CHIMIA **2023**, *77*, 764-772

Water-soluble and Water-dispersible Polymers Used in Commercial Agricultural Formulations: Inventory of Polymers and Perspective on their Environmental Fate

Kevin Kleemann and Michael Sander*

*Correspondence: Prof. Dr. M. Sander, E-mail: Michael.Sander@env.ethz.ch
Institute of Biogeochemistry and Pollutant Dynamics, ETH Zurich, CH-8092 Zurich, Switzerland

Supplementary Information
Tables 1 – 5

Table 1. Trade names, molecular weight, and corresponding reference for polyethylene glycols (PEGs).

Trade Name	Molecular Weight (Da)	Ref.
Adeka Tol SO-135	800	1
Aduxol TRD-08	400	2
Atplus 242	/	3
Carbowax PEG 8000 Granular	7920	4
Lipoxol 200	200	5
Lipoxol 400	400	6
Pluracol E 8000	8000	7
Pluriol E 200	200	8
Pluriol E 8000 Flakes	8000	9
Polikol 600	600	10
Polydiol 400	400	11
Polyethylenglykol 400	400	
Polyethylenglykol PEG 200	200	
Polyglycol P-4000 E	4000	12
Polyglykol 8000 S	8000	13
Renex 30	400	14

Table 2. Trade names, molecular weight, functionalization, and corresponding reference for functionalized polyethylene glycols (PEGs).

Trade Name	Molecular Weight (Da)	Functionalization	Ref.
Agnique CSO-30	1320	castor oil	[15]
Agnique CSO-40	1760	castor oil	[15]
Agnique CSO-20	880	castor oil	[15]
Agnique SPO-40	/	sorbitan ester	[15]
Atlox 1086	1760	sorbitol hexaester	[16]
Atlox 4894	/	alkylphenol	[17]
Berol 108	/	castor oil	[18,19]
Berol 175	/	castor oil	[20,21]
Berol 184 L	/	castor oil	[22]
Berol 199	1408	castor oil	[23]
Berol 494 H	/	castor oil	[22]
Berol 537W	220	castor oil	[24]
Berol 829	880	castor oil	[25]
Berol 904	/	castor oil	[22]
Berol 907	220	castor oil	[26]
Cithrol 6MO	528	stearate	[27,28]
Dehydol 100	400	C_{12}-C_{18} alcohol	[29,30]
Dispersogen TP160	700	triphenylethyl phenol, phosphoric ester	[31,32]
Emulan EL	/	castor oil	[33,34]

Emulan EL 40	/	castor oil	[33]
Emulgator 1371 B	1760	ricinus oil	[35,36]
Emulgator EL	880	castor oil	[37]
Emulgator PS 54	2376	tristyrylphenol	[38]
Emulgator SZZ 14	/	alkyl alcohol	[39]
Ethomeen HT/60	2200	tertiary amine	[40–42]
Ethylan 68/30	900	C_{16}-C_{18} alcohol	[43,44]
Ethylan NS 500 K	/	C_4 alcohol	[45]
Ethylan NS 500 LQ	/	C_4 alcohol	[46,47]
Ethylan TD 1407	616	C_{13} alcohol	[48,49]
Etocas 10	400	castor oil	[50,51]
Etocas 30	1300	castor oil	
Etocas 35	1600	castor oil	[51]
Etocas 40	1800	castor oil	[51]
Genamin T 200 NF	660	tallowamine	[52]
Genapol C-100	440	fatty alcohol	[53]
Genapol ID 060	264	Iso- C_{10} alcohol	[54]
Genapol O 100	440	C_{16}/$_{18}$ fatty alcohol	[55]
Genapol T 150	660	C_{16}/C_{18} fatty alcohol	[56]
Genapol T-200	880	C_{16}/C_{18} fatty alcohol	[57]
Genapol X-060	264	C_{13} alcohol	[58]
Genapol X-080	352	C_{13} alcohol	[59]
Genapol X-090	880	C_{13} alcohol	[60]

Genapol XM 60	880	methyl, C_{13} alcohol	[60]
Geronol CF/AR	440	alkyl ether phosphate	[61,62]
Lucramul CO 30	1320	castor oil	[51]
Lucramul L 06	264	C_{12}-C_{18} alcohol	[63,64]
Lucramul SPS 16	704	tristyrylphenol	[64]
Lutensol XP 89	352	C_{10} alcohol	[65,66]
Marlipal O 13/99	396	C_{13} alcohol	[67,68]
Merpoxen RO 350	1540	castor oil	[69,70]
Rhodasurf 860 P	308	iso-C_{10} alcohol	[71]
Sunaptol CA 350	1540	castor oil	[72,73]
Synperonic 13/10	440	C_{13} alcohol	[74,75]
Synperonic 13/10	440	Iso-C_{13} alcohol	[75]
Synperonic 13/10	440	C_{13} alcohol	[75]
Synperonic 13/12-LQ	528	C_{13} alcohol	[76]
Synperonic 91/10	440	C_9/C_{11} alcohol	[77]
Synperonic 91/6	264	C_9/C_{11} alcohol	[78]
Tergitol 15-S-12	528	C_{12}/C_{14} alcohol	[79,80]
Tergitol 15-S-7	308	C_{12}/C_{14} alcohol	[79]
Tergitol 15-S-9	396	C_{12}/C_{14} alcohol	[79]

Table 3. Trade names, molecular weight, comonomer and corresponding reference for polyethylene glycol (PEGs) copolymers.

Trade Name	Structure	Molecular Weight (Da)	Ref.
Agnique CP 72 L	PEG-polyvinyl acetate	/	[81,82]

Antarox B 500	PEG-PPG	/	83
Antarox B/848	PEG-PPG	/	84,85
Atlox 4912	PEG-12-hydroxystearic acid	>5000	86
Atlox 4913	PEG-polymethyl methacrylate	5000	17,87
Atlox 4914	PEG-polyisobutylene succinic acid	/	88
Emulgator HOT 5902	PEG6-PPG8	641	89
Epan U-108 (Poloxamer 188)	PEG-PPG	16250	90,91
Genapol EP 2584	PEG8-PPG4	554	92
Genapol PF 80 FP	PEG-PPG	9300	93
Hypermer B246	PEG-poly(12-hydroxystearic acid)	3500	94
Lucramul HOT 5902	PEG6-PPG8	658	60
Lutrol F 127 (poloxamer 407)	PEG202-PPG56	12600	95,96
Plurafac (AC) LF 300	PEG-PPG	700	97
Plurafac LF 120	PEG-PPG	/	98
Pluronic F 108	PEG-PPG	14600	99
Pluronic L 62	PEG-PPG	2000	100
Pluronic L 64	PEG-PPG	2900	101,102
Pluronic L 81	PEG-PPG	2800	103,104
Pluronic L 92	PEG-PPG	2000	105

Pluronic P 105	PEG-PPG	6500	[106,107]
Pluronic P 84	PEG-PPG	2400	[108]
Pluronic PE 10100	PEG-PPG	3500	[109]
Pluronic PE 6100	PEG-PPG	2000	[109]
Pluronic PE 6400	PEG-PPG	2900	[110]
Pluronic PE 6800	PEG-PPG	8000	[110]
Polyglykol 26-2N	PEG-PPG	/	[111,112]
Sokalan PG 101	PEG-polyvinyl acetate	/	[113]
Surfonic CO-15	PEG-PPG	6500	[114]
Synergen 848	PEG-PPG	/	[115,116]
Synergen GL 5	PEG-phthalic acid	/	[117,118]
Synperonic PE/F 127 (poloxamer 407)	PEG-PPG	12600	[119,120]
Synperonic PE/L64 (poloxamer 184)	PEG-PPG	2900	[121,122]
Synperonic PE/P 105	PEG-PPG	/	[123,124]
Synperonic T/304	funct. PEG-PPG	1650	[125,126]
Synperonic T/905	funct. PEG-PPG	/	[127]
Tergitol XD	PEG-PPG	2990	[128]
Tergitol XH	PEG-PPG	3738	[107,129]
Tersperse 4894	PEG-PPG	/	[130]
Tween 20	PEG branched copolymer	1200	[131]
Tween 60	PEG branched copolymer	1300	[132,133]

Tween 80	PEG branched copolymer	900	[131,134]
Tween 81	PEG branched copolymer	900	[135,136]
Tween 85	PEG branched copolymer	900	[131]

Table 4. Trade names, chemical structure, and corresponding reference for polysaccharides (PSacs).

