dioxide

Introduction, scope of this chapter

When discussing alternatives to kieselgur (see chapter 4.2), the Group noticed that carbon dioxide is not listed in Annex II, although it is also effective against stored products pests.

Authorization in general agriculture and in organic farming

Carbon dioxide is approved under pesticide legislation (Reg. 540/2011), for use as a fumigant against insects and mites in stored products, with or without air pressure (SANCO 2013b).
It is not listed in Annex II of Reg. 889/2008.

Agronomic use, technological or physiological functionality for the intended use

Carbon dioxide is applied to stored products as a fumigant. It can be used for pest control at ambient or at high pressure. At 20 °C and ambient pressure, some three weeks exposure time are needed in grain treatments to control all developmental stages of the rather tolerant weevils of the genus *Sitophilus*. By contrast, application times can be reduced to approximately 3 h at high pressure (20 bar). Carbon dioxide at ambient pressure is authorised for the disinfestation of infected grains, grain products and oilseeds. At high pressure, it is authorised for the disinfestation of infected grain products, tobacco, oilseeds, dried fruits, tea, spices and medical plants.

Carbon dioxide acts on pests by suffocation and by acidification. For this, a minimum concentration of 40 – 60 % carbon dioxide in the air is necessary. This can only be achieved in enclosures which are airtight. The use of carbon dioxide on stored products has gained importance in recent years.

Necessity for intended use, known alternatives

Protection of stored products against pests is of high importance form a hygienic and economic point of view, and to avoid food waste. Because there are many different stored products, different storage conditions and different pests (over 100 important species), different methods are needed. For an overview of preventive methods, see kieselgur (chapter 4.2). As a gas (and unlike kieselgur), carbon dioxide can enter into a large mass of bulk grain (e.g. peas or cocoa beans) and even kill beetles or developmental stages developing inside a grain kernel. This is important for the control of cereal grain pests such as weevils of the genus *Sitophilus*, grain borers like *Rhizopertha* or *Prostephanus*, grain moths like *Sitotroga* or bean weevils like *Callosobruchus* or *Acanthoscelides*.

While kieselgur is often used to prevent infestation, carbon dioxide is used for treating stocks which have already been infected. For the application of kieselgur, the grain would have to be moved which would spread the infestation to conveyor belts and other parts of the premise. In case of a severe infestation, fumigation with carbon dioxide is an efficient way of pest control. By contrast, biological control is more effective in preventing infestations.

Nitrogen gas is another potential fumigant to be used for pest control in stored products. Treatment with nitrogen gas is slower than with carbon dioxide (some 5 weeks for the control of all stages of the genus *Sitophilus*, as opposed to 3 weeks for carbon dioxide). The reason is that nitrogen gas acts only by absence of oxygen, and not by acidification.

Origin of raw materials, methods of manufacture

Storage houses normally use bottled carbon dioxide. There are various origins (see report EGTOP/6/13).

Environmental issues, use of resources, recycling

For this purpose (unlike greenhouses), carbon dioxide is hardly ever obtained by burning fossil fuels. As a consequence, the environmental impact is negligible.

Animal welfare issues

No issues identified.

Human health issues

Higher concentrations of carbon dioxide are dangerous. Carbon dioxide is heavier than air. In case of leakage, it can therefore accumulate close to the ground, and especially in cellars. To manage these risks, there need to be detectors with alarm.

Impact on food quality

On some dried fruits, discoloration and temporary fizzy sensation by high pressure carbon dioxide have been observed. In many other dried fruits, no such effect occurs, and they are widely treated with carbon dioxide. On other durables, no negative impact on food quality is known. Pesticide registration requires a minimum purity of 99.9 % (SANCO 2013b), therefore the Group has no concerns over potential contaminants present in the carbon dioxide.
The prevention of pest infestation is beneficial for product quality.

Traditional use and precedents in organic production

Carbon dioxide is authorised as a food additive for plant and animal products (Annex VIII A) and as a processing aid for plant and animal products (Annex VIII B). It is also authorised for organic wine making. The use of high pressure carbon dioxide is apparently judged as a physical method and tolerated by some certifiers.

The use of carbon dioxide in organic greenhouses was previously discussed by the Group (see report EGTOP/6/13). The Group accepted the practice of CO_2 enrichment, but was concerned about the widespread tendency of burning fossil fuels in summer for the main purpose of obtaining CO_2, and recommended that CO_2 should preferably be used from natural sources, from processing or from burning of biomass sources.

Aspects of international harmonization of organic farming standards

According to the Codex Alimentarius Guidelines for the production, processing, labelling and marketing of organically produced foods, carbon dioxide may be used for plant protection, if the need is recognised by the certification body or authority. Carbon dioxide may be used in US organic production for 'processing pest control'.

Reflections of the Group / Balancing of arguments in the light of organic farming principles

The Group sees a necessity for using carbon dioxide. Worker health can be managed with safety measures.

Conclusions

The Group concluded that the use of carbon dioxide for the control of stored product pests is in line with the objectives, criteria and principles of organic production as laid down in Council Regulation (EC) No 834/2007. It should therefore be included in Annex II. No restrictions are necessary in the Group's opinion. If a 'basic list of active substances' is established in Annex II (see chapter 4.10), carbon dioxide should be included there.

