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Environmental considerations of disinfectants used in agriculture

G. BRUINS * and J.A. DYER **

Summary: *Using disinfectants in agriculture increasingly requires consideration of the indirect effects on the environment and human health. At present, only limited information is available on post-application effects of disinfectants, and such data therefore needs to be gathered in order to assess potential effects.*

In addition, a basis exists for establishing precautionary guidelines using current information. Optimum handling and application procedures require a knowledge of the specific features of each type of disinfectant. A need to establish product standards through efficacy tests has also emerged.

The benefits of disinfectants for disease control must also be weighed against any environmental consequences. Emergency application of a disinfectant carries different implications from routine use on farms, and any large-scale application should undergo an environmental impact assessment.

KEYWORDS: Disease control – Disinfectants – Environmental impact.

INTRODUCTION

The responsible use of limited natural resources is required by an increasingly widespread ethic in contemporary society, which permeates all human activities. Soil and water, along with many other resources, are treasured ecological components and basic elements of agricultural production which must be preserved for future generations. This paper considers the possible effects of disinfectants on these environmental components. There is also a growing consensus that such environmental effects include risks to human health.

It is the duty of the veterinary profession to take measures to protect animal health and enhance animal production, while taking into account the well-being of the human environment. It is thus important to consider uses of disinfectants in animal production which may present environmental risks.

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The function of disinfectants is to kill and prevent the growth of microorganisms. Disinfectants are potentially noxious/harmful substances which are used in intensive animal production and disease control programmes. In fulfilling this role, disinfectants may also have an adverse impact on the environment. Given that disinfectants are selected for their toxic properties, it is no surprise that these products may harm beneficial microorganisms, plant and animal life, and even humans, when used without due caution.

Disinfection products and detergents used on the farm may find their way into farm products and thus into the human food chain. Milk is a prime example (1, 3, 15). Waste water treatment may also be affected by the careless discharge of disinfectants (J. Hiddink, unpublished findings, 1993).

SCOPE OF CONSIDERATIONS

Two general reasons for disinfectant application are considered here. In the first case, disinfectants are occasionally required during emergency situations. For example, after the extermination of a herd carrying a dangerous infectious disease, carcass disposal and site cleaning are critical. Given the need to control the disease risk, liberal application of disinfectants is accepted in such a case. During an emergency, the concern is usually for a particular and often dangerous organism. Frequent examples in the field of animal health include the causal agents of tuberculosis, anthrax, brucellosis and bovine spongiform encephalopathy (BSE).

The second case refers to the routine use of disinfectants, particularly in day-to-day farm operations (e.g. the cleaning of cow udders prior to milking). In such applications, the role of disinfectants is linked to sanitation. The appropriate volume of disinfectants to be used in this role is not easily determined. Similarly, there seems to be a lack of understanding of the post-application destination of these chemicals, and little or no regulation exists in this field. However, there seems to be reason for concern over the possible cumulative environmental effects and human health risks associated with routine use of disinfectants.

CLEANING

Before applying a disinfectant, thorough cleaning must be performed. When animals die as a result of disease or are killed as part of a disease control and eradication programme (rather than during routine on-farm slaughter for food), the first concern is for the containment of contagious diseases. Disposal of carcasses, and cleaning and disinfection of barns, stalls and other housing, should also be conducted in a way which precludes any poisonous hazard to health or the environment. Disinfectant products should never be used in concentrations higher than those recommended by the manufacturer, in an attempt to compensate for poor cleaning or shorter contact time.

As a rule, persons who handle carcasses and contaminated materials should be dressed in protective garments, provided with the proper equipment, and appropriately supervised to prevent danger to themselves or the further infection of buildings and grounds (6). In addition, handling of waste materials and disposal activities should be conducted in a way which prevents further contamination of soil, air or water.

After the specific pathogen has been identified, the most appropriate disinfectant should be selected on the basis of the target pathogen and applied only at the recommended rate. Those in charge of disinfection should be aware of the potential impact of cleaning and disinfection efforts on humans, or domestic or wild animals. The preservation of environmental elements such as soil, water and air can best be ensured by aiming for efficient disinfectant application.