Trade Name	Structure	Ref.
Ac-Di-Sol	Crosslinked sodium carboxymethyl cellulose	[137]
AG-RH23	Xanthan Gum	[138,139]05/12/2023 11:31:00
Atlox AL-2575 LF-LQ-(MV)	Alkyl polysaccharide	[140]
Avicell CL 611	Microcrystalline cellulose and carboxymethyl cellulose	[141]
234. Avicell PH 103	Low MW microcrystalline cellulose	[142]
Carbocel C2/6	Sodium carboxymethyl cellulose	[143]
Carboxymethylcellulose sodium salt	Sodium carboxymethyl cellulose	
Dextrin	Dextrin	
Dextrin Gelb	Dextrin	

Ethocel Standard 10 Premium Ethylcellulose	Ethyl cellulose	144
Grindsted Xanthan 80	Xanthan gum	145
Grindstedt Xanthan 23 OF	Xanthan gum	
Gummi arabicum	Gum arabic	
Hydroxy propyl cellulose	Hydroxypropyl cellulose	
Kahlgum 6653 TQ40	Xanthan gum	146,147
Keltrol	Xanthan gum	148
Kelzan	Xanthan gum	149
Klucel LF Pharm	Hydroxypropyl cellulose (95000 Da)	150
KUW Xanthan Gum	Xanthan gum	
Madeol X80	Xanthan gum	151
Natrosol 250 HXR	Hydroxyethyl cellulose (1000000 Da)	152
Natrosol 250 M	Hydroxyethyl cellulose (720000 Da)	153
Primellose	Crosslinked sodium carboxymethyl cellulose	154
Primojel	carboxymethly starch	155
Rhodigel 23	Xanthan gum	156
Rhodopol 23	Xanthan gum (1000000 Da)	157–159

Rhodopol 50 MC	Cationic xanthan gum	160,161
Rhodopol 50 MD	Xanthan gum	162
Rhodopol G	Xanthan gum	163,164
Satiaxane CX 911	Xanthan gum	165
Sodium Starch Glycolate	Starch	
Starch	Starch	
Tensiofix 821	Xanthan gum	
Thixogum CS IRX 53764	Acacia. Gum etc	166
Tylose MOBS 3 P4	Hydroxypropyl methyl cellulose	167
Vanzan NF	Xanthan gum	168

Table 5. Trade names, chemical structure, and corresponding reference for Vinylic (Co-)Polymers (VCPs) and others.

Trade Name	Structure	Molecular Weight (Da)	Ref.
Acronal 290 D	Poly(styrene-co-acrylic acid) copolymer	50000 - 800000	169
Acronal A 380	Poly(styrene-co-acrylic acid) copolymer	50000 - 800000	169
Agrimer 15	Polyvinylpyrrolidone	6000 - 15000	170

Agrimer 30	Polyvinylpyrrolidone	40000 - 80000	[170]
Agrimer 90	Polyvinylpyrrolidone	1000000 - 1700000	[170]
Agrimer AL-10 LC	Polyvinylpyrrolidone	12000 - 22000	[170]
Agrimer AL-22	Polyvinylpyrrolidone	11000 - 17000	[170]
Agrimer ST	Poly(vinylpyrrolidone -co-styrene) copolymer	/	[170]
Agrimer VA 6	Poly(vinylpyrrolidone -co-vinyl acetate) copolymer	40000	[170]
Alberdingk AS 6002	Poly(styrene-co-acrylic acid) copolymer	/	[171]
Amecoat PVA 5/88	Polyvinyl alcohol (88%)	/	[172]
Atlox 4913	Poly(methyl methacrylate-co-ethylene glycol) copolymer	20000 to 30000	[173]
Atlox 4914	Poly(isobutylene succinic anhydride-co-ethylene glycol) copolymer	/	[88]

Atlox LP-1-LQ	Poly(hydroxystearic acid) polyester	/	174
Atlox Metasperse 100L	Poly(styrene-co-acrylic acid) copolymer	5,000-100,000	175,176
Atlox Metasperse 550S	Poly(styrene-co-acrylic acid-co-methacrylic acid) terpolymer	>1200	177
BYK-154	Poly(acrylic acid)	/	178–180
Carbopol Aqua 30 Polymer	Crosslinked poly(acrylic acid)	/	181–183
Carbopol ETD 2691	Crosslinked poly(acrylic acid)	/	184–187
Celvol Polyvinylalkohol, copolymer	Polyvinyl alcohol (92-95%)	/	188
Dispersogen PSL 100	Poly(acrylic acid-co-another monomer)	>1000	61,189
Emuldur 360 A	Acid-functionalized Polyurethane Dispersion (PUD)	/	190–192

ENVIPOL 871	Poly(acrylic acid-co-methacrylic acid) copolymer	/	193–195
Geropon DA	Poly(acrylic acid-co-methacrylic acid) copolymer	/	196,197
Geropon DA 1349	Poly(acrylic acid-co-methacrylic acid) copolymer	/	173,198
Gohsenol GH20	Polyvinyl alcohol (88%)	110000	199,200
Gohsenol GL05	Polyvinyl alcohol (88%)	25000	201
Gohsenol KH-17	Polyvinyl alcohol (83%)	290000	202,203
Gohsenol KH-20	Polyvinyl alcohol (80%)	398000	202,204
Gohsenol KL-03	Polyvinyl alcohol (97%)	13200	205,206

Gohsenol KL-05	Polyvinyl alcohol (95%)	45000	[207]
Gohsenol KM-11	Polyvinyl alcohol (89%)	55000	[208,209]
Gohsenol KP-08R	Polyvinyl alcohol (71-75%)	35000 Note: We asked Mitsubishi Chemicals Europe for further information (molecular weight etc.) on the Gohsenol product line (Email from 3rd of July 2023) and they provided the molecular weights of KP-08R as well as KM-11.	
Gohsenol NK-05	Polyvinyl alcohol (70%)	28000	[209,210]
Hypermer B246	Poly(hydroxystearic acid)-poly(ethylene glycol) copolymer	2500-3500	[94]
iPoly50 Lösung	Poly(methacrylate-co-another monomer) copolymer	/	[211]

Kollidon VA 64	Poly(vinylpyrrolidone-co-vinyl acetate) copolymer	45000-70000	[212–214]
Kuraray Poval 3-85	Polyvinyl alcohol (85%)	10000 – 40000 Note: We asked Kuraray Europe for further information (molecular weight etc.) on the Poval product line (Email from 30th of June 2023) and they provided the molecular weight ranges for Kuraray Poval 3-85, Kuraray Poval 4-88 and Kuraray Poval 5-88.	[215,216]
Kuraray Poval 4-88	Polyvinyl alcohol (88%)	10000 - 40000	
Kuraray Poval 5-88	Polyvinyl alcohol (88%)	10000 - 40000	
Laicril P-1530	Poly(styrene-co-acrylic acid) copolymer	/	[217]
Lomar LS-1	Poly(naphthaleneformaldehyde) sulfonate	/	[218,219]
Luviskol K 17 Pulver	Polyvinylpyrrolidone	< 300000	

Luviskol K90 Powder	Polyvinylpyrrolidone	700000	[220,221]
Luviskol VA 64 Pulver	Poly(vinylpyrrolidone -co-vinyl acetate) copolymer	/	[222]
Luvitec K 30 powder	Polyvinylpyrrolidone	375000	[223]
Luvitec VA 64 PLV	Poly(vinylpyrrolidone -co-vinyl acetate) copolymer	/	[224,225]
Luvitec VA 64 powder	Poly(vinylpyrrolidone -co-vinyl acetate) copolymer	/	[224]
MAXI-BOND Pellet Binder	Polymethylolcarbamide	/	[226]
MonoSol M-8534	Polyvinyl alcohol	/	[227,228]
Mowilith DC 02/1	Polyvinyl Acetate	/	[229]
Mowilith DHS	Polyvinyl Acetate	/	[230–232]
Mowilith DM 1340 solution	Poly(vinyl acetate-co-ethylene) copolymer	/	[233]
Mowilith DM 2	Poly(vinyl acetate-co-ethylene) copolymer	/	[234]