4.4 Piperonyl butoxide

Introduction, scope of this chapter

The Group was asked whether it is possible to use pyrethrins without piperonyl butoxide (from an efficacy point of view), what alternatives to pyrethrins would exist, and whether the use of piperonyl butoxide would be compatible with the principles of organic farming.

The Group noted that the situation regarding the use of piperonyl butoxide in organic farming is unclear at the moment. This chapter discusses the use in plant protection, although piperonyl butoxide could potentially also be used for the control of parasites in animal husbandry.

Authorization in general agriculture and in organic farming

Under pesticide legislation, piperonyl butoxide is considered as a 'synergist'. Synergists are substances or preparations which, while showing no or only weak activity […], can give enhanced activity to the active substance(s) in a plant protection product (Reg. 1107/2009, Art 2.3(b)).

Only active substances are listed in Annex II of Reg. 889/2008 at the moment, thus synergists are out of the scope of Annex II. Piperonyl butoxide was never listed in the organic regulation. However, the first version of 2092/91 listed pyrethrins with the comment 'possibly containing a synergist'. Its use in organic farming is tolerated, if it is authorised at member state level.

Agronomic use, technological or physiological functionality for the intended use

Piperonyl butoxide contains the functional group methylenedioxyphenyl, which inhibits enzymatic breakdown (detoxification) of pyrethrin within the insect body. It is added to some commercial formulations of pyrethrin (and other insecticides) to increase their efficacy.

Necessity for intended use, known alternatives

The efficacy of pyrethrum products can be increased not only with piperonyl butoxide, but also with other oils such as sesame oil. These alternatives are already in use for a number of years. They are not as effective as piperonyl butoxide, but satisfactory for the use in practice.

Origin of raw materials, methods of manufacture

The material of origin, sassafras oil, is distilled from the root bark or the fruit of a few tree species, especially the sassafras tree (*Sassafras albidum*). Sassafras oil is then chemically processed to obtain piperonyl butoxide, which has a very similar structure. The Group found no indication for natural occurrence of piperonyl butoxide, but its functional group methylenedioxyphenyl occurs in sassafras oil and in sesame oil (Franklin 1976).

Environmental issues, use of resources, recycling

Because piperonyl butoxide is not considered to be an active substance, no EFSA evaluation report is available.

Animal welfare issues

For mammals, piperonyl butoxide has a low oral toxicity and a very low toxicity when inhaled, adsorbed by the skin or exposed to eyes (EMEA 1999). The Group has no concerns over animal welfare and health issues.

Human health issues

Because piperonyl butoxide is not considered to be an active substance, no EFSA evaluation report is available. Toxicological data were summarised in 1999 by the Veterinary Medicines Evaluation Unit (EMEA 1999). Acute toxicity is low, but long-term exposure may lead to liver damage. The WHO has set an acceptable daily intake of 0.2 mg/kg, which indicates no major toxicological concerns. No MRL for piperonyl butoxide is fixed within EU.

Impact on food quality

Piperonyl butoxide leaves residues on food, which can be detected with standard pesticide screening methods. For a discussion on residues, see chapter 4.1 (potassium phosphonates).

Traditional use and precedents in organic production

The use of piperonyl butoxide has been tolerated in EU organic farming for a long time.

Aspects of international harmonization of organic farming standards

According to the Codex Alimentarius Guidelines for the production, processing, labelling and marketing of organically produced foods, piperonyl butoxide is excluded from use since 2005. The use of piperonyl butoxide is prohibited in US organic production.

Other relevant issues

It is possible that in some EU member states, all registered pyrethrin products contain piperonyl butoxide at the moment. In order to ensure continuous use of pyrethrin by organic farmers, an adequate transition period should be allowed, during which the manufacturers can modify their pyrethrin products (to substitute piperonyl butoxide), and register the new formulations.

Reflections of the Group / Balancing of arguments in the light of organic farming principles

The main advantage of piperonyl butoxide is that it increases efficacy of pyrethrin products and that it therefore reduces the use of pyrethrin. The disadvantages are its negative impact on the environment and on human health, and that it leaves residues.
Piperonyl butoxide is not necessary in the Group's opinion, because there are effective, preferable natural alternatives.

Conclusions

The Group concluded that the use of piperonyl butoxide is not in line with the objectives, criteria and principles of organic farming as laid down in Council Regulation (EC) No 834/2007. It should therefore not be included in Annex II, and the tolerance of its use should be phased out.

4.5 Use of potassium bicarbonate (potassium hydrogen carbonate) as an insecticide

Introduction, scope of this chapter

In this chapter, the term 'potassium bicarbonate' is used, which is the traditional term for this substance under organic legislation (Reg. 889/2008). Under pesticide legislation (Reg. 1107/2009) and recently also under Reg. 889/2008, however, the substance is now called 'potassium hydrogen carbonate'.

Potassium bicarbonate is authorised for use as a fungicide. This chapter evaluates whether its use should be extended to the use as insecticide. This chapter only discusses aspects which are new for this use. For other aspects, the previous evaluation made in 2008 should be consulted.