Where infectious microorganisms are present, a cleaning operation should precede disinfection. Such an operation might include the disposal of infected carcasses in a controlled manner, to minimize environmental effects (6).

The basic steps to be followed in cleaning are as follows:

a) All manure and bedding materials should be taken away and disposed of in an appropriate manner (incinerated, buried or ploughed into the earth).

b) Earth and sand flooring must be scraped down to the uncontaminated soil. All contaminated soil should be removed and subsequently sterilized, buried or ploughed under.

c) Any material – such as wooden planks and boards – which cannot be thoroughly sanitized must be removed and incinerated or buried.

d) All interior surfaces (e.g. ceilings, floors and walls) must be thoroughly cleaned with a powerful detergent.

e) All machinery and tools used in the removal of soiling (e.g. manure loaders, shovels, brushes and scrapers) must be thoroughly sanitized.

The selection of detergents is important. A product which could interfere with or neutralize the chemical action of the disinfection agent should not be used.

PRINCIPAL DISINFECTANTS USED ON THE FARM

Some of the more popular disinfectants include phenols, chlorine, peracetic acid, quaternary ammonium compounds and aldehydes. Disinfectants have been used for many years and were first used over a hundred years ago; for example, the first use of formaldehyde dates back to 1888 (13). However, it should be noted that little new information is available in the current literature on environmental impacts of disinfectants. The objective here is to briefly review the active disinfectant materials available, the intended action of these products, the problems associated with potential environmental impacts, possible alternatives and proposed solutions.

The efficacy of disinfectants is influenced by many factors, among which concentration, temperature and contact time are of prime importance. It is thus paramount to follow carefully the instructions printed on product labels to attain the required results in terms of germ mortality.

Chlorine

Chlorination is the most important water-treatment process in preventing the spread of infectious disease. The active chlorine carrier may take several forms: liquid types are based on inorganic chlorine compounds, while powder or tablet forms are based on organic chlorine compounds. The use of chlorine-based products as surface disinfectants is widespread, due to the universal action of these products against

vegetative bacteria, mycobacteria, viruses, and fungal and bacterial spores, although chlorine-based products are less effective in combating spore-forming bacteria and the causal agents of BSE and scrapie. In these cases, longer contact time and higher concentrations are required (M. Best, unpublished findings, 1993). Generally, the bactericidal effect of active chlorine is optimal in a neutral or weakly acidic solution (pH 5-7). Many tests have shown rapid killing of viruses, bacteria, yeasts and mould.

Chlorine-based disinfectants are usually unstable in both concentrated and diluted forms, as they are affected by heat and light. The use of freshly-prepared solutions is preferred. As a rule, these products are inexpensive and fast-acting. The working mechanism of chlorine-based products is thought to be the irreversible oxidative action on the cells of microorganisms. Chlorine can be blended safely with other alkaline products.

The negative characteristics of these products include high corrosivity to metals and the release of a strong odour. They may also be irritating to skin and eyes. Organic-bound chlorine such as chloramine-T does not have an unpleasant odour, but it is relatively expensive. Chlorine-based products have very rarely caused poisoning in humans or animals (8). The environmental risk of chlorine-based products for soil and plants appears to be small, and any damage is usually short term, as these products are easily neutralized by organic matter (8). Consequently, chlorine-based products are not recommended for the disinfection of slurry and manure.

Concern has been expressed recently with regard to the possible creation of trihalomethanes in chlorinated drinking water (4, 5). These disinfection by-products have been shown to be carcinogenic in laboratory animals. It is often impossible to prove that a chemical is not carcinogenic. However, it is important to weigh the toxicological risk due to disinfection against the disease risk of not disinfecting. Research has shown that the risks associated with not disinfecting drinking water clearly exceed those produced by disinfection (4). Bromine chloride has been proposed as a disinfectant in this regard (9).