Mowilith LDM 1871	Poly(vinyl acetate-co-ethylene) copolymer	/ Note: We asked Celanese for further information (molecular weight etc.) on the Mowilith product line (Email from 5th of July 2023) but no additional information was provided.	[235]
Mowilith LDM 6119	Poly(styrene-co-acrylic acid ester) copolymer	/	[236]
Mowilith LDM 7416	Acrylic (not further specified)	/	[237]
Mowiplus XW 330	Poly(acrylic acid)	/	[238,239]
Ongronat 2100	Oligomeric Methylenediphenyl Diisocyanate	/	[240,241]
Pergopak FC	Polymethylurea resin	/	[1]
Plasdone K-29/32	Polyvinylpyrrolidone	58000	[242,243]
Polyplasdone XL	Polyvinylpyrrolidone	/	[244,245]
Polyvinylalkohol	Polyvinyl alcohol	/	
Polyvinylpyrrolidon	Polyvinylpyrrolidone	/	
Primal ECO-934 TK	Poly(acrylic acid)	/	[246,247]
PVP K-30	Polyvinylpyrrolidone	40000	[248,249]

Rheovis AS 1125	Poly(acrylic acid-co-another monomer)	/	250,251
SELVOL Polyvinyl alcohol, copolymer	Polyvinyl alcohol	/	
Sokalan CP 9	Poly(maleic acid-co-olefin) copolymer	12000	252
Sokalan HP 50	Polyvinylpyrrolidone	40000	253,254
Sokalan K 30	Polyvinylpyrrolidone	50000	255
Sokalan PG 101	Poly(vinyl acetate-co-ethylene glycol) copolymer	/	113
Surfaron A 1561 N 100	Poly(alkyl naphthalene sulfonate)	/	256
Tosslon ET-20	Polyvinyl alcohol	/	257
Vinamul 18160	Polyvinyl Acetate	/	258–260

References

(1) Ono, T. Viscosity Modifier, and Emulsion Resin Composition or Aqueous Coatinf Composition Each Containing Same. EP3 009 487B1. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://data.epo.org/publication-server/pdf-document/EP13886661NWB1.pdf?PN=EP3009487%20EP%203009487&iDocId=5624404&iepatch=.pdf.

(2) *Fettalkoholethoxylate*. https://www.schaerer-surfactants.com/produkte/fettalkoholethoxylate (accessed 2023-08-01).

(3) *Atplus™ 242 | Croda Crop Care*. https://www.crodacropcare.com/en-gb/product-finder/product/100-atplus_1_242 (accessed 2023-08-01).

(4) *CARBOWAX™ Polyethylene Glycol 8000 Granular*. https://www.dow.com/en-us/pdp.carbowax-polyethylene-glycol-8000-granular.85527z.html (accessed 2023-08-01).

(5) *LIPOXOL 200*. https://products.sasol.com/pic/products/home/grades/EU/5lipoxol-200/index.html (accessed 2023-08-01).

(6) Lipoxol 400 (SAFETY DATA SHEET), 2021. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://sasoltechdata.com/MSDS/LIPOXOL%20400.pdf.

(7) *Pluracol® E8000 von Polioles, S.A. de C.V. - Farben & Lacke*. https://www.ulprospector.com/de/la/Coatings/Detail/25860/568908/Pluracol-E8000 (accessed 2023-08-01).

(8) *Pluriol® E 200 LS*. https://www.if.basf.us/agchem-products/30239729 (accessed 2023-08-01).

(9) *Pluriol® E 8000 Flakes*. https://www.if.basf.us/formulation-technologies-products/30074961# (accessed 2023-08-01).

(10) admin. *PEG-12 - POLIkol 600 - Produktportal der PCC Gruppe*. Produktportal der PCC-Gruppe. https://www.products.pcc.eu/de/id/1081728/polikol-600-peg-12-2/ (accessed 2023-08-01).

(11) *Polyethylenglycol 400 CAS 25322-68-3 | 807485*. https://www.merckmillipore.com/CH/de/product/Polyethylene-glycol-400,MDA_CHEM-807485 (accessed 2023-08-01).

(12) Basel, C. L. *Polyglykol 4000 P* Polyethylene glycol*. Clariant Ltd. https://www.clariant.com/de/Solutions/Products/2022/04/08/10/03/Polyglykol-4000-P (accessed 2023-08-01).

(13) *Polyethylenglykol 8000, 500 g, CAS No. 25322-68-3 | 3. Fällung & Aufkonzentrierung | DNA-/RNA-Isolation | Molekularbiologie | Life Science | Carl Roth - Schweiz*. https://www.carlroth.com/ch/de/3-faellung-aufkonzentrierung/polyethylenglykol-8000/p/0263.1 (accessed 2023-08-01).

(14) *Renex(R) 30*. Advance Scientific & Chemical. https://advance-scientific.com/fine-chemicals/cosmetic-ingredients/surfactants-emulsifying/renex-r-30/ (accessed 2023-08-01).

(15) Core Range - Industrial Formulators, 2019. https://www.basf.com/kr/documents/ko/product/Core%20Range_Industrial%20Formulators.pdf.

(16) Hanagan, M. A.; Oberholzer, M. R.; Pasteris, R. J.; Shapiro, R. Solid Forms of an Azocyclic Amide. WO2010123791A1, October 28, 2010. https://patents.google.com/patent/WO2010123791A1/en?oq=WO2010%2f123791Al (accessed 2023-08-01).

(17) Dimitrova, G. Suspension Concentrate Formulation Containing Pyrimethanil. US6559156B1, May 6, 2003. https://patents.google.com/patent/US6559156B1/en. (accessed 2023-07-31).

(18) Danican, S.; Drochon, B.; James, S.; Ding, B. Permeable Cements. US7717176B2, May 18, 2010. https://patents.google.com/patent/US7717176B2/en?q=(Berol+108)&oq=Berol+108 (accessed 2023-07-31).

(19) *Nouryon Berol 108*. https://www.matweb.com/search/datasheettext.aspx?matguid=04085ba3a1c34f8cafddba2e24ba9437 (accessed 2023-07-31).

(20) Surface Chemistry - Cleaning Applications. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://krahnnordics.com/app/uploads/2019/09/EMEIA-Cleaning-Product-Catalog_2019.pdf (accessed 2023-07-23).

(21) *Berol 175 - Nouryon - Surfactant - Alcohol Alkoxylates - Natural*. https://www.knowde.com/stores/nouryon/products/berol-175 (accessed 2023-07-31).

(22) *| IMCD Finland*. https://www.imcd.fi/en/trade-names/pharmaceuticals-BG6/berol-a5u690000000enkAAA?query=494 (accessed 2023-07-31).

(23) *Berol 199 Castor Oil 32 EO*. Nouryon. https://www.nouryon.com/product/berol-199-castor-oil-32-eo/ (accessed 2023-07-31).

(24) Currie, F. Use of Self-Assembled Surfactant Systems as Media for a Substitution Reaction. *Journal of Colloid and Interface Science* **2004**, *277* (1), 230–234. https://doi.org/10.1016/j.jcis.2004.04.054.

(25) *Berol 829 Castor Oil 20 EO*. Nouryon. https://www.nouryon.com/product/berol-829-castor-oil-20-eo/ (accessed 2023-07-31).

(26) Krogh, K. A.; Vejrup, K. V.; Mogensen, B. B.; Halling-Sørensen, B. Liquid Chromatography–Mass Spectrometry Method to Determine Alcohol Ethoxylates and Alkylamine Ethoxylates in Soil Interstitial Water, Ground Water and Surface Water Samples. *Journal of Chromatography A* **2002**, *957* (1), 45–57. https://doi.org/10.1016/S0021-9673(02)00077-8.

(27) *Cithrol™ 6MS | Croda Personal Care*. https://www.crodapersonalcare.com/en-gb/product-finder/product/35-cithrol_1_6ms (accessed 2023-08-01).

(28) Hollis, G. L. *Surfactants Europa: A Directory of Surface Active Agents Available in Europe*, 3d ed.; Royal Society of Chemistry: Cambridge, 1995.

(29) Dehydol 100 - TDS, 2013. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://chemical.carytrad.com.tw/uploads/1/2/3/8/123848866/tds_dehydol_100_en.pdf.

(30) *Products Detail - Dehydol 100*. Products Detail. https://www.homecare-and-i-and-i.basf.com/products/products-detail/Dehydol-100/30528452 (accessed 2023-08-01).

(31) A.Ş, A. K. *GENAPOL LA 090*. Ataman Kimya A.Ş. https://www.ataman-chemicals.com/products/genapol-la-090-4744.html (accessed 2023-08-01).