Authorization in general agriculture and in organic farming

Potassium bicarbonate was approved in 2008, as a fungicide against powdery mildew of grapes (*Uncinula necator*) and apple scab (*Venturia inaequalis*) (SANCO 2008). In 2012, the use as an insecticide against pear suckers (*Psylla pyri, P. pyricola*) was added (SANCO 2012). The Group could verify registrations for use as an insecticide on pear for Belgium and the United Kingdom.

The use of potassium bicarbonate in organic farming was evaluated in 2008 (Forster et al. 2008) and authorised in the same year (Reg. 404/2008). At that time, its effect against pear suckers was unknown.

Agronomic use, technological or physiological functionality for the intended use

According to the technical documentation, potassium bicarbonate is lethal for larvae of pear suckers, and repellent for adults, thus reducing egg laying. It has to be applied at weekly intervals. In the UK, a maximum of 9 sprays with 6.8 kg/ha of potassium bicarbonate are authorised.

Necessity for intended use, known alternatives

In regions where pear suckers occur, there is a great need for a control method against this pest. Kaolin is a potential alternative, but plant protection products may not be registered in all member states. Its authorization for organic farming was recommended earlier by the Group (see report EGTOP/3/2011), and it is now authorised for organic farming (Reg. 354/2014). In the Group's opinion, potassium bicarbonate and kaolin are similarly acceptable for use in organic farming.

Origin of raw materials, methods of manufacture

Forster et al. (2008) concluded that both potassium and bicarbonate are ubiquitous in nature. The commercial substance is manufactured from potassium chloride and carbon dioxide.

Environmental issues, use of resources, recycling

Forster et al. (2008) did not see the need to reassess these issues.

Animal welfare issues

No issues identified.

Human health issues

Forster et al. (2008) did not identify any issues.

Food quality and authenticity

No issues identified.

Traditional use and precedents in organic production

Potassium bicarbonate is traditionally used in organic farming.

Aspects of international harmonization of organic farming standards

According to the Codex Alimentarius Guidelines for the production, processing, labelling and marketing of organically produced foods, it may be used for plant protection, without further restrictions. It is included in the IFOAM standards. Potassium bicarbonate may be used for disease control in US organic production, but not for pest control.

Reflections of the Group / Balancing of arguments in the light of organic farming principles

Potassium bicarbonate is already authorised as a fungicide, and the Group sees no arguments against its use also as an insecticide.

Conclusions

The Group concluded that the use of potassium bicarbonate as an insecticide is in line with the objectives, criteria and principles of organic farming as laid down in Council Regulation (EC) No 834/2007. The Group recommends that the restriction 'fungicide' should be deleted. As a less preferred alternative, the use 'insecticide' could be added.

If a 'basic list of active substances' is established in Annex II (see chapter 4.10), potassium bicarbonate should be included there.

4.6 Use of fatty acid potassium salt (soft soap) for disease control

Introduction, scope of this chapter

In chemistry, ‘soap’ is a salt of a fatty acid. Sodium salts are called ‘Marseille soap’, while potassium salts are called ‘soft soap’ (for details, see chapter ‘group substances’ below). In this chapter, they are discussed collectively under the term ‘soft soap’, which was chosen for being short.

Soft soap is authorised in organic farming for use as an insecticide. The Group was asked whether its use should be extended to the use as a fungicide. In addition, other potential uses are also briefly discussed.

Authorization in general agriculture and in organic farming

Soft soap was last evaluated in 2013 (EFSA 2013a). It is currently authorised as an insecticide, acaricide and plant growth regulator, but also as an herbicide. For a soft soap based on coconut oil, registration as an adjuvant is pending in Germany. The same product is registered as a fungicide in Switzerland, for use against sooty blotch on apples.

Agronomic use, technological or physiological functionality for the intended use

The available data suggest that soft soap has a limited potential to be used against crop diseases. The mode of action is not clear to the Group; it could be either as an adjuvant to enhance the effect of a fungicide, or as a fungicide itself.

Necessity for intended use, known alternatives

Sooty blotch (*Gloeodes pomigena*) is a disease which attacks apples from the end of July until harvest. Symptoms develop only during harvest, and may cause severe losses. Sooty blotch is well controlled as a side-effect of copper fungicides applied for scab control (Höhn et al. 2012). Only when the cultivation of scab-resistant apple varieties (which do not need to be treated with copper fungicides) started, sooty blotch gained economic importance. In the cultivation of scab-resistant apple varieties, soft soap is highly necessary.

As far as other crops are concerned, the Group thinks that the available scientific data do not support a level of efficacy which is promising for practical use as a fungicide. Nevertheless, it has a potential use as an acaricide and as an adjuvant. Herbicides: see below.

Origin of raw materials, methods of manufacture

Fatty acids can be obtained from various natural sources, for example coconut oil. They are treated with potassium hydroxide to obtain soft soap.