Formaldehyde

Products such as formalin (a water-based 30-37% formaldehyde solution in 10% methanol) have been used for many years as disinfectants in animal disease control and prevention programmes. Formaldehyde may be used in either the liquid or gaseous state. The aqueous solution is a broad-spectrum disinfectant which is effective as a bactericide, tuberculocide, fungicide and sporicide. The vaporised and gaseous form provides good penetration (11). Fumigation activities must be performed in the absence of personnel, as exposure to gaseous formaldehyde may result in harm to the mucous membranes of the respiratory system and the eyes. Formaldehyde is a very popular surface disinfectant due to the capacity to kill viruses, and is considered inexpensive. Another advantage is that formaldehyde is affected very little by the pH of its environment and the presence of other organic matter. As such, formaldehyde could be used at fairly low concentrations to disinfect liquid manure. Solutions of formaldehyde have virtually unlimited shelf-life and are considered non-corrosive to metal. Formaldehyde foam products may be used as sprays and are used to disinfect barns, stalls and other housing on the farm.

However, formaldehyde is potentially carcinogenic and should be handled with extreme caution. Direct contact with this product must be avoided. Formalin produces irritating fumes and has a pungent odour even at very low concentrations. Some

individuals have strong allergic reactions to formalin, and cases of dermatitis have been reported (8, 14). Thus, it is advisable to minimize any exposure of humans and animals to formaldehyde. The use of formaldehyde in farm situations should not present a great environmental risk, as disinfectant concentrations should be low and organic material will assist in the rapid breakdown of the product.

In exceptional cases (e.g. the killing of anthrax spores in the soil surface), the formaldehyde solution will probably also kill beneficial microbes and plant life. However, one must bear in mind that such efforts are driven by the need to kill a dangerous pathogen and thus may require extreme action.

Possible alternatives to formaldehyde include chlorine-type disinfectants, glutaraldehyde, peracetic acid and hydrogen peroxide. In recent years, in view of some of these unpleasant characteristics, formaldehyde has been used more widely in combination products than as a single-ingredient disinfectant.

Phenolics

Phenol (carbolic acid) and phenol derivatives originate when a hydroxy group replaces one of the hydrogen atoms on the aromatic ring (10). Common constituents in phenol derivatives are *o*-phenylphenol and *o*-benzylparachlorophenol. It takes much longer for phenols to be inactivated than for other disinfectants such as formaldehydes and peracetic acid, and the environmental effects will thus be of longer duration and could potentially be more serious. Phenolics are among the most frequently-used surface disinfectants world-wide and have been in use for 130 years. Phenolics are often combined with detergents.

Phenolics are slowly being replaced by other disinfection products, mainly because they are toxic. In addition, the surface action of phenolics is less effective than that of formaldehyde, and they have an unpleasant odour which may be transferred to agricultural products. Phenolics may also induce skin irritation and de-pigmentation (7). Further, most phenolics are ineffective against non-enveloped viruses (e.g. foot and mouth disease virus and bluetongue virus) or bacterial spores. However, the effect of phenolics may vary with each specific preparation, but these compounds are generally effective against enveloped viruses and vegetative bacteria.

These products are highly toxic to the environment, are generally hard to break down and are not easily neutralized by organic material. Instructions for use must be strictly followed to avoid prolonged negative consequences for the soil, and for animal and plant life.

Peracetic acid

Peracetic acid is a very strong oxidizing agent. Because of this characteristic, it has quite a wide spectrum of disinfectant uses and is fast-acting. It is an effective disinfectant against bacteria, viruses, moulds, yeasts and bacterial spores. Peracetic acid has been used as a surface disinfectant for many years, primarily because of its excellent antimicrobial effect. This disinfectant lends itself well to being mixed with acidic detergents. Peracetic acid is mildly corrosive and should be handled with care. However, the environmental impact is considered small, as this product will break down into water and acetic acid (R.W. Georgeson, unpublished findings, 1993). Peracetic acid may be viewed as a replacement for other disinfectants which potentially have a far greater adverse impact on the environment.