(32) Wacker, A.; Hess, J.; Kupfer, R.; Rösch, A. Pestizidzubereitungen enthaltend N-substituierte 2-Pyrrolidon-4-carbonsäureester. DE102010046679A1, March 22, 2012. https://patents.google.com/patent/DE102010046679A1/de?q=(Dispersogen+TP+160)&oq=Dispersogen+TP+160 (accessed 2023-08-01).

(33) Dawson, H. B.; Balderstone, M. Non-Ionic Surfactant Aggregates. US9433207B2, September 6, 2016. https://patents.google.com/patent/US9433207B2/en (accessed 2023-07-31).

(34) *Products Detail Emulan® EL*. Products Detail - BASF. https://www.homecare-and-i-and-i.basf.com/products/products-detail/Emulan-EL/30043883 (accessed 2023-07-31).

(35) Schmitt, G.; Schmitz, G.; Walz, K.; Mielke, B.; Neumann, H. Neue Insektizide Formulierungen. WO1998000020A1, January 8, 1998. https://patents.google.com/patent/WO1998000020A1/de (accessed 2023-08-01).

(36) Hinderer, J.; Klinksiek, B.; Mansfeld, G.; Schnelle, A.; Illger, H.-W.; Illger, P. Riechstoffhaltige wachsformulierungen. WO2001038440A1, May 31, 2001. https://patents.google.com/patent/WO2001038440A1/de?q=(Emulgator+1371B)&oq=Emulgator+1371B (accessed 2023-08-01).

(37) *Emulsifier EL*. https://www.chembk.com/en/chem/Emulsifier%20EL (accessed 2023-08-01).

(38) Arylphenol Alkoxylates. https://www.whitchem.co.uk/wp-content/uploads/2019/12/Levaco-Agrochemicals-Arylphenol-alkoxylates.pdf (accessed 2023-07-31).

(39) Naik, A. H.; Stendel, W.; Voege, H. Pesticidal Pour-on Formulations Particularly Effective against Acarines and Insects. US4764529A, August 16, 1988. https://patents.google.com/patent/US4764529A/en?q=(SZZ14)&oq=SZZ14 (accessed 2023-08-01).

(40) *Ethomeen HT/60 Hydrogenated Tallow Amine 50 EO*. Nouryon. https://www.nouryon.com/product/ethomeen-ht60-hydrogenated-tallow-amine-50-eo/ (accessed 2023-07-31).

(41) Product Data Sheet - Ethomeen HT/60 Hydrogenated Tallow Amine 50 EO, 2022. https://www.nouryon.com/globalassets/inriver/resources/pds-ethomeen-ht60-emeia-en.pdf (accessed 2023-07-31).

(42) Abraham, W.; Dyszlewski, A.; Hemminghaus, J. W.; Kohn, F. C.; Wright, D. R.; Zhang, J. Plant Health Compositions Comprising a Water-Soluble Pesticide and a Water-Insoluble Agrochemical. US20200296968A1, September 24, 2020. https://patents.google.com/patent/US20200296968A1/en?q=(Ethomeen+HT%2f60)&oq=Ethomeen+HT%2f60 (accessed 2023-07-31).

(43) *Ethylan CPG7545*. Nouryon. https://www.nouryon.com/product/ethylan-cpg7545/ (accessed 2023-08-01).

(44) Bates, C. Combinations of Derivatized Saccharide Surfactants and Etheramine Oxide Surfactants as Herbicide Adjuvants. EP2 337 452B1. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://patentimages.storage.googleapis.com/1e/1f/bc/2384bec71225bc/EP2337452B1.pdf.

(45) *Ethylan NS 500 K*. Nouryon. https://www.nouryon.com/product/ethylan-ns-500-k/ (accessed 2023-08-01).

(46) Ethylan NS-500LQ (Polyalkoxylated Butyl Ether), Product Data Sheet, 2023. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.nouryon.com/globalassets/inriver/resources/pds-ethylan-ns-500lq-emeia-en.pdf.

(47) Silva, T. E. D.; Machado, S. L.; Colla, L. F.; Ziserman, L.; Shapira, R.; Nahmoud, S. Stabilized Cyclohexanedione Oxime Composition. US20220030858A1, February 3, 2022. https://patents.google.com/patent/US20220030858A1/en?q=(Ethylan+NS)&oq=Ethylan+NS (accessed 2023-08-01).

(48) Surface Chemistry (General Catalog), 2010. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.keemia.ee/sites/default/files/2018-11/AkzoNobel_SC_Catalog.pdf.

(49) Ask Us for Your Solutions, Agricultural Solutions - Product Portfolio Europe, Middle East and Africa, 2021. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.nouryon.com/globalassets/inriver/resources/brochure-agriculture-product-portfolio-emea-en.pdf.

(50) *ECO Etocas 30 - Croda - 61791-12-6 - EPA Registered*. Knowde. https://www.knowde.com/stores/croda/products/eco-etocas-30 (accessed 2023-08-01).

(51) Peris, G. Emulsion Concentrates of Lipophilic Compounds. US20190000074A1, January 3, 2019.

https://patents.google.com/patent/US20190000074A1/en?q=(Etocas)&oq=Etocas (accessed 2023-08-01).

(52) Vanlaeys, A.; Dubuisson, F.; Seralini, G.-E.; Travert, C. Formulants of Glyphosate-Based Herbicides Have More Deleterious Impact than Glyphosate on TM4 Sertoli Cells. *Toxicology in Vitro* **2018**, *52*, 14–22. https://doi.org/10.1016/j.tiv.2018.01.002.

(53) Basel, C. L. *Genapol C 100*. Clariant Ltd. https://www.clariant.com/de/Solutions/Products/2014/01/16/15/29/Genapol-C-100 (accessed 2023-08-01).

(54) Basel, C. L. *Genapol ID 060*. Clariant Ltd. https://www.clariant.com/en/Solutions/Products/2013/12/09/18/27/Genapol-ID-060 (accessed 2023-08-01).

(55) *Genapol® O 100 von Clariant International Ltd. - Körperpflegemittel & Kosmetik*. https://www.ulprospector.com/de/eu/PersonalCare/Detail/1021/714871/Genapol-O-100 (accessed 2023-08-01).

(56) Functional Chemicals Division - Genapol T 150, Nonionic Surfactant for the Detergent Industry, 2003. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://atamankimya.com/Assets/Documents/Genapol_T_150_(_Ceteareth_15_)_ataman_kimya_20201027_194731.pdf.

(57) Löffler, M. Verfahren Zur Herstellung von Stabilen Polymer-Konzentraten. EP1 464 658A1. https://patentimages.storage.googleapis.com/a4/74/f6/502b75cba6335c/EP1464658A1.pdf.

(58) *Genapol X 060 - Cleaning - AAKO*. AAKO. Chemical Excellence. https://www.aako.nl/products/cleaning/genapol-x-060/ (accessed 2023-08-01).

(59) *Genapol® X-080 | Sigma-Aldrich*. http://www.sigmaaldrich.com/ (accessed 2023-08-01).

(60) FAERS, M.; Gaertzen, O.; Roechling, A.; RATSCHINSKI, A. Oil-Based Suspension Concentrates with Low Gravitational Separation and Low Viscosity. US20180235208A1, August 23, 2018. https://patents.google.com/patent/US20180235208A1/en (accessed 2023-08-01).

(61) Kawanaka, H.; Sada, Y. Pesticidal Composition. AU2006202748B2, December 23, 2010. https://patents.google.com/patent/AU2006202748B2/en?q=(Geronol+CF%2fAR)&oq=Geronol+CF%2fAR (accessed 2023-08-01).

(62) Mulqueen, P. J.; Nettleton-Hammond, J. H.; Perry, R. B.; Ramsay, G. Agrochemical Compositions. AU2004296585A1, June 23, 2005. https://patents.google.com/patent/AU2004296585A1/en?q=(Geronol+CF%2fAR)&oq=Geronol+CF%2fAR&page=3 (accessed 2023-08-01).

(63) Product Overview - Chemical Solutions, 2015. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.whitchem.co.uk/wp-content/uploads/2019/12/Levaco-Product-Overview-chemical-solutions.pdf.

(64) Agro Solutions - We Keep an Eye on Your Growth, 2019. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://lucrop.levaco.com/media/agro-solutions_adjuvants-additives_2019.pdf.

(65) *Lutensol® XP 89 by BASF Corporation - Household, Industrial & Institutional Cleaners*. https://www.ulprospector.com/en/na/Cleaners/Detail/3690/63450/Lutensol-XP-89 (accessed 2023-08-01).