Environmental issues, use of resources, recycling

In its latest evaluation of the outdoor uses of soft soap, EFSA (2013) identified a risk for aquatic organisms and bees. For potassium salts of fatty acids, EFSA identified data gaps to address the following aspects of the ecotoxicological risk assessment: aquatic organisms, bees, non-target arthropods, earthworms and soil microorganisms. A low risk to birds, mammals, non-target plants and sewage treatment organisms was concluded. When soft soap is used correctly (according to label instructions) and not applied to watercourses, the Group has no concerns.

Animal welfare issues

No issues identified.

Human health issues

No issues identified.

Food quality and authenticity

No MRLs are required for soft soap, and the group has no concerns over possible residues of soft soap.

Control of sooty blotch is necessary to maintain good quality of apples during storage.

Traditional use and precedents in organic production

Soft soap is traditionally used in organic farming, and has been authorized for EU organic farming since 1991.

Aspects of international harmonization of organic farming standards

According to the Codex Alimentarius Guidelines for the production, processing, labelling and marketing of organically produced foods, soft soap may be used for plant protection, without further restrictions. In US organic production, soft soap may be used as an active ingredient for pest control, but not for disease control. However, it may be used as a formulating agent (inert ingredient), and may thereby also occur in fungicides. Use as an herbicide is allowed, but only for farmstead maintenance (roadways, ditches, right of ways, building perimeters) and ornamental crops.

Other relevant issues

Soft soap is also registered for use as an herbicide, but the Group did not evaluate this use. The Group emphasises that the use of any substance as herbicide has no precedent in EU organic farming.

Reflections of the Group / Balancing of arguments in the light of organic farming principles

Soft soap is traditionally used in organic farming (as insecticide) and has a very low toxicity and hardly any negative impact on the environment. Based on current experience, the Group sees effectiveness against sooty blotch, but expects only limited effectiveness as a fungicide in most other crops. The Group sees no major argument against its use as a fungicide in organic farming.

Conclusions

The Group concluded that the use of soft soap for disease control is in line with the objectives, criteria and principles of organic farming as laid down in Council Regulation (EC) No 834/2007 and recommends appropriate modifications of the present listing of soft soap in Annex II, in accordance with pesticide registrations.

The Group recommends to delete the restriction ‘insecticide’. As a less preferred option, the use ‘fungicide’ could be added. The use as herbicide should not be authorised. If a ‘basic list of active substances’ is established in Annex II (see chapter 4.10), soft soap should be included there.

4.7 'Basic substances'

Introduction, scope of this chapter

The Group was asked whether substances authorised as 'basic substances' under Art. 23 of Reg. 1107/2009 could automatically be considered as included in Annex II of Reg. 889/2008. 'Basic substances' are substances which are not predominantly used for plant protection (a full definition is given in Art. 23 of Reg. 1107/2009).

Authorization of 'basic substances' under Reg. 1107/2009

The procedures and data requirements for registration of pesticides have been tailored to modern, synthetic pesticides, for which applications are typically submitted by a commercial agrochemical company. When the new pesticides regulation 1107/2009 was elaborated, a second registration pathway was established for so-called 'basic substances'. These are substances which are useful in plant protection, but are not predominantly used for this purpose. The category of 'basic substances' is new, and experience is still very limited. So far, the 'guidance document' is not yet finalised, and only one pilot dossier has undergone the entire evaluation procedure.

Once that a substance has been granted the status of 'basic substance', it can be sold and used freely, and there is no legal protection for the applicant. Commercial companies are therefore unlikely to submit applications for basic substances. Unlike normal pesticides, however, applications for basic substances can be submitted by any interested party. It is likely that applications will be submitted mainly by governmental agencies or non-profit organisations such as organic farmers' associations.

Not every substance which is predominantly used for purposes other than plant protection will be applied for / granted the status of 'basic substance'. Those substances which have been registered through the 'normal' pathway are likely to keep their status as registered pesticides, such as spearmint, orange and rape seed oil, ethylene, soft soap, paraffin oil and quartz sand.

Range of substances which might qualify as 'basic substances'

At this stage, it is difficult to foresee the range of substances which will be applied for this category. In June 2013, the Commission has compiled a draft list of possible candidates for basic substances, which were identified by EU member states and stakeholders (SANCO 2013a). This list contains 49 substances, some of which are discussed below. However, the Group cannot exclude that other substances will be proposed as basic substances in the future.

Possible candidates with a traditional use in organic farming (calcium hydroxide, gelatine, lecithin and Quassia)

Among the possible candidates for basic substances, calcium hydroxide, gelatine, lecithin and *Quassia* extract are of particular interest. These substances have a traditional use in organic plant protection, but could not be re-authorised during the 4th stage of pesticide re-evaluation. For these substances, continued use in EU organic farming can only be ensured, if they are authorised as basic substances. At the moment, these substances are still included in Annex II of Reg. 889/2008, and the Group has no objections to their continued use, if they should be approved as basic substances. If these substances are approved as basic substances; the Group recommends that their use in organic production should be allowed immediately, with no need to consult the Group.