Quaternary ammonium compounds

Quaternary ammonium compounds are used as surface disinfectants and have good detergent action due to an ability to lower the surface tension of water. However, these compounds should not be used in hard water situations (12). They have low toxicity, may be used under various pH conditions and are non-corrosive to metals. Quaternary ammonium compounds have a limited spectrum of activity and are not effective against viruses, mycobacteria and bacterial spores. Furthermore, some bacteria have shown resistance to these disinfectants (13; R.W. Georgeson, unpublished findings, 1993). It thus becomes necessary to combine quaternary ammonium compounds with other disinfectants to improve their efficacy. However, caution should be exercised when mixing products, as these may inactivate each other. The effect of these compounds as bactericides is quickly neutralized by hard water, soap residues and organic matter. Quaternary ammonium compounds are felt to have only a minor role to play in animal disease control and prevention. These compounds degrade rapidly in the environment.

Hydrogen peroxide

Hydrogen peroxide is available as a 30% solution in water. It is an effective surface disinfectant for use against viruses, bacteria, mycobacteria and fungi. Although hydrogen peroxide is widely believed to be ineffective against bacterial spores (Environment, Energy and Natural Resources Subcommittee, unpublished report, 2 October 1990), recent studies indicate some sporicidal action (M. Best, unpublished findings, 1993).

Hydrogen peroxide is widely used as a disinfectant, mainly as it is non-pollutant, breaking down into water and oxygen. Thus, no long-term environmental problems should arise from the use of this product. Hydrogen peroxide could be used at high concentrations and high temperatures, and is a fast-acting disinfectant under these conditions. Vaporizable hydrogen peroxide is now available and would provide a satisfactory alternative to gaseous formaldehyde. At lower temperatures, a longer contact time is required. Hydrogen peroxide is corrosive to metals and is unstable when exposed to heat and light.

Iodophors

An iodophor is formed by iodine combined with a solubilizing carrier such as alcohol or water. Iodophors have long been used by health professionals, primarily as antiseptics. Iodine solutions are toxic, produce an offensive odour, may stain and could cause irritation to the skin. A popular iodophor-based disinfectant is povidone-iodine, which is less toxic and less irritant than other iodine solutions. Iodophors must be properly diluted to achieve antimicrobial activity (it is thought that dilution causes more free iodine to be available for disinfection) (Environment, Energy and Natural Resources Subcommittee, unpublished report, 2 October 1990). These products are fast-acting, and kill bacteria, viruses and mycobacteria. However, iodophors require much longer contact times to kill fungi and bacterial spores. They may be mixed with acids to enhance their efficacy. Iodophors, which are generally labelled as antiseptics, should never be used as surface disinfectants, as they generally contain insufficient free iodine to be effective in this role. Iodophors may stain treated objects, are corrosive and are easily neutralized by organic matter. They are affected by pH in the alkaline range and by hard water. The corrosivity is greater at higher temperatures (e.g. >40°C).

Caustic soda (sodium hydroxide)

Caustic soda (sodium hydroxide) is a strong surface disinfectant which finds a use in many farm situations. A high concentration of this substance can kill all microorganisms including bacterial spores. Such concentrations will produce a pH of 13 or higher. Viruses are the most easily eradicated microorganisms. Sodium hydroxide is highly corrosive and irritating to the skin, eyes and mucous membranes of animals and humans; contact could result in severe burns. Most problems occur after careless use of this disinfectant. Extreme caution is required when handling sodium hydroxide. Great care must be taken regarding the environmental impact of this product, especially when dealing with water run-off, as sodium hydroxide may severely affect the pH of surface water and plant life. It is recommended that this disinfectant be used only when there is absolute certainty that the environment will not be negatively affected. However, sodium hydroxide has the advantage of being relatively cheap and lends itself to being handled in bulk.

GENERAL COMPARISONS

All the above products are generally toxic to a broad range of living tissue, and are principally used as 'weapons of mass destruction', which are liberally applied on a single occasion with no intention of providing long-lasting protection against the return of microorganisms.

A comparative assessment of the products reviewed above is presented in Table I. This assessment is aimed at facilitating the use of the right product for the type of organism and situation, so that the application rate may be minimized. Both the persistence and breakdown products are also considered.

