European Commission

Pilot project: Proposal for approbation of basic substances, in the context of Regulation (EC) N°1107/2009

VINEGAR
Food grade

BASIC SUBSTANCE APPLICATION

February 2014

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" *VINEGAR* Food Grade "

1. PURPOSE OF THE APPLICATION

This report is submitted to support the application for the first approbation of Vinegar as a substance in the Parliament and Council Regulation (EC) 1107/2009 as a basic substance….

1.1. NAME AND ADDRESS OF APPLICANTS

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2. IDENTITY OF THE SUBSTANCE/PRODUCT AS AVAILABLE ON THE MARKET AND PREDOMINANT USE

2.1. PREDOMINANT USES OF THE SUBSTANCE OUTSIDE PLANT PROTECTION

Vinegar is worldwide known as foodstuff for preservation and dressing. Naturally occurring and relatively inexpensive organic acids traditionally have been used as food preservatives. Whether naturally product during fermentation or intentionally added. These acids retard microbial growth and contribute desirable sensory properties to a number of foods. Acetic acid, historically diluted in the form of vinegar, has been utilized perhaps longer than any other preservative for its antimicrobial effect that couples food keeping-quality wholesomeness and safety. Reviews of vinegar contain historical information that couples the discovery of acetic acid to wine spillage. And since wine has been used for at least 1.000 years, vinegar probably has also been used that long (Nickol. 1979: Pederson. 1979). Early uses of vinegar were for medicinal purposes, such as wet compresses or consumption as a drink elixir (Nickol, 1979).
Because acetic acid is the predominant flavouring and anti-microbial component in vinegars, the following review will focus on the importance of this acid as a direct food additive or more recently as a food processing aid to decontaminate foods prior to distribution and consumption.
Vinegar is an acidic liquid (pH generally between 2 and 3) obtained by the oxidation of ethanol in alcoholic fermentation process acetic drinks. It is used in human food. Common vinegar has a concentration of about 5-8% acetic acid but the tartaric acid and citric acid are found in lower concentrations in natural vinegar.

Nickol GB. 1979 Vinegar, In: Peppler HJ, Perlman D. Microbiology technology. 2nd ed. New York: Academic Press. p 155-172.

Pederson CS. 1979 Microbiology of food fermentation, 2nd ed. Westport: AVI Publishing Co. p 52.

Vinegar is also use in cosmetics.

European Commission 2006 Decision 2006/257/EC Commission Decision of 9 February 2006 amending Decision 96/335/EC establishing an inventory and a common nomenclature of ingredients employed in cosmetic products.

2.2. IDENTITY AND PHYSICAL CHEMICAL PROPERTIES OF THE SUBSTANCE AND PRODUCT TO BE USED

Distilled vinegar
The term "distilled vinegar" is something of a misnomer, because it is not produced by the distillation of vinegar, but rather, by the fermentation of distilled alcohol. The fermentate is then diluted to produce a colourless solution of about 5% to 8% acetic acid in water, with a pH of about 2.4. This is variously known as distilled spirit or "virgin" vinegar, or white vinegar, and is used for medicinal, laboratory, and cleaning purposes, as well as in cooking, baking, meat preservation, and pickling. The most common starting material in some regions, because of its low cost, is malt. In the United States, corn (maize) is the usual starting ingredient for most distilled vinegars.

Spirit vinegar
The term 'spirit vinegar' is sometimes reserved for the stronger variety (5% to 20% acetic acid) made from sugar cane.

2.2.1. Common name of the substance and product and their synonyms/plant nomenclature

Proposed name: *VINEGAR*

ISO common name (approved or proposed): VINEGAR

Synonyms: VINEGAR, Acetum (cosmetic), Common VINEGAR; vinaigre (French); eissig (German); aceto (Italian); azijn (Dutch), vinagre (Spanish)

VINEGAR, the substance, is a well-known and widespread food product.
In VINEGAR, the main active substance, is acetic acid, secondly active compounds are listed below .

2.2.2. Chemical name with CAS, EEC and CIPAC numbers

Chemical denomination is vinegar.

IUPAC:	Acetic acid (vinegar ext.)
INCI:	Vinegar
CAS:	90132-02-8
EINECS/ELINCS:	290-419-7

Constituents are:

Component	g/L (range)
acetic acid	44-56
citric acid	0-0.56
tartaric acid	0-0.25
malic acid	0-0.2
malonic acid	0-0.4
succinic acid	0-1.1
lactic acid	0-1.9
propionic acid	0-0.55
glycerol	0-1.5
ethanol	0.13-0.32[£]

Component	Interval (mg / L)
P	-
Na	-
K	26.70-1800
Ca	9.60-200
Mg	4.20-130
Fe	1.95-10.50
Cu	0.02 -0.35
Zn	0.01-7.90
Mn	0.10-9.83
Ni	-
Pb	0.013-0.265
Sn	-
Cd	-

£ ºG.L.

Aguiar A. de Alencar Nascimento R.A. Ferretti L.P. Gonçalves A.R. 2005 Determination of Organic Acids and Ethanol in Commercial Vinegars *Braz. J. Food Technol*., 5º SIPAL

For more details on monoatomic salts composition:

AKPINAR-BAYIZIT Arzu, TURAN Murat Ali, YILMAZ-ERSAN Lutfiye, TABAN Nilgun 2010 Inductively Coupled Plasma Optical-Emission Spectroscopy Determination of Major and Minor Elements in Vinegar, *Notulae Botanicae Horti Agrobotanici Cluj-Napoca,* 38 (3), 64-68

2.2.2.1. Acetic acid

Chemical denomination is ethanoic acid / acetic acid.

IUPAC:	ethanoic acid
CAS:	64-19-7
EINECS/ELINCS:	200-580-7

2.2.2.2. Citric acid

Chemical denomination is Citric acid.

IUPAC:	2-hydroxypropane-1,2,3-tricarboxylic acid
CAS:	77-92-9

EINECS/ELINCS: 201-069-1

2.2.2.3. Tartaric acid

Chemical denomination is Tartaric acid.

IUPAC:	2,3-dihydroxybutanedioic acid
CAS:	87-39-4
EINECS/ELINCS:	201-766-0

2.2.2.4. Malic acid

Chemical denomination is malic acid.

IUPAC:	D-(+)-hydroxybutanedioic acid
CAS:	6915-15-7
EINECS/ELINCS:	230-022-8

2.2.2.5. Malonic acid

Chemical denomination is malonic acid.

IUPAC:	propanedioic acid
CAS:	141-82-2
EINECS/ELINCS:	205-503-0

2.2.2.6. Succinic acid

Chemical denomination is Succinic acid.