Horsetail

Dried horsetail (*Equisetum arvense* L.) is the first substance for which an application as basic substance was submitted. EFSA has completed the consultation with member states, and published its conclusions (EFSA 2013b). However, a final decision on its authorization has not yet been published. According to the application (EC 2013), horsetail is intended to be used on fruit trees, grapevines, cucumber and tomato, for the control of a range of foliar diseases. The application gives no details regarding the effectiveness of such treatments, therefore the Group could not evaluate the necessity for its use, which is required by Art. 16(2) of Reg. 834/2007.

The Group has not attempted a full evaluation of horsetail. The facts that horsetail is a plant, and that horsetail decoctions have traditionally been used in organic farming, are arguments in favour of its inclusion in Annex II. However, EFSA mentions some toxicological concerns over certain constituents of horsetail.

Possible candidates which are foodstuffs

Among the possible candidates for basic substances, there are numerous foodstuffs. The definition of foodstuff in Art. 2 of Reg. 178/2002 includes all kinds of ‘regular foods’ as well as food additives and similar substances (e.g. flavours). The list contains substances of plant or animal origin such as beer, cinnamon, fructose, glucose, milk, molasses, sucrose, starch and sunflower oil. On the other hand, the list also contains synthetic food additives such as citric acid (E 330), magnesium chloride (E 511), potassium chloride (E 508) and sodium hydrogen carbonate (E 500).

Concerning the use of ‘regular foods’ of plant or animal origin, the Group has no toxicological and very little ecotoxicological concerns. However, issues of food waste should be considered.
In the case of synthetic food additives, it should be evaluated case by case whether their use for plant protection purposes is consistent with the principles of organic production. The Group would be concerned about automatic approval of such substances.
In all cases, GMO origin must be excluded.

Possible candidates which occur in nature, but have no traditional use in organic farming

The list of possible candidates contains also a number of other substances which occur in nature, but have no traditional use in organic farming. Some of these are discussed below:

- 1-Octen-3-ol is a metabolite of micro-organisms and edible mushrooms, and occurs also in a number of plants. It is used as an attractant for mosquitoes and flies. For commercial purposes, it is chemically synthesised.
- Dimethyl disulfide (DMDS) occurs is the mushroom *Phallus impudicus*, known colloquially as the common stinkhorn. It is used as a flavour for foods, and also in the petrochemical industry. For commercial purposes, it is chemically synthesised.
- Lactoperoxidase is a component of the immune system and occurs in humans and most animals. Lactoperoxidase is an effective antimicrobial agent, and is used for preserving food and cosmetics, and also in medicine (e.g. dental and wound treatment).
- Salicylic acid occurs in various plants. It is used in cosmetics and medicine. For commercial purposes, it is chemically synthesised.

In conclusion, some of these substances might prove to be acceptable for organic farming, but this is not certain at the moment. The Group recommends that each of them should be fully evaluated, and would be concerned about automatic approval of such substances.

Possible candidates which are synthetic substances

The Group cannot exclude that synthetic substances or substances with negative side-effects might be approved as basic substances in the future. Their use would not comply with the objectives and principles of organic farming, and automatic approval would clearly be undesirable (Art 4c of Reg. 834/2007).

Reflections of the Group / Balancing of arguments in the light of organic farming principles

The main advantage of automatic authorization of basic substances is that this saves time, efforts and costs. In the case of automatic authorization, substances would be immediately available for organic farmers after their approval as basic substances. In the past until now, the inclusion of new substances has often taken several years.

The main disadvantage of automatic authorization of basic substances is that the organic sector loses control over the substances authorised for plant protection. In public perception, the range of substances authorised for plant protection plays an important role. It is seen as an important factor determining the environmental impact of organic farming, but also determining food quality (residues).

According to Article 16.2 of Reg. 834/2007, substances must be necessary, in order to be authorized for organic production. In the Group's opinion, the concept of 'automatic authorization' is contradictory to this principle.

In the Group's opinion, it is crucial that the range of substances authorised for plant protection remains fully under the control of the organic sector. Thus, the disadvantages of automatic approval outweigh the advantages.

However, in the Groups opinion, a faster evaluation procedure for basic substances could be considered.

Conclusions

The Group does not recommend that substances authorised as 'basic substances' under Reg. 1107/2009 are automatically considered as included in Annex II of Reg. 889/2008.

4.8 'Low risk substances'

Introduction, scope of this chapter

There is also a group of low risk substances in pesticide legislation (Art. 22 of Reg. 1107/2009). These substances are plant protection products. At the moment, neither the criteria nor potential candidates for low risk substances are known.

Reflections

In the Group's opinion, it is crucial that the range of substances authorised for plant protection remains fully under the control of the organic sector.

Conclusions

The Group is against automatic approval of low risk substances in organic farming.

4.9 'Group substances'

Introduction

When an active substance is authorised as a pesticide, it is added to the Annex of Reg. 540/2011. In most cases, the listing refers to a chemically well-defined substance. In a few cases, however, the listing is broader and covers a group of substances. The Group was asked whether there is a need for discrimination between individual substances within a group, when such 'group substances' are included in the Annexes in Reg. 889/2008.

The Group could find neither an official definition of 'group substances', nor an official list of such substances.