CRITERIA FOR AN ENVIRONMENTAL ACTION PLAN

It is clear that a number of questions are raised by the post-application effects of disinfectants. The above review of major disinfectant types indicates that answers to such questions depend on the type of disinfectants used. These questions include the following:

a) What is the downstream destination of disinfectants after application, taking account of the following factors:

- persistence
- solubility
- biodegradability
- breakdown products?

b) Who are the major users of disinfectants in agriculture, and what is the relationship between emergency and routine use?

c) What are the potentially sensitive environmental components which may be affected?

d) What are the alternatives to disinfectants in both emergency and routine use?

e) Are feasible and cost-effective means available for mitigating the post-application effects of disinfectants?

TABLE I

Use and toxicity of various types of disinfectant

Disinfectant type	Bacteria	Mycobacteria	Viruses	Bacterial spores	Yeasts	Moulds	Toxicity
Chlorine	++	++	++	+	++	++	medium
Formaldehyde	+	+	+	+	+	+	high
Phenolics	+	+	+–	–	+	+	high
Peracetic acid	++	++	++	++	++	++	low
Quaternary ammonium compounds	+–	–	–	–	++	+	low
Hydrogen peroxide	++	+	+	+–	+	+	low
Iodophors	++	++	++	+	+	+	medium
Sodium hydroxide	+	+	+	+	+	+	high

++ = killed rapidly
+– = some killing
+ = killed
– = not killed

Neither a lack of answers to these questions nor the lack of immediate on-site environmental and health impacts constitutes grounds for ignoring potential cumulative effects. One possible cumulative impact follows from the nature of these disinfectants as 'weapons of mass destruction'; this may lead to the destruction or radical modification of naturally beneficial microbial populations. At the same time, the search for adverse environmental effects should not mask the benefits of disinfectants in reducing risks to the health of humans and farm animals.

An encouraging aspect of disinfection is that phenolics, the most environmentally-damaging group, are being phased out, as the persistence of their by-products, unlike those of other types of disinfectants, gives rise to potential cumulative adverse effects.

ADDRESSING THE UNKNOWN FACTORS

The environmental components which are of immediate concern due to possible contamination by disinfectants include the following:

- soil
- soil moisture and ground water
- streams fed by ground water or surface water discharge from farm waste water or effluent
- aquatic plant and animal communities in streams.

Other potential effects may result from farm waste water with high disinfectant concentrations, if larger animals or humans are exposed to the water before it drains away. Animals may be vulnerable if they drink or even walk through such water. Contaminated animal tissue and products (meat or milk) also constitute a human health risk.

To define the downstream destination, the volume of disinfectant use needs to be quantified. This requires knowledge not only of who (i.e. what type of farm) uses these products, but also of the rates and frequencies of application. The next step is to quantify typical volumes of waste water resulting from washing barns, and the disinfectant concentrations present in the flushing of waste water.

With relatively low use of disinfectants, the expected impact on ground water and streams and rivers downstream would be minimal, as most products lose their action after being diluted and broken down by oxidation. Most disinfectants will thus quickly de-activate, break down or lose potency. However, there may be impacts on small stream aquatic life if a stream is close to a barn, or if the wash water can percolate through course soil or reach the stream through surface run-off. Late winter/spring thaw is a particularly vulnerable period for this type of chemical shock effect.

SOME ALTERNATIVES AND MITIGATION OPTIONS

The first strategy which may be considered to reduce potential impacts is to reduce the volume of use. The most easily applied reduction strategy is to ensure that the real need is for disinfection, rather than improved sanitation. For example, soap and water and a little extra labour may be as effective as a highly toxic disinfectant in many farm operations.

The management of contaminated washing water or waste water may provide a means of mitigating the environmental impact of disinfectants. Such a strategy would involve diluting the disinfectant and allowing time for the chemical to break down and dissipate. For example, where diseased animals (either alive or as carcasses) must be transported by truck for disposal, the vehicle bodies are a target for disinfection (6). The impact of the disinfectants used can be minimized by washing down surfaces after disinfectant application at a site where the contaminated water will have minimal environmental effect, such as into a liquid manure pit or compost site. Government requirements may still insist on the disinfection of trucks used for the disposal of contaminated material.