IUPAC:	Butanedioic acid
CAS:	110-15-6
EINECS/ELINCS:	203-740-4

2.2.2.7. Lactic acid

Chemical denomination is Lactic acid.

IUPAC:	2-Hydroxypropanoic acid
CAS:	79-33-4
EINECS/ELINCS:	201-296-2

2.2.2.8. Propionic acid

Chemical denomination is Propionic acid.

IUPAC:	propanoic acid
CAS:	90132-02-8
EINECS/ELINCS:	290-419-7

2.2.2.9. Glycerol

Chemical denomination is glycerol.

IUPAC:	propan-1,2,3-triol
CAS:	56-81-9
EINECS/ELINCS:	200-289-5

2.2.2.10. Ethanol

Chemical denomination is ethanol, ethyl-alcohol.

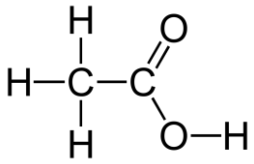
IUPAC:	ethanol
CAS:	64-17-5
EINECS/ELINCS:	200-578-6

2.2.3. Molecular and structural formula, molecular mass

2.2.3.1. Acetic acid

Major chemical component after water is acetic acid.
Molecular formula**:** $C_2H_4O_2$

Structural formula:



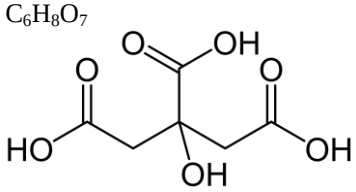
Molecular mass**:** 60.05 [g/mol]

Minor chemical components after acetic acid are.

2.2.3.2. Citric acid

Molecular formula**:** $C_6H_8O_7$

Structural formula:

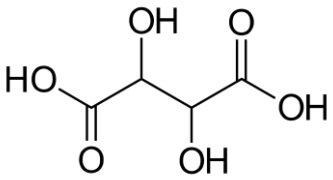


Molecular mass**:** 192.124 (anhydrous); 210.14 (monohydrate) [g/mol]

2.2.3.3. Tartaric acid

Molecular formula**:** $C_4H_6O_6$ (Basic formula); $HO_2CCH(OH)CH(OH)CO_2H$ (Structural formula)

Structural formula:

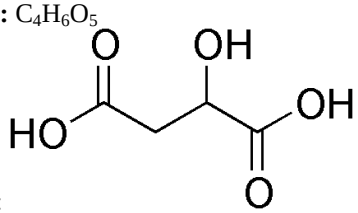


Molecular mass**:** 150.09 [g/mol]

2.2.3.4. Malic acid

Molecular formula**:** $C_4H_6O_5$

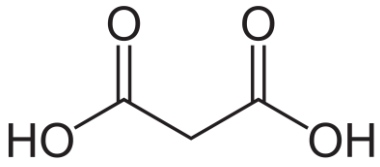
Structural formula:



Molecular mass**:** 134.09 [g/mol]

2.2.3.5. Malonic acid

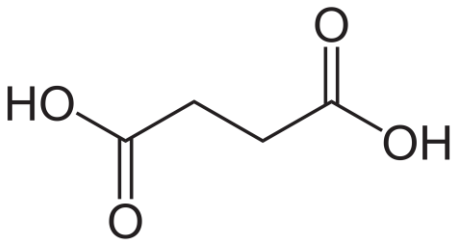
Molecular formula**:** $C_3H_4O_4$

Structural formula: 

Molecular mass**:** 104.06 [g/mol]

2.2.3.6. Succinic acid

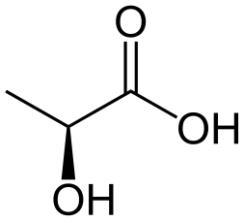
Molecular formula**:** $C_4H_6O_4$

Structural formula: 

Molecular mass**:** 118.09 [g/mol]

2.2.3.7. Lactic acid

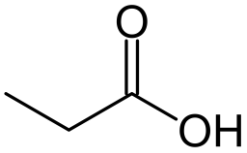
Molecular formula**:** $C_3H_6O_3$

Structural formula: 

Molecular mass**:** 90.08 [g/mol]

2.2.3.8. Propionic acid

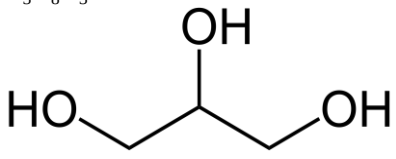
Molecular formula**:** $C_3H_6O_2$

Structural formula: 

Molecular mass**:** 74.08 [g/mol]

2.2.3.9. Glycerol

Molecular formula**:** $C_3H_8O_3$

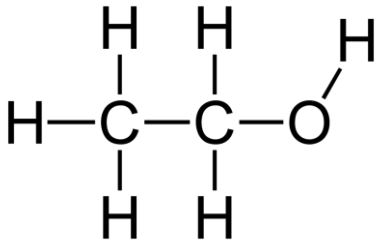
Structural formula: 

Molecular mass**:** 92.09 [g/mol]

2.2.3.10. Ethanol

Molecular formula**:** C_2H_6O

Structural formula:



Molecular mass**:** 46.07 [g/mol]

2.2.4. Method or methods of manufacture of the substance and of the product

Commercially available, not relevant, but overall consideration for vinegar specifications is included in:

FAO WHO 1987 codex alimentarius commission, ALINORM 87/19 APPENDIX II DRAFT EUROPEAN REGIONAL STANDARD FOR VINEGAR p 34-38

And following later proposed Draft

FAO WHO 2000 codex alimentarius commission, CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5

2.2.5. Description and specification of purity of the active substance and product

Commercially available, not relevant, but overall consideration for vinegar specifications is included in:

FAO WHO 2000 codex alimentarius commission, CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5

2.2.6. Identity of inactive isomers, impurities and additives

Not applicable, mainly constituted in acetic acid and water. Global consideration for vinegar impurities is included in:

FAO WHO 2000 codex alimentarius commission, CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5

2.2.7. Methods of analysis

Global consideration for vinegar analysis is included in:

FAO WHO 2000 codex alimentarius commission, CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5

2.2.7.1. Methods of analysis for determination of the active substance as manufactured

RESOLUTION OENO 52/2000 I. VINAIGRES DE VIN – DETERMINATION DE LA TENEUR EN ACIDITE TOTALE

FAO WHO 2000 codex alimentarius commission, CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5

2.2.7.2. Analytical methods for determination of relevant impurities

RESOLUTION OENO 56/2000 V. VINAIGRES DE VIN – DETERMINATION DE LA TENEUR EN ALCOOL RESIDUEL

FAO WHO 2000 codex alimentarius commission, CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5

2.2.7.3. Analytical methods for determination of residues

FAO WHO 2000 codex alimentarius commission, CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5

2.3. CURRENT, FORMER AND IN CASE PROPOSED TRADE NAMES OF SUBSTANCES/ PRODUCTS AS PUT ON THE MARKET

Vinegar

2.4. MANUFACTURER OF THE SUBSTANCE/PRODUCTS

Not relevant, foodstuff commercially available all over the world.