(66) *Lutensol® XP 89*. https://www.if.basf.us/agchem-products/30168772 (accessed 2023-08-01).

(67) *MARLIPAL O13/99 von Sasol Chemicals - Schmiermittel & Kühlschmierstoffe*. https://www.ulprospector.com/de/eu/Lubricants/Detail/3856/110819/MARLIPAL-O13-99 (accessed 2023-08-01).

(68) *MARLIPAL O 13/99 - Sasol - Trideceth-9 - 69011-36-5 - Knowde*. https://www.knowde.com/stores/sasol/products/marlipal-o-13-99 (accessed 2023-08-01).

(69) *MERPOXEN RO 350 - Wall Chemie - PEG-35 Castor Oil - 61791-12-6*. https://www.knowde.com/stores/wall-chemie/products/merpoxen-ro-350 (accessed 2023-08-01).

(70) MERPOXEN RO 350. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://wall-chemie.de/wp-content/uploads/pdf/TDS-MERPOXEN_RO_350(EU).pdf.

(71) Yin, C.; Fu, J.; Lu, X. Poly(Ethylene Oxide) Helical Conformation and Alkali Metal Cation Selectivity Studied Using Electrospray Ionization Mass Spectrometry. *Rapid Communications in Mass Spectrometry* **2020**, *34* (9), e8719. https://doi.org/10.1002/rcm.8719.

(72) *Polyoxyl 35 Castor Oil CAS 61791-12-6*. https://www.usbio.net/molecular-biology/165984/Polyoxyl-35-Castor-Oil (accessed 2023-08-01).

(73) *Polyoxyl 35 Castor Oil | P689395 | TRC - Bio-Connect*. https://shop.bio-connect.nl/chemicals/polyoxyl-35-castor-oil/p689395-100mg/sfid/7648466 (accessed 2023-08-01).

(74) *Substance Information - ECHA*. https://echa.europa.eu/de/substance-information/-/substanceinfo/100.105.729 (accessed 2023-08-01).

(75) *Synperonic™ 13/10 | Croda Crop Care*. https://www.crodacropcare.com/en-gb/product-finder/product/34-synperonic_1_13_2_10 (accessed 2023-08-01).

(76) *Synperonic™ 13/12 | Croda Home Care*. https://www.crodahomecare.com/en-gb/product-finder/product/819-synperonic_1_13_2_12 (accessed 2023-08-01).

(77) *Synperonic™ 91/10 | Croda Home Care*. https://www.crodahomecare.com/en-gb/product-finder/product/1661-synperonic_1_91_2_10 (accessed 2023-08-01).

(78) *Synperonic™ 91/6 | Croda Home Care*. https://www.crodahomecare.com/en-gb/product-finder/product/1659-synperonic_1_91_2_6 (accessed 2023-08-01).

(79) Bera, A.; Mandal, A.; Belhaj, H.; Kumar, T. Enhanced Oil Recovery by Nonionic Surfactants Considering Micellization, Surface, and Foaming Properties. *Pet. Sci.* **2017**, *14* (2), 362–371. https://doi.org/10.1007/s12182-017-0156-3.

(80) *TERGITOL™ 15-S-12 Surfactant*. https://www.dow.com/en-us/pdp.tergitol-15-s-12-surfactant.85635z.html (accessed 2023-08-01).

(81) *Agnique CP 72L- Polyether modified poly vinyl acetate*. https://3g.dye-ol.com/shop/pro-6812.aspx (accessed 2023-08-02).

(82) *Agnique® CP-72 L*. https://www.if.basf.us/agchem-products/30605144 (accessed 2023-08-02).

(83) STORK, A.; Reckmann, U.; Pontzen, R. Agrochemical Compositions Comprising Alkyl Polypropylene Glycol Polyethylene Glycol. US20110086848A1, April 14, 2011. https://patents.google.com/patent/US20110086848A1/en (accessed 2023-08-02).

(84) *Antarox® B/848*. Solvay. https://www.solvay.com/en/product/antarox-b848 (accessed 2023-08-02).

(85) *Solvay ANTAROX® B/848 Surfactant*. https://www.matweb.com/search/datasheettext.aspx?matguid=e7e5ef8a78c44292ac6be7785c0276ff (accessed 2023-08-02).

(86) VanderGheynst, J. S.; Scher, H. B. Storage Stable Compositions of Biological Materials. US7485451B2, February 3, 2009. https://patents.google.com/patent/US7485451B2/en (accessed 2023-08-01).

(87) Tadros, T. F. 12. Polymeric Surfactants in Paints and Coatings. In *12. Polymeric surfactants in paints and coatings*; De Gruyter, 2017; pp 231–242. https://doi.org/10.1515/9783110487282-013.

(88) Qin, K.; Liu, L. Agricultural Compositions. US20090202648A1, August 13, 2009. https://patents.google.com/patent/US20090202648A1/en?q=(Atlox+4914+polyisobutylene+succinic+anhydride-polyethylene+glycol)&oq=Atlox+4914+polyisobutylene+succinic+anhydride-polyethylene+glycol%C2%A0 (accessed 2023-08-02).

(89) フィアース，マルコム; ダングワース，ハワード・ロジャー; ウィックソン，ジェームズ・リチャード; ナイト，キャサリン・マリエ; フラベル，ジェームズ・アレキサンダー. Pesticide formulation based on emulsion polymer. JP7110117B2, August 1, 2022. https://patents.google.com/patent/JP7110117B2/en?q=(Lucramul%C2%AE+HOT+5902)&oq=Lucramul%C2%AE+HOT+5902 (accessed 2023-08-02).

(90) *Corning™ Poloxamer 188, 10%ige Lösung Poloxamer 188, 10 %-ige Lösung; 100 ml Medien für Insektenzellkulturen | Fisher Scientific*. https://www.fishersci.ch/shop/products/corning-insectagro-cell-culture-media-3/15323551 (accessed 2023-08-01).

(91) *POLOXAMER 188*. Ataman Kimya. https://www.atamanchemicals.com/poloxamer-188_u24397/https://onlinelibrary.wiley.com/doi/abs/10.1002/ (accessed 2023-08-01).

(92) Krubasik, L.; Preuschen, J.; Stein, A.; Roy, P. Detergent Composition. US10563151B2, February 18, 2020. https://patents.google.com/patent/US10563151B2/en?q=(Genapol+EP)&oq=Genapol+EP (accessed 2023-08-02).

(93) Kuhls, J.; Weiss, E. Concentrated Dispersions of Fluorinated Polymers and Process for Their Preparation. US4369266A, January 18, 1983.

https://patents.google.com/patent/US4369266A/en?q=(Genapol+PF)&assignee=80&oq=Genapol+PF+80 (accessed 2023-08-01).

(94) Braun, O.; Mallo, P. Concentrated Inverse Latex, Process for Preparing It and Industrial Use Thereof. US8765822B2, July 1, 2014. https://patents.google.com/patent/US8765822B2/en?q=(Hypermer+B246)&oq=Hypermer+B246 (accessed 2023-08-01).

(95) Lutrol L and Lutrol F-Grades, Pharma Ingredients & Services, 2010. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://chem.pharmacy.psu.ac.th/chemical/msds/lutrol_f127.pdf.

(96) Fakhari, A.; Corcoran, M.; Schwarz, A. Thermogelling Properties of Purified Poloxamer 407. *Heliyon* **2017**, *3* (8), e00390. https://doi.org/10.1016/j.heliyon.2017.e00390.

(97) Gutenberger, A.; Zeisler, V. V.; Berghaus, R.; Auweter, H.; Schreiber, L. Effects of Poly- and Monodisperse Surfactants on14C-Epoxiconazole Diffusion in Isolated Cuticles of Prunus Laurocerasus. *Pest Management Science* **2013**, *69* (4), 512–519. https://doi.org/10.1002/ps.3402.

(98) Engelskirchen, S.; Maurer, R.; Levy, T.; Berghaus, R.; Auweter, H.; Glatter, O. Highly Concentrated Emulsified Microemulsions as Solvent-Free Plant Protection Formulations. *Journal of Colloid and Interface Science* **2012**, *388* (1), 151–161. https://doi.org/10.1016/j.jcis.2012.06.084.

(99) *Poly-(ethylenglykol)-block-poly-(propylenglykol)-block-poly-(ethylenglykol) average Mn ~14,600 | Sigma-Aldrich*. http://www.sigmaaldrich.com/ (accessed 2023-08-01).