Another strategy to minimize the use of disinfectants is to ensure that the most appropriate type of product is used for a particular situation. Only after the target microorganism has been identified can an appropriate disinfectant be selected on the basis of the data presented in Table I. Site conditions such as surface area types and organic load must be taken into account when selecting a suitable disinfectant. Doubts regarding the efficacy of disinfectants do not help in this regard; it has been suggested that up to 20% of disinfectants on the market may be ineffective (Environment, Energy and Natural Resources Subcommittee, unpublished report, 2 October 1990). It is far from certain that a more concentrated disinfectant will act more quickly and effectively, and the use of higher concentrations may well result in a greater risk of damage to the environment. Therefore, instructions for use must be followed carefully and the recommended dosage applied.

The claims of manufacturers regarding the efficacy of products against microorganisms have not usually been verified by independent laboratory testing. It is therefore strongly recommended that impartial laboratory testing be performed to substantiate such claims before germ-killing products are approved for sale and use. This is highly important, as it enables users of disinfectants to determine whether the product is effective against the target pathogen (Environment, Energy and Natural Resources Subcommittee, unpublished report, 2 October 1990). New disinfectants should also be thoroughly investigated for potential environmental impacts before being approved.

Given that a disinfectant is essentially employed for the 'mass destruction' of microorganisms, it may also be worthwhile exploring the possible development of specific agents for the destruction of particular microorganisms. For example, where a disease such as anthrax is to be controlled, and where the microorganisms are dispersed over a wide area and will survive for many years as spores, the use of a specifically dedicated agent for disinfection would prevent the destruction of beneficial organisms over that area. A disinfectant acting in a narrow spectrum, or a product which is more pathogen-specific, would be highly desirable in such circumstances. However, this strategy will require long and expensive research, which may not prove to be cost-effective.

Sound protocols for cleaning and disinfection should always be executed under the supervision of qualified staff. Monitoring and control should be properly integrated and should go hand-in-hand with proper training of disease control personnel. Stricter control of cleaning and disinfection activities will probably lead to less waste and accidental spills, and will avoid the use of stronger dosages of disinfectant than those recommended by the manufacturer.

Other alternatives could utilize an isolation strategy. Enclosing, fencing-off or burying contaminated tissue or organic material, rather than disinfection, may be

feasible in many situations. In the case of some animal disease epidemics (e.g. anthrax), where the organism survives in the soil as well as in animal tissue, some form of treatment of contaminated fields is necessary. Where a large area of land is contaminated by dangerous microbes, temporarily retiring or fallowing the land may be as effective as massive application of a disinfectant. Any such large-scale application (even in an emergency) should undergo an environmental impact assessment specific to the site and situation prior to execution.

CONCLUSION

The potential adverse environmental effects of disinfectant use in agriculture have been given some exploratory consideration in this paper. Little is known about downstream effects of disinfectant applications. At present, this lack of knowledge prevents an effective formal environmental impact assessment from being performed. A more thorough environmental evaluation of disinfectants will require additional data. Specific questions which need to be answered may be found in the Appendix. As disinfectants are used all over the world for a variety of purposes, it would be of interest to know the extent to which negative environmental and other adverse effects have been encountered.

Some potential exists for cumulative downstream effects and health risks, and there is also potential for more acute effects in the area immediately surrounding the site of application if the washing water cannot be dissipated effectively. There also appear to be several viable low-cost alternatives and mitigation strategies which can minimize and control these effects. The most likely target for reducing potential environmental impacts is routine use, rather than emergency situations, although environmental considerations should not be ignored during an emergency.

Environmental considerations must also take into account the benefits provided by disinfectants. With regard to immediate health concerns, the benefits of destroying dangerous microbes far outweigh the risk of chemical toxicity, provided that safe handling practices are used. From a broader perspective, the role of disinfectants in animal husbandry also appears favourable, given the risks posed by animal diseases. Not only are domestic, commercially-important herds involved but wildlife populations, particularly ungulates, are also at risk from diseases such as tuberculosis, anthrax and brucellosis (2). Where depopulation and carcass disposal are required as disease control measures, the proper use of disinfectants in the carcass disposal process is essential (6).