2.5. TYPE OF PREPARATION OF THE SUBSTANCE/PRODUCT

Solution for seed treatment (LS)

2.6. DESCRIPTION OF THE RECIPE FOR THE PRODUCT TO BE USED

Formally, the formulation made of *VINEGAR* is commonly constituted of 5-8% acetic acid up to 20% in water. But, Vinegar is a common foodstuff, largely commercially available. Therefore, there is no recipe retained for this registration, only dilution is described here:

Mode of preparation : dilution in water	**% of vinegar in the preparation**	**Dilution vinegar/water L/L**	**Final volume L**	**Conc. of acetic acid (main a. s.)**
"Distilled vinegar" VINEGAR at 5-10% acetic acid	**50**	**1/1**	**2**	**25-50g/L**

2.7. FUNCTION ON PLANT PROTECTION

Fungicide, bactericide.

3. USES OF THE SUBSTANCE AND ITS PRODUCT

3.1. FIELD OF USE

The *VINEGAR* solution is intended to be used in fields for plant protection as fungicide/bactericide on wheat and barley seed together with vegetables seed (carrots, tomatoes …).

Doran WL 1928 ACETIC ACID AS A SOIL DISINFECTANT Journal of Agricultural Research, Vol. 36, No. 3 Washington, D.C.

Basic considerations are reported concerning action of acetic acid, active ingredient of vinegar, as fungicide.

Tobias A. 2010 Examination of materials and methods potential for organic seed treatment, Doctoral Theses

During our experiments all concentrations of the selected vinegars inhibited the growth of the examined strains of bacteria, for which the pH value, which is the potential of hydrogen of the medium is responsible. For the pH sensitivity of bacteria these materials successfully inhibit their germination. These pathogens require the optimal pH value = 7.2 for their growth according to scientific literature, thus the medium made acid by vinegars is not suitable for their development.
Vinegars in 0.5% concentration inhibit reproduction and increasing concentration this effect can be multiplied. The inhibiting effect of vinegar in 10% concentration exceeds that of 50 ppm Streptomycin-sulfate.
The negative effect on germination ability of vinegars is in inverse ratio to concentration, however from 2.5% concentration they do not have negative effect on germination ability compared to the control, what is more, in the case of pepper germination ability was enhanced. White wine vinegar in very low condition (0.5%) stimulated mainly the germination ability and vigour of tomato seeds, while red wine vinegar had the same effect on the vigour of pepper seeds. On the basis of my experiments the antimicrobial effect of vinegar, cider vinegar, white and red wine vinegar can be established.

The above mentioned compounds in higher concentration have *cide* effect on bacteria, while stronger acids have the same effect on fungi, as well. Microbiological efficiency of vinegars is directly proportional to their concentration; however enhancing concentration might deplete germination ability of seeds.

Tobias A. et al. 2008 Testing of different seed treatment materials on seed borne bacterial disease of tomato and pepper, First Symposium on Horticulture in Europe

In vitro trials have shown that vinegar, cider vinegar, red wine vinegar and white wine vinegar have inhibiting effect against the causative agent of bacterial canker *(Clavibacter michiganensis subsp. michiganensis)*, bacterial speck *(Pseudomonas syringae pv. tomato)* of tomato. These materials also have inhibiting impact on the causative agent of bacterial spot of pepper *(Xanthomonas campestris pv. vesicatoria)*. The bacterial strains were more sensitive to acidic than alkaline circumstances. The lowest examined concentration (0.5 %) of vinegars had also bactericide impact.

Tobias A. et al. 2008 Examinations of potential environmental friendly materials against tomato and pepper pathogens, International Journal of Horticultural Science, 14(4):49-54

In vitro trials have shown that vinegar, eider vinegar, red wine vinegar, white wine vinegar, cinnamon and thyme oil have inhibiting effect against the causative agent of bacteria and fungi. Germination test has shown that examined vinegar types do not decrease germination ability if the concentration is low but in higher (more than 5%) concentration it ruins the germination ability. Even in 0.5% concentrations of red- and white wine vinegar have good effect on germination capacity.

Tobias A. et al. 2007a Testing of suitable materials for ecological seed treatment, International Ph.D. Students` Conference. University of South Bohemia in České Budějovice, Faculty of Agriculture, 17th, April, České Budějovice, Czech Republic, Proceeding ISBN: 978-80-7040-972-5

Tobias A. et al. 2007b In vitro examination of the inhibition effect of different materials on seed borne bacterial disease of tomato and pepper, 15th International Congress on the Hungarian Society for Microbiology 18-20 July, Budapest Hungary (poszter), Acta Microbiologica et Immunologica Hungarica, Supplement 54, p.133-134

General consideration are discussed in

Marchand P, Coulombel A. 2012 Fiches Série Scienc'ITAB: Le Vinaigre, Activité antifongique, AlterAgri 116, p30-31

Bruyere J. 2013 Utilisation de l'acide acétique *(vinaigre)* dans la lutte contre la carie du blé *(Tilletia caries et foetida)* Journées Substances Naturelles en Protection des Cultures Réglementation, expérimentation, usages 9 & 10 avril 2013

Vinegar at 1L per quintal of seed was clearly determined to be the best dose for wheat.

On common blunt with a different technique, but with vinegar:

Sholberg, PL; Gaudet, DA; Puchalski, B; Randall, P (2006) Control of common bunt (Tilletia tritici and T-laevis) of wheat (Triticum aestivum cv. 'Laura') by fumigation with acetic acid vapour. Canadian Journal of Plant Science, 86(3), 839-843

***Vinegar* is intended to control bacteria**

Tobias A. et al. 2007 Effect of different treatments to bacterial canker *(Clavibacter michiganensis* subsp. *michiganensis)*, bacterial speck *(Pseudomonas syringae* pv. *tomato)* in tomato and bacterial spot *(Xanthomonas campestris* pv. *vesicatoria)* in pepper International Journal of Horticultural Science, 13 (2): 49–53

Vinegar has effect on bacteria on tomato and pepper seed as seed treatments.

3.2. EFFECTS ON HARMFUL ORGANISMS OR ON PLANTS

The *VINEGAR* solution is intended to limit seeds fungi aggression according to experimental studies.