'Group substances' in the organic regulation

Grouping of similar substances can be useful, and has been practiced not only in pesticide registration (Reg. 540/2011), but also in the organic regulation (Reg. 889/2008). In Annex II, several group substances are mentioned. In most cases, these groups also contain some substances which are not authorized under Reg. 540/2011:

- hydrolysed proteins;
- 'plant oils (e.g. mint oil, pine oil, caraway oil)';
- 'micro-organisms; Products as specified in the Annex to Implementing Regulation (EU) No 540/2011 and not from GMO origin';
- pheromones;
- fatty acid potassium salt (soft soap);
- paraffin oil.

More examples can be found in Annex I, such as 'products and by-products of plant origin for fertilisers'. In all these cases, it has been a deliberate decision to authorise an entire group of substances, which can be evaluated similarly form the point of view of organic farming.

Hydrolysed proteins

Hydrolysed proteins are authorised as attractants. They are mixtures of various amino acids. These occur in nature as mixtures, and are usually not separated during the manufacturing process. As described below for fatty acids, any further specification would impose a need for separation of substances during the manufacturing process, which is not desirable from an organic point of view. The Group does not see any amino acid which should be excluded from organic production. In conclusion, the Group sees no need for further specification of hydrolysed proteins in the organic legislation.

Plant oils

Plant oils are authorised as a group in the organic legislation, but are registered as pesticides individually. Currently, citronella oil, clove oil, spear mint oil and rape seed oil are registered, while many other oils have not been approved. In Reg. 540/2011, they are listed with the prefix 'Plant oils / […]'. This prefix could give the wrong impression that all plant oils are registered. However, in the context of Reg. 889/2008 this is of no concern, because this regulation indeed authorises all plant oils.

Citronella oil is authorised as an herbicide. This use is not acceptable for organic farming (see fatty acids, chapter 4.6). The other plant oils are authorised as insecticides, acaricides, fungicides, bactericides or sprouting inhibitors. These uses are acceptable for organic farming. The Group can imagine other uses to be developed in the future, for example repellent, nematicide, rodenticide, fruit thinning, molluscicide. In the Group's opinion, all uses except the use as herbicide are acceptable.

Micro-organisms

The use of biocontrol agents, including micro-organisms, is one of the most preferable methods of pest/disease control in organic farming. For micro-organisms which have been approved as pesticides, their use has very few negative side-effects on the environment and is harmless for the operator. Microbial biocontrol is a rapidly developing field, and new micro-organisms are regularly approved under Reg. 540/2011.

The Group does not see any micro-organisms which should be excluded from organic production, except for GMOs.

The Group recommends that the present listing of micro-organisms as a group should be maintained, with the restriction that they must not be GMOs.

Pheromones

A large number of pheromones are approved under Reg. 540/2011. Under Reg. 889/2008, all pheromones were traditionally authorised, but their use was limited to traps and dispensers. Recently, the range of substances has been limited to numbers 255, 258 and 259 of Reg. 540/2011.

Pheromones have some very beneficial properties: (1) very low toxicity to humans, (2) very low toxicity to non-target organisms and very little negative side-effects on the environment, (3) they are used in low doses (OECD 2001), and (4) they are usually not applied onto the crops, but in traps or dispensers. For practical reasons, it is not possible to extract pheromones from their natural sources (i.e. the pests), so they are manufactured synthetically. In some cases, the synthesized molecules deviate slightly from the natural form, but they are functionally identical. In the Group's opinion, the use of pheromones is clearly preferable to the use of insecticides. The Group is even willing to accept the use of non-natural pheromones, as long as they are not directly applied to crops. For synthetic pheromones, however, it should be checked whether they are similarly host-specific as their natural analogues.

The Group concluded: (1) for pheromones used in traps and dispensers, not only numbers 255, 258 and 259, but also new substances are in line with the principles of organic production. (2) new pheromones sprayed onto plants could be acceptable, but they should be evaluated case by case, and listed individually in Reg. 889/2008.

Fatty acid potassium salt (soft soap)

Fatty acids potassium salts are a group of substances with variable chemical composition, but similar chemical properties and similar effects as pesticides. Numerous fatty acids occur in nature. They can be roughly categorised by their chain length (number of C-atoms), and by the presence or absence of double bonds (unsaturated vs. saturated). Well-known examples include formic and acetic acid. Fatty acids can be obtained from fats of plant or animal sources. These fats are always a mixture of several fatty acids. The product used for plant protection is normally a potassium salt of mixture of fatty acids with chain lengths of 7 – 18 C-atoms (CAS number 67701-09-1). Certain fatty acids are also marketed as pure compounds, e.g. pelargonic acid (C9).
Mixtures of fatty acids with chain lengths of 7 – 18 C-atoms are authorised for use as pesticides. From an organic point of view, each individual fatty acid could be evaluated similarly, and similarly to the mixture. Thus, further specification has no added value. These fatty acids occur in nature as mixtures, and are usually not separated during the manufacturing process. Any

further specification would impose a need for separation of substances during the manufacturing process, which is not desirable from an organic point of view. The Group does not see any fatty acid potassium salts which should be excluded from organic production. In conclusion, the Group sees no need for further specification of fatty acids in the organic legislation.