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IMPACT SUR L'ENVIRONNEMENT DES DÉSINFECTANTS UTILISÉS EN AGRICULTURE. – G. Bruins et J.A. Dyer.

***Résumé** : Les effets indirects des désinfectants agricoles sur l'environnement et la santé publique doivent être mieux pris en compte. Il faut notamment rassembler les données disponibles, aussi limitées soient-elles, sur les effets secondaires des désinfectants, afin d'évaluer leur impact potentiel.*

De plus, des principes généraux de sécurité peuvent être établis à partir de l'information existante. Mais pour élaborer les meilleures méthodes d'emploi et d'application, il faut connaître parfaitement les caractéristiques propres à chaque type de désinfectant. Il semble également nécessaire de fixer des normes applicables aux produits en procédant à des tests d'efficacité.

Les avantages des désinfectants appliqués à la lutte contre les maladies doivent aussi être appréciés en fonction de leurs conséquences sur l'environnement. Les effets d'un désinfectant ne sont pas les mêmes selon qu'il s'agit d'une situation d'urgence ou d'une utilisation de routine, et toute application à grande échelle devrait faire l'objet d'une évaluation d'impact sur l'environnement.

MOTS-CLÉS : Désinfectants – Impact sur l'environnement – Lutte contre les maladies.

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IMPACTO EN EL MEDIO AMBIENTE DE LOS DESINFECTANTES USADOS EN AGRICULTURA. – G. Bruins y J.A. Dyer.

Resumen: *El uso de desinfectantes en agricultura requiere cada vez más que se consideren sus efectos indirectos en el medio ambiente y la salud pública. La información sobre los efectos segundarios de los desinfectantes es limitada, y por lo tanto es necesario reunir los datos disponibles de modo de poder evaluar su posible impacto.*

Por otra parte, se pueden enunciar principios generales de seguridad a partir de la información básica existente. Pero para establecer métodos de uso y aplicación que sean óptimos, hay que conocer perfectamente las características específicas de cada desinfectante. También se ha mostrado la necesidad de fijar normas aplicables a los productos mediante pruebas de eficacia.

Las ventajas del uso de desinfectantes en la lucha contra las enfermedades deben también apreciarse en función de sus efectos en el medio ambiente. Estos efectos variarán según se trate de una aplicación en situación de emergencia o de un uso corriente, y todo uso de desinfectantes en gran escala debería ser objeto de una evaluación de su impacto en el medio ambiente.

PALABRAS CLAVE: Desinfectantes – Impacto en el medio ambiente – Lucha contra las enfermedades.

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Appendix

Questionnaire on the use of disinfectants

This questionnaire is used to obtain information regarding the detection of residues from disinfectants – employed to protect animal or human health or to prevent spread of animal disease – in food of animal origin or other materials, in a manner which might

be interpreted as contaminating the environment or posing a threat to the health of other animals or humans. Animal health professionals, individual users and regulators of disinfection products, and managers of disinfection programmes around the world (e.g. in Member Countries of the Office International des Epizooties) will be preferred candidates to be approached to complete the questionnaire. Data obtained using this questionnaire could be compiled and published at a later date, as a follow-up to this paper.

Question 1

Please name the six most common disinfectants used by yourself, your agency or persons under your authority. You can use trade names, chemical names or common names. Use whatever term is most often used in your work environment.

Question 2

Please indicate the purpose(s) for which each disinfectant named above was used.

Question 3

Complaints concerning use of disinfectants

a) Please list any complaints you have received about the use of each disinfectant listed in Question 1.

b) Please identify the source of each complaint. Be as specific as possible. We need to know, for example, if a complaint such as 'it smells bad' or 'it stings or burns a bit if it touches the skin' was from the applicator, or was issued by an official agency because of concern for environmental pollution or for human or animal health.

Question 4

Please provide as much specific information as you can on each residual finding of any disinfectant or resulting by-product in any of the following:

a) human food
b) human tissue
c) animal tissue
d) clothing
e) ground water
f) surface water
g) soil.

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