ITAB 2012 Agir rapidement pour contenir la carie commune CONTROLER LA CARIE COMMUNE actes chapitre Traitements de semences : contrôler la carie p33

The application on seed Tillecur, biological fortifying flour of mustard, and the application of acetic acid (vinegar) lead to a protection similar to that of official organic farming reference Cerall (difference not significant to the analysis of the combination test).

Tobias A. 2011 Organic seed treatment possibilities, ISOFAR Conference programme, Organic is life – knowledge for tomorrow, 3rd Scientific Conference of ISOFAR 2011 Proceedings pp511-513.

In vitro trials have shown that vinegar, eider vinegar, red wine vinegar, white wine vinegar, cinnamon and thyme oil have inhibiting effect against causative agent of bacteria and fungi. In all examined materials 10% vinegar caused the highest inhibition.

Borgen A. Strategies for regulation of seed borne diseases in organic farming Agrologica, www.agrologica.dk, p 1

Strategies including use of vinegar are described)

Borgen A. and Bent N. 2001 Effect of seed treatment with acetic acid for control of seed borne diseases. Proceedings from BCPC, Symposium No. 76: "Seed Treatment: Challenges & Opportunities", eds. A. J. Biddle. BCPC, Farnham, 135-140

Experiments with vinegar as dressing have been carried out in organic farming and have proven to be effective against common bunt (*Tilletia tritici*) and leaf stripe (*Pyrenophora graminea*).

Borgen A. & Kristensen L. 2000. Seed borne diseases – a challenge for organic cereal production. In Proceedings of the 13th IFOAM Scientific Conference, Basel 2000

Vinegar was found to be active on Barley leaf stripe

Lizot JF. et al. 2002 Désinfection des semences : des produits naturels pour la bio, Alter Agri N° 53 mai/juin p20-21

Concentration of 10% vinegar was chosen because we observed a slowdown in growth of seedlings from 20%. This second screening showed the effectiveness of broad-spectrum fungicide vinegar, alone or in combination. Disinfection by products containing vinegar decreases statistically heavy contamination and the general level of contamination.

Saidi B. et al. 2001 Effect of seed treatment with organic acids on the control of common bunt (*Tilletia tritici* and *T. laevis*) in wheat Meded Rijksuniv Gent Fak Landbouwkd Toegep Biol Wet. 66(2a), pp213-21

Using commercial acetic acid and lactic acid, the pathogen was successfully controlled, but the treatment negatively affected seed germination and seedling vitality. Using dilutions of acetic acid and lactic acid, significant control of the pathogen also was achieved with acetic acid without causing phytotoxicity. Dilutions of lactic acid also gave good control, but showed some phytotoxicity. Using 30-50 ml/kg of vinegar, which is a natural source of acetic acid, proved to be one of the most effective alternatives for control of common bunt on wheat. The treatment had no negative effects on seed germination nor on seedling vitality.

Results in 2011 and 2012 on wheat gave some interesting efficacy profile of vinegar: N dose is 1 litre (L) per qt of seeds, N/2 = 0.5 L; 2N = 2 L

Situation	Product Dose	VIN dose N 2012	VIN N/2 2012	VIN 2N 2011	Control
Contaminated Seeds / Healthy Soil	**% Efficacy / Control**	78	50	81,7	-

Situation	Product Dose	VIN dose N 2012	VIN N/2 2012	VIN 2N 2011	Control
Healthy Seeds / Contaminated Soil	**% Efficacy / Control**	67	45	67,5	-

For the year 2012, as a percentage of bunted heads, the results are, to get an idea of the level of contamination for this campaign:

Situation	Product Dose	VIN N 2012	VIN N/2 2012	Control
Contaminated Seeds / Healthy Soil	**Average bunted heads %**	12.25	28.25	56.5

Healthy Seeds / Contaminated Soil	**Average bunted heads %**	7.75	13	23.75

Bruyere J. 2013 Utilisation de l'acide acétique *(vinaigre)* dans la lutte contre la carie du blé *(Tilletia caries et foetida)* Journées Substances Naturelles en Protection des Cultures Réglementation, expérimentation, usages 9 & 10 avril 2013

Vinegar at 1L per quintal of seed was clearly determined to reduce presence of common bunt in wheat.

***Vinegar* is intended to control bacteria**

Tobias A. et al. 2007 Effect of different treatments to bacterial canker *(Clavibacter michiganensis* subsp. *michiganensis),* bacterial speck *(Pseudomonas syringae* pv. *tomato)* in tomato and bacterial spot *(Xanthomonas campestris* pv. *vesicatoria)* in pepper International Journal of Horticultural Science, 13 (2): 49–53

Vinegar has effect on bacteria on tomato and pepper seed as seed treatments. The Mode of action is not clearly determined.

van der Wolf, J.M., Bimbaum, Y., van der Zouwen, P.S. and Groot, S.P.C. 2008 Disinfection of vegetable seed by treatment with essential oils, organic acids and plant extracts *Seed Sci. & Technol.*, 36, 76-88

The organic acids acetic acid, propionic acid, ascorbic acid and lactic acid showed a high antibacterial effect in the seed treatments, although in most experiments relatively high concentrations (≥ 2%) were required. The antimicrobial mechanism is not fully understood and the activity is dependent on the physiological status of the pathogen and the physicochemical properties of the environment (Ricke, 2003).

Conclusion §3

Use of vinegar as fungicide is fully described, mode of action is not described, but since propionic acid, lactic acid or diluted hydrochloric acid are described for the same purpose, acidic properties (low pH) are clearly involved in fungicide action.

Use of vinegar as bactericide is fully described, mode of action is explored in*:

Reynolds A. E. 1974 The Mode of Action of Acetic Acid on Bacteria, University Microfilms, 230 pages

* Oldness of the dissertation and excessive price of the reprint discourage us to order the reference.

Ricke S.C. 2003 Perspectives on the Use of Organic Acids and Short Chain Fatty Acids as Antimicrobials *Poultry Science* 82, p632–639

Although the antibacterial mechanism(s) for organic acids are not fully understood, they are capable of exhibiting bacteriostatic and bactericidal properties depending on the physiological status of the organism and the physicochemical characteristics of the external environment. Given the weak acid nature of most of these compounds, pH is considered a primary determinant of effectiveness because it affects the concentration of undissociated acid formed (Davidson, 2001). It has been traditionally assumed that undissociated forms of organic acids can easily penetrate the lipid membrane of the bacterial cell and once internalized into the neutral pH of the cell cytoplasm dissociate into anions and protons (Eklund, 1983, 1985; Salmond et al., 1984; Cherrington et al., 1990, 1991; Davidson, 2001).