Paraffin oil

Paraffin oils are mixtures of hydrocarbons, containing molecules of various chain lengths (11 – 31 C atoms). Under Reg. 540/2011, three mixtures are approved as a group (CAS No 64742-46-7, No 72623-86-0 and No 97862-82-3), while a fourth mixture is approved individually (CAS No 8042-47-5). From an organic point of view, each individual hydrocarbon and each mixture could be evaluated similarly. Thus, further specification has no added value. The Group does not see any individual hydrocarbon or mixture of hydrocarbons which should be excluded from organic production. In conclusion, the Group sees no need for further specification of paraffin oils in the organic legislation.

Repellents by smell of animal or plant origin

The following repellents by smell of animal or plant origin are listed in Reg. 540/2011: fish oil, sheep fat, tall oil crude and tall oil pitch. Sheep fat has recently been authorised for organic farming, while the other substances are not authorised. Sheep fat has been discussed in report EGTOP/3/2011, and has recently been authorized for organic farming (Reg. 354/2014).
For the moment, the Group has not studied fish oil, tall oil crude and tall oil pitch in detail, and therefore cannot recommend to list all these repellents as a group.

Other relevant issues

There may be other groups in the future. These would need to be considered case by case, before they are included.

Conclusions

For the ‘group substances’ currently authorised for organic production, the Group sees no need for further specifications in Reg. 889/2008. In the contrary, it could be reflected whether it would be appropriate to replace some of the current listings of individual substances by newly formed groups.
Before bringing a new group on the list, it must be very carefully evaluated whether there are substances inside the group that do not comply with the principles of organic farming. Depending on this evaluation, it should be decided whether the group is included as a whole, or whether a further discrimination is required.
For all groups, only the substances authorized under Reg. 540/2011 can be used.

4.10 Specification of use categories in Annex II (‘basic list of active substances’)

Introduction

The first EU organic regulation (Reg. 2092/91) listed all authorised pesticides in Annex II B, without restrictions in their use. Specifications of the use category (e.g. ‘insecticide’, ‘fungicide’) were added in 1997 (Reg. 1488/97). Today, the use category is specified for all products listed in Annex II, except for micro-organisms.

For pesticides, the use category is primarily specified by Reg. 540/2011. Pesticide registration is a dynamic process. New uses are regularly approved, and old uses are withdrawn. In recent years, the specifications in Annex II of Reg. 889/2008 were therefore often outdated. This has caused considerable efforts for updating of Annex II, and it has delayed the implementation of newly approved uses on organic farms. The following proposal aims to improve this situation.

Use categories defined by pesticide legislation

This paragraph lists all use categories currently found in the EU pesticides database.

- Control of pests/diseases: insecticide, acaricide, molluscicide, nematicide, rodenticide, bactericide, fungicide, attractant, repellent, elicitor, plant activator, virus inoculation, synergist, soil treatment. Some of these categories describe the target species (e.g. insecticide), while others describe the mode of action (e.g. attractant) or the site of application (soil treatment).
- Control of weeds/algae: herbicide, algicide, safener. Again, some categories describe the target species (e.g. algicide), while others describe the mode of action (safener).
- Other uses: plant growth regulator, pruning, desiccant, other treatment.

In the Group's opinion, it would be sufficient for the first group to specify that they can be used for the control of pests/diseases, and no more detailed specification is necessary. By contrast, all other potential uses are critical with respect to organic farming principles, and detailed specification is adequate.

Details of the proposal for currently listed substances

The Group proposes the establishment of a 'basic list of active substances' as the first sub-chapter within Annex II. This should contain selected substances from Annex II. The proposal is limited to substances of natural origin, for which the use in organic plant protection is not controversial (see below). For all cases where there could be concerns about certain uses, authorized uses should be specified as until now.

In most of these substances, the Group proposes to delete the specifications. Some plant oils, soft soaps and micro-organisms have herbicidal activity and could potentially be used as herbicides. To avoid any misunderstandings, the use as herbicides should therefore be excluded for the entire 'basic list of active substances'.

Basic list of active substances

Substances not to be used as herbicides, but only for the control of plant pests and diseases.

Name of substance	New conditions for use	Change from present conditions
Lecithin*	(no specification)	delete 'fungicide'
Plant oils	Use also as sprout inhibitors. Products as specified in the Annex to Commission Implementing Regulation (EU) No 540/2011.	delete 'insecticide, acaricide, fungicide'
Micro-organisms	Products as specified in the Annex to Commission Implementing Regulation (EU) No 540/2011 and not from GMO origin.	none
Pheromones	only in traps and dispensers Products as specified in the Annex to Commission Implementing Regulation (EU) No 540/2011 (numbers 255, 258 and 259)	delete 'attractant, sexual behaviour disrupter'.

Fatty acid potassium salt (soft soap)	(no specification)	delete ‘insecticide’
Quartz sand	(no specification)	delete ‘repellent’
Kaolin	(no specification)	delete ‘repellent’
Laminarin	(no specification)	delete ‘elicitor of crop’s self-defence mechanisms’
Potassium hydrogen carbonate (aka potassium bicarbonate)	(no specification)	delete ‘fungicide’
Kieselgur	(no specification)	(new substance, inclusion proposed in chapter 4.2 of this report)
Carbon dioxide	(no specification)	(new substance, inclusion proposed in chapter 4.3 of this report)

*subject to approval under pesticides legislation.