(100) Caragheorgheopol, A.; Schlick, S. Hydration in the Various Phases of the Triblock Copolymers EO13PO30EO13 (Pluronic L64) and EO6PO34EO6 (Pluronic L62), Based on Electron Spin Resonance Spectra of Cationic Spin Probes. *Macromolecules* **1998**, *31* (22), 7736–7745. https://doi.org/10.1021/ma980982g.

(101) *Pluronic L64, average Mn ~2,900 | Sigma-Aldrich*. http://www.sigmaaldrich.com/ (accessed 2023-08-02).

(102) and, L. Y.; Alexandridis*, P.; Steytler, D. C.; and, M. J. K.; Holzwarth*, J. F. *Small-Angle Neutron Scattering Investigation of the Temperature-Dependent Aggregation Behavior of the Block Copolymer Pluronic L64 in Aqueous Solution†*. ACS Publications. https://doi.org/10.1021/la000008m.

(103) *Pluronic® L-81 (Synperonic® L 81), Sigma-Aldrich®*. VWR. https://de.vwr.com/store/product/8909879/pluronic-l-81-synperonic-l-81-sigma-aldrich (accessed 2023-08-02).

(104) *Pluronic® L 81*. https://www.if.basf.us/formulation-technologies-products/30084790 (accessed 2023-08-02).

(105) *Pluronic block copolymers and Pluronic poly(acrylic acid) microgels in oral delivery of megestrol acetate*. https://doi.org/10.1211/0022357044427.

(106) Ultrasonic Activated Drug Delivery from Pluronic P-105 Micelles. *Cancer Letters* **1997**, *118* (1), 13–19. https://doi.org/10.1016/S0304-3835(97)00218-8.

(107) Schott, H. Krafft Points and Cloud Points of Polyoxyethylated Nonionic Surfactants: Part 1 Krafft Points in Binary Surfactant-Water Systems. *Tenside Surfactants Detergents* **2005**, *42* (6), 356–367. https://doi.org/10.3139/113.100275.

(108) de Freitas, C. F.; da Rocha, N. L.; Pereverzieff, I. S.; Batistela, V. R.; Malacarne, L. C.; Hioka, N.; Caetano, W. Potential of Triblock Copolymers Pluronic® P-84 and F-108 with Erythrosine B and Its Synthetic Ester Derivatives for Photodynamic Applications. *Journal of Molecular Liquids* **2021**, *322*, 114904. https://doi.org/10.1016/j.molliq.2020.114904.

(109) K.G.Marinova,L.M.Dimitrova ,R.Y.Marinov,N.D.Denkov, A.Kingma. Impact of the Surfactant Structure on the Foaming/Defoaming Performance of Nonionic Block Copolymers in Na Caeinate Solutions. *Bulg. J Phys.* **2012**, No. 39, 53–64.

(110) Nguyen-Kim, V.; Prévost, S.; Seidel, K.; Maier, W.; Marguerre, A.-K.; Oetter, G.; Tadros, T.; Gradzielski, M. Solubilization of Active Ingredients of Different Polarity in Pluronic® Micellar Solutions – Correlations between Solubilizate Polarity and Solubilization Site. *Journal of Colloid and Interface Science* **2016**, *477*, 94–102. https://doi.org/10.1016/j.jcis.2016.05.017.

(111) Kft, A. *Polyglycol 26-2N pesticide*. Agromedium. https://agromedium.com/en-hu/pesticide/polyglycol-26-2n-811a00d7/ (accessed 2023-08-02).

(112) POLYGLYCOL 26-2N - MASTER SAFETY DATA SHEET, 1995. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://www.elanco.gr/pdf/agroximika-diafora/Kaytar-SL-deltio-asfaleias.pdf.

(113) Klamczynski, K.; Kuhns, M.; Klimov, E. A Method for Producing an Aqueous Co-Formulation of Metalaxyl. WO2015124661A1, August 27, 2015. https://patents.google.com/patent/WO2015124661A1/en (accessed 2023-08-02).

(114) Yumpu.com. *SURFONIC® EO/PO Block Copolymers*. yumpu.com. https://www.yumpu.com/en/document/read/148318/surfonicr-eo-po-block-copolymers (accessed 2023-08-01).

(115) *Clariant SC series products*. http://www.chessm.com.cn/570/570/164 (accessed 2023-08-02).

(116) Aponte, J.; Baur, P.; Schweinitzer, G.; Milbradt, R.; Arnold, R.; Bodelon, L.; Weick, T. Use of N-Substituted Pyrrolidones to Promote the Penetration of Agrochemical Active Agents. 20200323206, October 15, 2020. https://www.freepatentsonline.com/y2020/0323206.html (accessed 2023-08-02).

(117) Basel, C. L. *Synergen GL 5*. Clariant Ltd. https://www.clariant.com/de/Solutions/Products/2014/01/16/15/31/Synergen-GL-5 (accessed 2023-08-02).

(118) *Synergen GL5- Adjuvant (Offer No. 128154) - B2B Offers at Plastech Vortal*. https://www.plastech.biz/en/b2b-marketplace/Synergen-GL5-Adjuvant-128154 (accessed 2023-08-02).

(119) *Synperonic™ PE/F 127 PHARMA | Croda Pharma*. https://www.crodapharma.com/en-gb/product-finder/product/5773-synperonic_1_pe_2_f127_1_pharma (accessed 2023-08-02).

(120) *Synperonic™ PE/F 127 | Croda Crop Care*. https://www.crodacropcare.com/en-gb/product-finder/product/130-synperonic_1_pe_2_f_1_127 (accessed 2023-08-02).

(121) *Synperonic™ PE/L64 | Croda Pharma*. https://www.crodapharma.com/en-gb/product-finder/product/859-synperonic_1_pe_2_l64 (accessed 2023-08-02).

(122) *Pluracare L 64 G - BASF - Poloxamer 184 - 9003-11-6 - Knowde*. https://www.knowde.com/stores/basf/products/basf-pluracare-l-64-g (accessed 2023-08-02).

(123) *Synperonic® PE P105 surfactant | Sigma-Aldrich*. http://www.sigmaaldrich.com/ (accessed 2023-08-02).

(124) *Synperonic PE/P105 - Croda*. https://adhesives.specialchem.com/product/a-croda-synperonic-pe-p105 (accessed 2023-08-02).

(125) Office, E. P. *European publication server*. https://data.epo.org/publication-server/document?iDocId=6134229&iFormat=0 (accessed 2023-08-02).

(126) *Synperonic T/304 | Croda Industrial Specialties*. https://www.crodaindustrialspecialties.com/en-gb/product-finder/product/674-synperonic_1_t_2_304 (accessed 2023-08-02).

(127) *Synperonic™ T/905 | Croda Crop Care*. https://www.crodacropcare.com/en-gb/product-finder/product/145-synperonic_1_t_2_905 (accessed 2023-08-02).

(128) TDS - TERGITOLTM XD Surfactant Product Information. https://www.dow.com/content/dam/dcc/documents/en-us/productdatasheet/119/119-01893-01-tergitol-xd-surfactant.pdf (accessed 2023-08-01).

(129) *Dow - Safety Data Sheet: Tergitol XH*. https://de.scribd.com/document/470912912/tergitol-xh (accessed 2023-08-01).

(130) Le, T. N.; Pentland, P. E. Suspension Concentrate Composition. AU2018282387A1, July 11, 2019. https://patents.google.com/patent/AU2018282387A1/en (accessed 2023-08-02).

(131) Die, E. liegt noch nicht vor. Flüssige Fungizid-Haltige Formulierungen. EP3178320A1, June 14, 2017. https://patents.google.com/patent/EP3178320A1/de (accessed 2023-08-02).

(132) Genwa, K. R. Improved Energy Efficiency of Photogalvanic Cell with Four Dyes as Photosensitizers in Tween 60- Ascorbic Acid System. *Int. J. Phy. Sc.* **2013**, *8* (29), 1515–1525.

(133) *TWEEN® 60 nonionic detergent | Sigma-Aldrich*. http://www.sigmaaldrich.com/ (accessed 2023-08-02).

(134) *TWEEN® 80 viscous liquid | Sigma-Aldrich*. http://www.sigmaaldrich.com/ (accessed 2023-08-02).

(135) *Tween™ 81 | Croda Crop Care*. https://www.crodacropcare.com/en-gb/product-finder/product/256-tween_1_81 (accessed 2023-08-02).

(136) *Tween™ 81 - Croda*. https://coatings.specialchem.com/product/a-croda-tween-81 (accessed 2023-08-02).