3.3. SUMMARY OF INTENDED USES

3.3.1. As fungicide

Crop and/or situation (a)	Member State for use	Example product name as available on the market	F G I (b)	Target (c)	Product**		Application				Application rate per treatment			PHI (days) (m)	Remarks (*)
					Type (d-f)	Conc of a.i. g/kg (i)	Method kind (f-h)	Growth stage and season** (j)	Number min max (k)	Interval between applications (min)	g a.i./hl min max (g/hl)	Water l/ha min max	g a.i./ha min max (g/ha) (l)		
Wheat seeds *Triticum vulgare* Blé tendre *Triticum aestivum* Durum wheat *Triticum durum* Spelt *Triticum spelta*	France	*Vinegar*	F	fungi like Common bunt: *Tilletia caries* *Tilletia foetida*	Liquid for Seed Treatment (LS) **£**	**25-40***	Seed application before seedling*	Autumn	1	None	**25-40* per 100 kg of Seed**** (2 litre of the preparation)	2L of the preparation[£] added **per 100 kg of Seed****	**24-80*‡**	None: Not applicable Seed treatment	
Barley seeds *Hordeum vulgare*				fungi like Barley leaf stripe *Pyrenophora graminea*											
Market vegetables Gardening like carrot *Daucus carota* tomato *Solanum lycopersicum* bell pepper *Capsicum spp*				fungi like Alternaria: *Alternaria spp*				Autumn to spring			Seeds are temporary deep in the preparation then removed	None Preparation is used pure	Seeds are temporary deep in the preparation then removed		

*** Of active substance acetic acid. ** Seed treatment, just before sowing. £ Preparation is describe in the recipe §2.6. ‡ Considering 0.9 to 2 qt of seeds per ha.**

* For uses where the column „Remarks. As above or other conditions to take into account

(a) For crops, the EU and Codex classification (both) should be taken into account ; where relevant, the use situation should be described (e.g. fumigation of a structure)

(b) Outdoor or field use (F), greenhouse application (G) or indoor application (I)

(c) *e.g.* pests as biting and suckling insects, soil born insects, foliar fungi, weeds or plant elicitor

(d) *e.g.* wettable powder (WP), emulsifiable concentrate (EC), granule (GR) etc..

(e) GCPF Codes – GIFAP Technical Monograph N° 2, 1989

(f) All abbreviations used must be explained

(g) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench

(h) Kind, e.g. overall, broadcast, aerial spraying, row, individual plant,

(i) g/kg or g/L. Normally the rate should be given for the active substance (according to ISO)

(j) Growth stage at last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including where relevant, information on season at time of application

(k) Indicate the minimum and maximum number of application possible under practical conditions of use

(l) The values should be given in g or kg whatever gives the more manageable number (e.g. 200 kg/ha instead of 200 000 g/ha or 12.5 g/ha instead of 0.0125 kg/ha

(m) PHI - minimum pre-harvest interval between the plant – type of equipment used must be indicated

3.3.2. As bactericide

Crop and/or situation (a)	Member State for use	Example product name as available on the market	F G I (b)	Target (c)	Product**		Application				Application rate per treatment			PHI (days) (m)	Remarks (*)
					Type (d-f)	Conc of a.i. g/kg (i)	Method kind (f-h)	Growth stage and season** (j)	Number min max (k)	Interval between applications (min)	g a.i./hl min max (g/hl)	Water l/ha min max	g a.i./ha min max (g/ha) (l)		
Market vegetables gardening like tomato *Solanum lycopersicum* bell pepper *Capsicum spp* Cabbage *Brassica oleracea*	France	*Vinegar*	F G	*Clavibacter Michiganensis Clavibacter Michiganensis* subsp. *michiganensis Pseudomonas syringae* pv. *Tomato Xanthomonas campestris* pv. *Vesicatoria Botrytis aclada*	Liquid for Seed Treatment (LS) **£**	**25-40***	Seed application before seedling*	Autumn to spring	1	None	Seeds are temporary deep in the preparation then removed	None Preparation is used pure	Seeds are temporary deep in the preparation then removed	None: Not applicable Seed treatment	

*** Of active compound acetic acid**
**** Seed treatment, just before sowing.**
£ Preparation is describe in the recipe §2.6.

* For uses where the column „Remarks. As above or other conditions to take into account
(a) For crops, the EU and Codex classification (both) should be taken into account ; where relevant, the use situation should be described (e.g. fumigation of a structure)
(b) Outdoor or field use (F), greenhouse application (G) or indoor application (I)
(c) *e.g.* pests as biting and suckling insects, soil born insects, foliar fungi, weeds or plant elicitor
(d) *e.g.* wettable powder (WP), emulsifiable concentrate (EC), granule (GR) etc..
(e) GCPF Codes – GIFAP Technical Monograph N° 2, 1989
(f) All abbreviations used must be explained
(g) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench
(h) Kind, e.g. overall, broadcast, aerial spraying, row, individual plant,
(i) g/kg or g/L. Normally the rate should be given for the active substance (according to ISO)
(j) Growth stage at last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including where relevant, information on season at time of application
(k) Indicate the minimum and maximum number of application possible under practical conditions of use
(l) The values should be given in g or kg whatever gives the more manageable number (e.g. 200 kg/ha instead of 200 000 g/ha or 12.5 g/ha instead of 0.0125 kg/ha
(m) PHI - minimum pre-harvest interval between the plant – type of equipment used must be indicated

4. CLASSIFICATION AND LABELLING OF THE SUBSTANCE

Not applicable: *VINEGAR* is a food product.
No comment on ECHA following pre-registration (30/11/2010).

5. IMPACT ON HUMAN AND ANIMAL HEALTH

5.1. EFFECTS HAVING RELEVANCE TO HUMAN AND ANIMAL HEALTH ARISING FROM EXPOSURE TO THE SUBSTANCE/ITS PRODUCTS OR TO IMPURITIES CONTAINED IN THE SUBSTANCE/PRODUCT OR THEIR TRANSFORMATION PRODUCTS

The application indicates the DAR of acetic acid (2008) to address all toxicological endpoints. EFSA prepared a conclusion on acetic acid in 2013 (EFSA Journal 2013;11(1):3060): no data gaps or concerns were highlighted for the mammalian toxicology, apart for the potential of skin corrosion (but only for concentration >90%). It was concluded that no reference values need to be set for consumer exposure, however the critical effects of acetic acid for operators/workers/bystanders are related to its irritating properties by inhalation, triggering by neurobehavioral signs and changes in red blood cells at 15 mg/m³ in a valid human volunteer study. Based on a NOAEC of 10 mg/m³, and with the application of an uncertainty factor of 10 for intra-species variability, the Acceptable Operator Exposure Concentration (AOEC) is 1 mg/m³.