Implementation of the proposal with new substances

Before a new substance is included in Annex II, it should be reflected whether specifications of the use category are necessary or not. Specifications should only be added, if there is a doubt that future uses might not comply with organic farming principles. Based on these considerations, the substance may be included in the ’basic active substances’, or elsewhere in Annex II.
For the substances evaluated in this report, the Group has already adopted this approach.

Justification of the proposal

The proposal is limited to non-controversial substances (see above) for which no concerns have been raised in the organic sector; for all other substances (e.g. ethylene), the Group fully supports the current practice of specifying uses in Annex II.

With respect to *non-controversial substances*, the Group points out the following arguments:

- Even for substances where no specifications are given in Annex II, the use must follow the specifications laid down in Reg. 540/2011.
- With respect to organic farming principles, there is no added value in repeating these specifications.
- For the EU authorization process, these specifications represent an extra burden, because use categories must regularly be updated (for examples, see the evaluations of potassium bicarbonate and of soft soap above).
- For organic farmers, these specifications unnecessarily delay the adoption of newly approved uses.
- In the case of emergency measures against newly upcoming and spreading pests/diseases, these specifications present unnecessary difficulties for the implementation on organic farms.
- For input manufacturers, these specifications represent a second hurdle (besides pesticide registration) which further delays the marketing to organic farmers. By deleting the specifications for substances in the ‘basic list of active substances’, the development of new plant protection products and/or the registration of new uses can be encouraged for these substances.

The approach of authorizing a ‘basic list of active substances’ of substances without further restrictions was first proposed by the Group for selected food additives, with the aim to facilitate the sector in creating a wide variety of high quality organic foods (see report EGTOP/5/2012). Later, the Group concluded that a ‘basic list of active substances’ might also be useful for disinfectants (see report EGTOP/6/13). The ‘basic list of active substances’ is thus in line with similar proposals for other kinds of inputs, listed in other Annexes of Reg. 889/2008. The aim is the same: to give some flexibility to the sector (within clearly defined limits), so that it can develop improvements on its own.

Conclusions

In the Group’s opinion, restrictions of use category in Annex II should be limited to those cases where further limitations are needed from an organic farming point of view, beyond the limitations already imposed by pesticide approval (Reg. 540/2011). For other cases, specifications of use category should be deleted.

The Group recommends to include a ‘basic list of active substances’ (as shown above) in Annex II.

4.11 Priority assessment of requests

During the discussions on this mandate, the issue of priority-setting for requests was raised by the Commission. The Group decided to make a proposal in this report, although this is relevant not only for plant protection.

A large number of requests concerning different areas of organic production are continuously presented to the Commission, some of which are passed on to the EGTOP. Due to limitations in capacity, some of these proposals have to be postponed for some time, before they can be dealt with. In this situation, it would be useful to have transparent criteria for the assessment of the priority of requests.

To this end, the group has identified a number of questions, which will be useful for an evidence-based priority setting. However, the final priority-setting remains a task for the Commission, and the Group has not attempted to develop a ‘mathematical formula’ for calculation of priority.

The existing ‘dossier templates’ for requests should be amended with a chapter containing all information necessary to evaluate the relevance and priority of a request at the European scale. To avoid duplication, similar questions should be deleted from the existing templates, where necessary.

Relevance and priority of the request at the European scale

Geographical relevance of the request (member states, regions, …)
Socio-economic relevance of the request (acreage, turnover, number of operators/stakeholders affected, …; as far as known)
Sectors affected (details …)
Severity and immediacy of the problem addressed (impact on human, animal or plant health, …)
Stakeholder engagement/consultation in dossier preparation
Aspects of international harmonization / market distortion

A (possible) authorization leads to amendment(s) in the respective Annex[6]
Other aspects justifying high priority, such as • relevance for the development of a new organic production sector, • addressing of a newly upcoming problem in production or a quarantine organism, • addressing a recent development in agricultural policies, • addressing a new trend in consumer preferences/nutritional habits or new developments in food technology, • addressing a declared goal of organic farming.

[6] It should be carefully analysed whether the specific use of a substance is already (implicitly) authorized or not. This is to avoid the following conclusion: "The group considers that the use of … is in line with objectives, criteria and principles of the organic regulation. There is no need for amendment of the specific conditions of Annex ...."

5. LIST OF ABBREVIATIONS / GLOSSARY

Annex II	Annex II to Regulation 889/2008
BBCH-scale	The BBCH-scale is a scale used to identify the phenological development stages of a plant. 'BBCH' stands for 'Biologische Bundesanstalt, Bundessortenamt und Chemische Industrie'
DG SANCO	Health and Consumers Directorate-General of the European Commission
SCLPs	Straight Chain Lepidopteran Pheromones (see chapter 4.9)
The Group	The Expert Group for Technical Advice on Organic Production (EGTOP)

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