(137) Freeman, C.; Weiner, M.; Kotkoskie, L.; Borzelleca, J.; Butt, M. Subchronica Nd Developmental Toxicity Studies in Rats with Ac-Di-Sol Croscarmellose Sodium. *Int. J. Toxicol.* **2003**, *22*, 149–157.

(138) *AG-RH23 | Agricultural & Environmental Solutions | Azelis*. https://explore.azelis.com/en_GB/it_ag/ag-rh23 (accessed 2023-08-16).

(139) *AgRHO® Pol 23*. Solvay. https://www.solvay.com/en/product/agrho-pol-23 (accessed 2023-08-16).

(140) *Atlox™ AL-2575 LF | Croda Crop Care*. https://www.crodacropcare.com/en-gb/product-finder/product/330-atlox_1_al-2575_1_lf (accessed 2023-08-16).

(141) *AVICEL CL-611*. Pharma Excipients. https://www.pharmaexcipients.com/product/avicel-cl-611/ (accessed 2023-08-16).

(142) *AVICEL PH-103*. Pharma Excipients. https://www.pharmaexcipients.com/product/avicel-ph-103/ (accessed 2023-08-16).

(143) *China Carboxymethyl Cellulose 9004-32-4 Manufacturers, Suppliers, Factory - Keying*. https://www.keyingchemical.com/polymer/carboxymethyl-cellulose.html (accessed 2023-08-16).

(144) *ETHOCEL™ Standard 10 Industrial - Industrial Cellulosics von DuPont*. https://www.industrialcellulosics.com/de-de/products/ethocel/ethocel-standard-10-industrial (accessed 2023-08-16).

(145) *GRINDSTED® Xanthan 80 von DuPont Danisco - Lebensmittel, Getränke und Ernährung*. https://www.ulprospector.com/de/eu/Food/Detail/1534/111350/GRINDSTED-Xanthan-80 (accessed 2023-08-16).

(146) *Kahlgum 6653 TQ40 – Xanthan Gum von KahlWax - Körperpflegemittel & Kosmetik*. https://www.ulprospector.com/de/eu/PersonalCare/Detail/33069/703222/Kahlgum-6653-TQ40-Xanthan-Gum (accessed 2023-08-16).

(147) *Kahlgum 6653 TQ40 - Xanthan Gum - KahlWax*. https://cosmetics.specialchem.com/product/i-kahlwax-kahlgum-6653-tq40-xanthan-gum (accessed 2023-08-16).

(148) *Xanthan Gum - Keltrol® - Kelzan® - Xantural® | Biesterfeld AG*. https://www.biesterfeld.com/de/ch/produkt/xanthan-gum/ (accessed 2023-08-16).

(149) *KELZAN® Xanthan Gum*. CP Kelco. https://www.cpkelco.com/products/xanthan-gum/kelzan-xanthan-gum-i-cp-kelco/ (accessed 2023-08-16).

(150) Klucel Hydroxypropylcellulose - Physical and Chemical Properties, 2017. https://www.ashland.com/file_source/Ashland/Product/Documents/Pharmaceutical/PC_11229_Klucel_HPC.pdf.

(151) AMIGOS. *AMIGOS*. AMIGOS. https://amigoschem.vn/en (accessed 2023-08-16).

(152) *Natrosol 250 HXR - Ashland*. https://adhesives.specialchem.com/product/p-ashland-natrosol-250-hxr (accessed 2023-08-16).

(153) Formulating Elegant Liquid and Semisolid Drug Products, 2018. https://www.ashland.com/file_source/Ashland/links/PHA18-101_Natrosol_250_HEC_Formulating_elegant_liquid_and_semisolid_%20drug_products.pdf.

(154) *Primellose® Croscarmellose sodium from DFE Pharma - Product Description and Details*. https://www.americanpharmaceuticalreview.com/25260-Excipients/10570396-Primellose-Croscarmellose-sodium/ (accessed 2023-08-16).

(155) *Primojel® Sodium starch glycolate from DFE Pharma - Product Description and Details*. https://www.americanpharmaceuticalreview.com/25260-Excipients/10570395-Primojel-Sodium-starch-glycolate/ (accessed 2023-08-16).

(156) *Xanthan gum 91-108%, RHODIGEL® USP, NF*. VWR. https://ie.vwr.com/store/product/2996395/xanthan-gum-91-108-rhodigel-usp-nf (accessed 2023-08-16).

(157) *Solvay RHODOPOL® 23 Surfactant*. https://www.matweb.com/search/datasheettext.aspx?matguid=1195a67ea16741c3a32b527b43a7940b (accessed 2023-08-16).

(158) *RHODOPOL 23*. https://www.chembk.com/en/chem/RHODOPOL%2023 (accessed 2023-08-16).

(159) Kohler, N.; Milas, M.; Rinaudo, M. Elimination of Xanthan Microgels by New Enzymatic Treatments. *Society of Petroleum Engineers Journal* **1983**, *23* (01), 81–91. https://doi.org/10.2118/10712-PA.

(160) *Rhodopol 50 MC | Agricultural & Environmental Solutions | Azelis*. https://explore.azelis.com/en_GB/it_ag/rhodopol-50-mc (accessed 2023-08-16).

(161) *Rhodopol*. https://digitalfire.com/material/rhodopol (accessed 2023-08-16).

(162) Rhône-Poulenc. Use of Xanthan Gum in Water-based Paints. *Pigment & Resin Technology* **1987**, *16* (4), 7–11. https://doi.org/10.1108/eb042346.

(163) *Rhodopol® G | Solvay*. https://www.solvay.com/en/product/rhodopol-g (accessed 2023-08-16).

(164) *Solvay RHODOPOL® G Surfactant*. https://www.matweb.com/search/datasheettext.aspx?matguid=ef0d8a592cc544e2a6b047b07ab93610 (accessed 2023-08-16).

(165) *Xanthan Gum | Cargill*. https://www.cargill.com/bioindustrial/xanthan-gum (accessed 2023-08-16).

(166) *Thixogum*. Nexira. https://www.nexira.com/brand/thixogum-2/ (accessed 2023-08-16).

(167) TDS - Tylose MOBS 4070 P4, 2021. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.essentialingredients.com/spec/Tylose%20MOBS%204070%20P4.pdf.

(168) *VANZAN® NF von Vanderbilt Minerals, LLC - Körperpflegemittel & Kosmetik*. https://www.ulprospector.com/de/eu/PersonalCare/Detail/687/28321/VANZAN-NF (accessed 2023-08-16).

(169) Maier, S.; Langner, M.; FEDIER, S. S. Water-Based 2-Component Composition with Chemical Curing. WO2019101740A1, May 31, 2019. https://patents.google.com/patent/WO2019101740A1/en (accessed 2023-08-17).

(170) Agrimer™ Polyvinylpyyrolidone (PVP), 2019. https://www.ashland.com/file_source/Ashland/Documents/PHA19-020%20Agrimer%20PVP%20Brochure.pdf (accessed 2023-08-18).

(171) *ALBERDINGK AS 6002 - Alberdingk Boley*. https://coatings.specialchem.com/product/r-alberdingk-boley-alberdingk-as-6002 (accessed 2023-08-17).

(172) *Polyvinylalkohol 5-88 CAS 9002-89-5 | 141354*. https://www.merckmillipore.com/CH/de/product/Polyvinyl-alcohol-5-88,MDA_CHEM-141354 (accessed 2023-08-18).

(173) *Solvay: New Dispersant Polymers for the Design of Complex Suspension and Flowable Concentrate Formulations*. Grainews. https://news.agropages.com/News/Detail-38842.htm (accessed 2023-08-17).

(174) Tollington, P. J.; Roschzttardtz, F. I.; Triet, R. B. V.; Appelman, E.; Rieffe, H. L. Structured Agrochemical Oil Based Systems. EP2020848A2, February 11, 2009. https://patents.google.com/patent/EP2020848A2/en (accessed 2023-08-17).

(175) Tang, C. C.; Ward, D. W.; Wheeler, G. R. Seed Coating Composition. US8273684B2, September 25, 2012. https://patents.google.com/patent/US8273684B2/en?q=(Atlox+Metasperse+100L)&oq=Atlox+Metasperse+100L (accessed 2023-08-17).

(176) Herbert, R. M. Novel Polymeric Dispersants for Aqueous Suspension Concentrate Formulations. In *Pesticide Formulations and Delivery Systems: Meeting the Challenges of the Current Crop Protection Industry*; ASTM International; pp 15–23. https://doi.org/10.1520/STP11109S.