Considering the inhalation toxicity effects of acetic acid in humans, vinegar could be considered as a substance of concern. However, under the proposed conditions of use (seed treatment) it is considered unlikely that the relevant effects via inhalation could realistically occur. It is noted that the key component of vinegar (acetic acid) is approved as a plant protection product.

EFSA 2013 conclusion on acetic acid, EFSA Journal 2013;11(1):3060

5.2. TOXICOKINETICS AND METABOLISM IN HUMANS

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

5.3. ACUTE TOXICITY

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

5.4. SHORT-TERM TOXICITY

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

5.5. GENOTOXICITY

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

5.6. LONG-TERM TOXICITY

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

5.7. REPRODUCTIVE TOXICITY

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

5.8. NEUROTOXICITY

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

5.9. TOXICITY STUDIES ON METABOLITES

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

5.10. MEDICAL DATA: ADVERSE EFFECTS REPORTED IN HUMANS

No report is described, in general use of vinegar as food.

5.11. ADDITIONAL INFORMATION RELATED TO THERAPEUTIC PROPERTIES OR HEALTH CLAIMS

Not applicable: *VINEGAR* is a food product.

5.12. ADDITIONAL INFORMATION RELATED TO USE AS FOOD

VINEGAR is available all over the world as consumption product for cooking, preservative action...

5.13. ACCEPTABLE DAILY INTAKE, ACUTE REFERENCE DOSE, ACCEPTABLE OPERATOR EXPOSURE LEVEL

D'Mello J. P. Felix 2003 Food safety contaminants and toxins, CABI publishing p 248

Acetic acid (*vinegar*) is also employed in preparing salad dressings, sauce, mayonnaise, pickles, ketchups, syrups and cheese. *ADI*: not limited.

FAO WHO 1974 Food additives series n°5 Toxicological evaluation of some food additives including anticaking agents, antimicrobials, antioxidants, emulsifiers and thickening agents, ACETIC ACID AND ITS POTASSIUM AND SODIUM SALTS

ADI: not limited.

5.14. IMPACT ON HUMAN AND ANIMAL HEALTH ARISING FROM EXPOSURE TO THE ACTIVE SUBSTANCE OR IMPURITIES CONTAINED IN IT

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

Conclusion §5
Safety of vinegar is proven with centuries of use and no ADI limit.

6. RESIDUES

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

Although, vinegar is commercially available foodstuff, possible residues determination are available.

RESOLUTION OENO 56/2000 V. VINAIGRES DE VIN – DETERMINATION DE LA TENEUR EN ALCOOL RESIDUEL

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7. FATE AND BEHAVIOUR IN THE ENVIRONMENT

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

8. EFFECTS ON NON-TARGET SPECIES

8.1. GENERAL CONSIDERATION:

EFSA 2013 conclusion on acetic acid, EFSA Journal 2013;11(1):3060

EU 2013 COMMISSION IMPLEMENTING REGULATION (EU) No 790/2013 of 19 August 2013 amending Implementing Regulation (EU) No 540/2011 as regards the conditions of approval of the active substance acetic acid

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8.1.1. succinic acid

All characteristics are detailed in:

Dupont, 2001, ROBUST SUMMARY FOR DICARBOXYLIC ACID CATEGORY, 201-13108, pp84-95

8.1.2. lactic acid

All characteristics are detailed in:

USEPA, 2009, BIOPESTICIDES REGISTRATION ACTION DOCUMENT L-Lactic Acid Office of Pesticide Programs, Biopesticides and Pollution Prevention Division, June 2009 U.S. Environmental Protection Agency, pp 1-22

8.1.3. propionic acid

All characteristics are detailed in:

USEPA, 1991, United States Pesticides And Environmental Protection Toxic Substances, Agency (7508W) 738-F-91-106, R.E.D. FACTS Propionic Acid

and

USEPA, 1991, REREGISTRATION ELIGIBILITY DOCUMENT, PROPIONIC ACID, AND SALTS, LIST D, CASE 4078, SEPTEMBER 1991

8.1.4. glycerol

All characteristics are detailed in:

OECD SIDS 2002 GLYCEROL UNEP PUBLICATIONS SIDS Initial Assessment Report For SIAM 14 Paris, France

8.2. EFFECTS ON TERRESTRIAL VERTEBRATES

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

8.2.1. Acetic acid

Oral: LD50 rat: 3.310 mg/kg
Inhalation: LC50 rat: 40 mg/l
Exposure: 4 h

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8.3. EFFECTS ON AQUATIC ORGANISMS

Vinegar is used in aquarium.

Babcock C. Holmes Farley R. 2012 Vinegar Dosing Methodology for the Marine Aquarium, Tank of the month vol 10 (6) http://reefkeeping.com/joomla/index.php/current-issue/article/116-vinegar-dosing-methodology-for-the-marine-aquarium

8.3.1. Acetic acid

LC50 (*Lepomis macrochirus* (Crapet arlequin)): 75 mg/l
Exposure: 96 h
LC50 (*Leuciscus idus*(Ide)): 410 mg/l
Exposure: 48 h

LC50 (*Oncorhynchus mykiss* (Trout, Truite arc-en-ciel)): > 300,82 mg/l
Exposure: 96 h
Method: OCDE 203

EC50 (*Daphnia magna*): > 300,82 mg/l
Exposure: 48 h
Method: OCDE 202

EC50 (*Daphnia magna*): 47 - 95 mg/l
Exposure: 24 h

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8.4. EFFECTS ON BEES AND OTHER ARTHROPODS SPECIES

8.4.1. Bees

As seed treatment, contact with bees should not occur.

Vinegar (up to 10 %) show little or no repellency (score mean rating 0.1).
Woodrow A.W. et al. 1965 Bees attractant and repellent *J. Econ. Entomol.* 58(6), pp 1094-1102

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414) and later.

EU 2013 COMMISSION IMPLEMENTING REGULATION (EU) No 790/2013 of 19 August 2013 amending Implementing Regulation (EU) No 540/2011 as regards the conditions of approval of the active substance acetic acid

8.4.2. Other athropods

No data found.

8.5. EFFECTS ON EARTHWORMS AND OTHER SOIL MACRO-ORGANISMS

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

8.6. EFFECTS ON SOIL MICRO-ORGANISMS

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

8.6.1. Acetic acid

Toxicity on bacteria : EC10 (*Pseudomonas putida*): 1.000 mg/l
Exposure: 30 min

8.7. EFFECTS ON OTHER NON-TARGET ORGANISMS (FLORA AND FAUNA)

As seed treatment, contact with aerial part of flora is supposed to be low, although, in DAR acetic acid, herbicide effect is described. As matter of fact, since this BSA vinegar is supported by Organic, Farming institute, no herbicide effect is pursue.
Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

8.8. EFFECTS ON BIOLOGICAL METHODS OF SEWAGE TREATMENT

Regarding data for this §point, all details can be found in Draft Assessment Report of Acetic Acid 2008 (Fourth Stage Review Program of Council Directive 91/414).

For more details:
NSW Department of Local Government. 2000. The Easy Septic Guide. Developed by Social Change Media for the New South Wales Department of Local Government.

Conclusion §8
At 80 equivalent g/ha (MAX) of acetic acid (a.s.) once per year, directly on the seeds, environmental safety of vinegar used as seed treatment is obvious.

9. OVERALL CONCLUSIONS WITH RESPECT OF ELIGIBILITY OF THE SUBSTANCE TO BE APPROVED AS BASIC SUBSTANCE

Describe in synthesis fulfilment of criteria

(a) is not a substance of concern; and

(b) does not have an inherent capacity to cause endocrine disrupting, neurotoxic or immunotoxic effects; and

(c) is not predominantly used for plant protection purposes but nevertheless is useful in plant protection either directly or in a product consisting of the substance and a simple diluent; and

(d) is not placed on the market as a plant protection product.

VINEGAR is a food compound which can be fully characterized according Council Regulation 2002/178 fully described in FAO codex.

FAO WHO 2000 codex alimentarius commission, CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5

VINEGAR has an extremely low toxicological profile, especially for the proposed use.
VINEGAR is consumed as food all over the world,

Therefore it is not considered as a substance of concern.

VINEGAR is not predominantly used for plant protection purposes but is used as a fungicide in plant protection, as a solution.

VINEGAR, as a plant is not placed on the market as a plant protection product. *VINEGAR* is commonly consumed all over the world as food sweetener, cooked food, and bakery.
VINEGAR fulfils the criteria of a 'foodstuff' as defined in Article 2 of Regulation (EC) N° 178/2002; therefore it shall be considered as a basic substance.

ANNEX I LIST REFERENCES RELIED ON

Include here all references studies and assessment reports cited in the various chapter of application model.

Author(s)	Year	**Title** **Source** **Company, report N°** **GLP or GEP status** **Published or not**
SECTION 1: Purpose of the application		
EC	2008	Title: Draft Assessment Report of Acetic Acid (Fourth Stage Review Program of Council Directive 91/414). Source: EC

Author(s)	Year	**Title** **Source** **Company, report N°** **GLP or GEP status** **Published or not**
SECTION 2: Classification and labelling		
EC	2008	Title: Draft Assessment Report of Acetic Acid (Fourth Stage Review Program of Council Directive 91/414). Source: EC
Aguiar A. de Alencar Nascimento R.A. Ferretti L.P. Gonçalves A.R.	2005	Title: Determination of Organic Acids and Ethanol in Commercial Vinegars Source: *Braz. J. Food Technol*., 5º SIPAL
AKPINAR-BAYIZIT Arzu, TURAN Murat Ali, YILMAZ-ERSAN Lutfiye, TABAN Nilgun	2010	Title: Inductively Coupled Plasma Optical-Emission Spectroscopy Determination of Major and Minor Elements in Vinegar Source: *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*, 38 (3), 64-68
Nickol GB	1979	Title: Vinegar. Source: Peppler HJ, Perlman D. Microbiology technology. 2nd ed. New York: Academic Press. p 155-172.
Pederson CS	1979	Title: Vinegar. Source: Microbiology of food fermentation, 2nd ed. Westport: AVI Publishing Co. p 52.
EC	2006	Title: Decision 2006/257/EC Commission Decision of 9 February 2006 amending Decision 96/335/EC establishing an inventory and a common nomenclature of ingredients employed in cosmetic products. Source: EC
FAO WHO	1987	Title: ALINORM 87/19 APPENDIX II DRAFT EUROPEAN REGIONAL STANDARD FOR VINEGAR p 34-38 Source: codex alimentarius commission
FAO WHO	2000	Title: CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5 Source: codex alimentarius commission
OIV	2000	Title: RESOLUTION OENO 52/2000, I. VINAIGRES DE VIN – DETERMINATION DE LA TENEUR EN ACIDITE TOTALE. Source: OIV
OIV	2000	Title: RESOLUTION OENO 56/2000, V. VINAIGRES DE VIN – DETERMINATION DE LA TENEUR EN ALCOOL RESIDUEL. Source: OIV

Author(s)	Year	**Title** **Source** **Company, report N°** **GLP or GEP status** **Published or not**
SECTION 3 : Uses of the substance and its product		
EC	2008	**Title**: Draft Assessment Report of Acetic Acid (Fourth Stage Review Program of Council Directive 91/414). **Source**: EC
Doran W.L.	1928	Title: ACETIC ACID AS A SOIL DISINFECTANT Source: Journal of Agricultural Research, , Vol. 36, No. 3 Washington, D.C.
Tobias A.	2010	Title: Examination of materials and methods potential for organic seed treatment Source: Doctoral Theses
Tobias A. et al.	2008	Title: Testing of different seed treatment materials on seed borne bacterial disease of tomato and pepper Source: First Symposium on Horticulture in Europe
Tobias A. et al.	2008	Title: Examinations of potential environmental friendly materials against tomato and pepper pathogens Source: *International Journal of Horticultural Science*, 14(4):49-54
Tobias A. et al.	2007	Title: Testing of suitable materials for ecological seed treatment Source: International Ph.D. Students` Conference. University of South Bohemia in České Budějovice, Faculty of Agriculture, 17th, April, České Budějovice, Czech Republic, Proceeding ISBN: 978-80-7040-972-5
Tobias A. et al.	2007	Title: In vitro examination of the inhibition effect of different materials on seed borne bacterial disease of tomato and pepper Source: 15th International Congress on the Hungarian Society for Microbiology 18-20 July, Budapest Hungary (poszter), *Acta Microbiologica et Immunologica Hungarica*, Supplement 54, p.133-134
ITAB	2012	Title: Agir rapidement pour contenir la carie commune, CONTROLER LA CARIE COMMUNE Source: actes chapitre Traitements de semences : contrôler la carie p33
Tobias A.	2011	Title: Organic seed treatment possibilities Source: ISOFAR Conference programme, Organic is life – knowledge for tomorrow, 3rd Scientific Conference of ISOFAR Proceedings pp511-513.
Borgen A.	-	Title: A. Strategies for regulation of seed borne diseases in organic farming. Source: Agrologica, www.agrologica.dk, p 1
Borgen A. & Bent N.	2001	Title: Effect of seed treatment with acetic acid for control of seed borne diseases. Source: Proceedings from BCPC, Symposium No. 76: "Seed Treatment: Challenges & Opportunities", eds. A. J. Biddle. BCPC, Farnham, 135-140
Borgen A. Kristensen L.	2000	Title: Seed borne diseases – a challenge for organic cereal production. Source: In Proceedings of the 13th IFOAM Scientific Conference, Basel
Lizot JF et al.	2002	Title: Désinfection des semences : des produits naturels pour la bio Source: *Alter Agri* N° 53 mai/juin p20-21
Saidi B. et al.	2001	Title: Effect of seed treatment with organic acids on the control of common bunt (Tilletia tritici and T. laevis) in wheat Source: *Meded Rijksuniv Gent Fak Landbouwkd Toegep Biol Wet.*; 66(2a):213-21
Marchand P, Coulombel A.	2012	Title: Fiches Série Scienc'ITAB: Le Vinaigre, Activité antifongique, Source: *AlterAgri 1*16, p30-31
Bruyere J.	2013	Title: Utilisation de l'acide acétique *(vinaigre)* dans la lutte contre la carie du blé *(Tilletia caries et foetida)* Source: Journées Substances Naturelles en Protection des Cultures Réglementation, expérimentation, 9 & 10 avril 2013
Sholberg, PL; Gaudet, DA; Puchalski, B; Randall, P	2006	Title: Control of common bunt (Tilletia tritici and T-laevis) of wheat (Triticum aestivum cv. 'Laura') by fumigation with acetic acid vapour. Source: Canadian Journal of Plant Science, 86(3), 839-843.

Author(s)	Year	**Title** **Source** **Company, report N°** **GLP or GEP status** **Published or not**
SECTION 4: Classification and labelling of the substance		
EC	2008	**Title**: Draft Assessment Report of Acetic Acid (Fourth Stage Review Program of Council Directive 91/414). **Source**: EC

Author(s)	Year	**Title** **Source** **Company, report N°** **GLP or GEP status** **Published or not**
SECTION 5 : Impact on human and animal health		
EFSA	2013	Title: Conclusion on the peer review of the pesticide risk assessment of the active substance acetic acid, **Source**: EFSA Journal 2013;11(1):3060
EC	2008	**Title**: Draft Assessment Report of Acetic Acid (Fourth Stage Review Program of Council Directive 91/414). **Source**: EC
D'Mello J. P. Felix	2003	**Title**: Foo safety contaminants and toxins **Source**: CABI publishing p 248
FAO WHO	1974	**Title**: Toxicological evaluation of some food additives including anticaking agents, antimicrobials, antioxidants, emulsifiers and thickening agents, ACETIC ACID AND ITS POTASSIUM AND SODIUM SALTS **Source**: Food additives series n°5

Author(s)	Year	**Title** **Source** **Company, report N°** **GLP or GEP status** **Published or not**
SECTION 6 : Residues		
EC	2008	**Title**: Draft Assessment Report of Acetic Acid (Fourth Stage Review Program of Council Directive 91/414). **Source**: EC
OIV	2000	**Title:** RESOLUTION OENO 56/2000, V. VINAIGRES DE VIN – DETERMINATION DE LA TENEUR EN ALCOOL RESIDUEL. **Source:** OIV

Author(s)	Year	**Title** **Source** **Company, report N°** **GLP or GEP status** **Published or not**
SECTION 7 : Fate and Behaviour in the environment		
EC	2008	**Title**: Draft Assessment Report of Acetic Acid (Fourth Stage Review Program of Council Directive 91/414). **Source**: EC

Author(s)	Year	**Title** **Source** **Company, report N°** **GLP or GEP status** **Published or not**
SECTION 8 : Effects on non target species		
EFSA	2013	**Title**: conclusion on acetic acid, **Source**: EFSA Journal 2013;11(1):3060
Dupont	2001	Title: ROBUST SUMMARY FOR DICARBOXYLIC ACID CATEGORY, 201-13108, pp84-95 **Source**: ROBUST SUMMARY FOR DICARBOXYLIC ACID CATEGORY
EC	2008	**Title**: Draft Assessment Report of Acetic Acid (Fourth Stage Review Program of Council Directive 91/414). **Source**: EC
EU	2013	**Title**: COMMISSION IMPLEMENTING REGULATION (EU) No 790/2013 of 19 August 2013 amending Implementing Regulation (EU) No 540/2011 as regards the conditions of approval of the active substance acetic acid **Source**: UE
Babcock C. Holmes Farley R.	2012	**Title**: Vinegar Dosing Methodology for the Marine Aquarium, **Source**: Tank of the month vol 10 (6) http://reefkeeping.com/joomla/index.php/current-issue/article/116-vinegar-dosing-methodology-for-the-marine-aquarium
NSW	2000	**Title**: The Easy Septic Guide. Developed by Social Change Media for the New South Wales Department of Local Government. **Source**: Department of Local Government.
USEPA	1991	**Title**: United States Pesticides And Environmental Protection Toxic Substances, Agency (7508W) 738-F-91-106, R.E.D. FACTS Propionic Acid **Source**: USEPA
USEPA	1991	**Title**: REREGISTRATION ELIGIBILITY DOCUMENT, PROPIONIC ACID, AND SALTS, LIST D, CASE 4078, SEPTEMBER 1991 **Source**: USEPA
USEPA	2009	**Title**: BIOPESTICIDES REGISTRATION ACTION DOCUMENT L-Lactic Acid Office of Pesticide Programs, **Source**: Biopesticides and Pollution Prevention Division, June 2009 U.S. Environmental Protection Agency, pp 1-22
OECD SIDS	2002	**Title**: GLYCEROL **Source**: UNEP PUBLICATIONS SIDS Initial Assessment Report For SIAM 14 Paris, France
MSDS	2013	**Title**: NATURAL CLEANER VINEGAR 1L Version 5.0 Date de révision 18.09.2013 **Source**: TanaProfessionals

Author(s)	Year	Title Source Company, report N° GLP or GEP status Published or not
SECTION 9 : Overall conclusions with respect of Eligibility of the substance to be approved as basic substance		
EC	2008	**Title**: Draft Assessment Report of Acetic Acid (Fourth Stage Review Program of Council Directive 91/414). **Source**: EC
FAO WHO	2000	Title: CL 2000/18-EURO, Proposed DRAFT revised REGIONAL STANDARD FOR VINEGAR p 1-5 Source: *codex alimentarius* commission