(177) Krieken, W. M. V. der; Jans, C. G. J. M. Stable Agricultural Compositions. US20180206486A1, July 26, 2018. https://patents.google.com/patent/US20180206486A1/en?q=(Atlox+Metasperse+550S)&oq=Atlox+Metasperse+550S (accessed 2023-08-17).

(178) *BYK-154*. https://www.byk.com/en/products/additives-by-name/byk-154 (accessed 2023-08-17).

(179) Sasada, M.; Hayata, Y.; HONGO, Y.; Kariya, T. Conductive Film-Forming Composition and Conductive Film Producing Method. US10053587B2, August 21, 2018. https://patents.google.com/patent/US10053587B2/en?q=(BYK-154)&oq=BYK-154 (accessed 2023-08-17).

(180) Magdassi, S.; Kamyshny, A.; Aviezer, S.; Grouchko, M. Method of Forming Aqueous-Based Dispersions of Metal Nanoparticles. US8227022B2, July 24, 2012. https://patents.google.com/patent/US8227022B2/en?q=(BYK-154)&oq=BYK-154 (accessed 2023-08-17).

(181) *Carbopol Aqua 30 polymer - Lubrizol*. https://www.lubrizol.com/Home-Care/Product-Finder/Products-Data/Carbopol-Aqua-30-polymer (accessed 2023-08-17).

(182) *Carbopol® Aqua 30 Polymer von Lubrizol - Wasch-, Pflege- & Reinigungsmittel*. https://www.ulprospector.com/de/eu/Cleaners/Detail/946/35258/Carbopol-Aqua-30-Polymer?st=20 (accessed 2023-08-17).

(183) Yumpu.com. *TDS-739 Carbopol Aqua 30 Polymer -- Technical Data ... - Lubrizol*. yumpu.com. https://www.yumpu.com/en/document/read/4251256/tds-739-carbopol-aqua-30-polymer-technical-data-lubrizol (accessed 2023-08-17).

(184) Miinea, L. A.; Marchant, N. S.; Baxter, J. R.; Rohr, E. L.; Camardo, A. Homogenous Film Compositions. US20190321507A1, October 24, 2019.

https://patents.google.com/patent/US20190321507A1/en?q=(Carbopol+ETD)&oq=Carbopol+ETD (accessed 2023-08-17).

(185) *CARBOMER INTERPOLYMER TYPE C (ALLYL SUCROSE CROSSLINKED)*. https://www.drugfuture.com/gsrs/substance/u990qe4lkp (accessed 2023-08-17).

(186) *Carbopol ETD 2691 polymer - Lubrizol*. https://www.lubrizol.com/Home-Care/Product-Finder/Products-Data/Carbopol-ETD-2691-polymer (accessed 2023-08-17).

(187) Saad, H.; Radi, K.; Douillard, T.; Jauffres, D.; Martin, C. L.; Meille, S.; Deville, S. A Simple Approach to Bulk Bioinspired Tough Ceramics. *Materialia* **2020**, *12*, 100807. https://doi.org/10.1016/j.mtla.2020.100807.

(188) SDS Celvol Polyvinylalkohol, Copolymer, 2009. http://www.slantsy.spb.ru/msds/MSDS%20Sekisui%20(chastichno%20gidrolizovan).pdf (accessed 2023-08-18).

(189) Basel, C. L. *Dispersogen PSL 100*. Clariant Ltd. https://www.clariant.com/de/Solutions/Products/2013/12/09/18/26/Dispersogen-PSL-100 (accessed 2023-08-17).

(190) WEISSE, S. A.; Steinke, T. H.; Vath, B.; Lenz, W. Mit Schichtsilikat Imprägnierter Melamin/Formaldehyd-Schaumstoff. WO2019052825A1, March 21, 2019. https://patents.google.com/patent/WO2019052825A1/de (accessed 2023-08-17).

(191) Schade, M.; Benten, R. von; Scherr, G. Flexible Flat Substrates Having an Abrasive Surface. US20160051112A1, February 25, 2016. https://patents.google.com/patent/US20160051112A1/en?q=(Emuldur+360A)&oq=Emuldur+360A (accessed 2023-08-17).

(192) Pietsch, I.; Roschmann, K.; TONHAUSER, C.; GEORGIEVA, K. One-Component Aqueous Coating Compositions Containing Polyurethane and Phyllosilicates for Oxygen Barrier Coatings. WO2017133935A1, August 10, 2017. https://patents.google.com/patent/WO2017133935A1/en?q=(Emuldur+360A)&oq=Emuldur+360A (accessed 2023-08-17).

(193) BORANE, M. D.; CHAVAN, P. G.; MORE, P. N. A Stabilization System for an Agrochemical Composition. WO2021234531A1, November 25, 2021. https://patents.google.com/patent/WO2021234531A1/en (accessed 2023-08-17).

(194) МУЗЫЛЕВ, К. Н.; АГАПОВА, О. О.; НИКОЛАЕВ, Е. Г.; Шабанова, В. С. Liquid Herbicidal Composition Based on Triflulsulfuron-Methyl. RU2694633C1, July 16, 2019. https://patents.google.com/patent/RU2694633C1/en (accessed 2023-08-17).

(195) *Formulations | Agriculture - Lamberti Group*. lamberti. https://agriculture.lamberti.com/Global-Solution/Formulations.html (accessed 2023-08-17).

(196) *Geropon® DA 1349*. Solvay. https://www.solvay.com/en/product/geropon-da-1349 (accessed 2023-08-17).

(197) Sixl, F. D. Aqueous Suspension Concentrate Containing Thidiazuron and Ethephon. EP0976329A1, February 2, 2000. https://patents.google.com/patent/EP0976329A1/en (accessed 2023-08-17).

(198) *Acrylate copolymer and HSN Code 34021190 Imports in India - Import data with price, buyer, supplier, HSN code*. https://www.volza.com/p/acrylate-copolymer/import/import-in-india/hsn-code-34021190/ (accessed 2023-08-17).

(199) Laforgue, A.; Robitaille, L.; Mokrini, A.; Ajji, A. Fabrication and Characterization of Ionic Conducting Nanofibers. *Macromolecular Materials and Engineering* **2007**, *292* (12), 1229–1236. https://doi.org/10.1002/mame.200700200.

(200) Nilsson, H.; Silvegren, C.; Törnell, B.; Lundqvist, J.; Pettersson, S. Suspension Stabilizers for PVC Production III: Control of Resin Porosity. *Journal of Vinyl Technology* **1985**, *7* (3), 123–127. https://doi.org/10.1002/vnl.730070308.

(201) Greenland, D. J. Adsorption of Polyvinyl Alcohols by Montmorillonite. *Journal of Colloid Science* **1963**, *18* (7), 647–664. https://doi.org/10.1016/0095-8522(63)90058-8.

(202) Hauptmann, P.; Säuberlich, R.; Schlothauer, K. Influence of the Molecular Structure of Poly(Vinyl Alcohol) on the Ultrasonic Absorption. *Polymer* **1984**, *25* (7), 985–988. https://doi.org/10.1016/0032-3861(84)90084-3.

(203) Patachia, S.; Moise, G.; Ozkul, M. H.; Ekincioglu, O. INFLUENCE OF THE SELF CROSSLINKABLE POLYMERS ON THE PROPERTIES OF THE MACRO DEFECT FREE (MDF) CEMENTS, 2009. http://webbut2.unitbv.ro/BU2009/BULETIN2009/Series%20I/BULETIN%20I%20PDF/Materials%20Science%20and%20Engineering/Patachia%20S_09.pdf.

(204) Finch, C. A. Some Properties of Polyvinyl Alcohol and Their Possible Applications. In *Chemistry and Technology of Water-Soluble Polymers*; Finch, C. A., Ed.; Springer US: Boston, MA, 1983; pp 287–306. https://doi.org/10.1007/978-1-4757-9661-2_17.

(205) *GOHSENOL™ KL-03 (NIPPON GOHSEI)*. http://www.cmib.org:8080/cmib/info.jsp?lang=ko&did=63220 (accessed 2023-08-17).

(206) *K Type GOHSENOL*. Soarus LLC. https://soarus.com/product/gohsenx/k-type-gohsenol/ (accessed 2023-08-17).

(207) Duis, K.; Junker, T.; Coors, A. Environmental Fate and Effects of Water-Soluble Synthetic Organic Polymers Used in Cosmetic Products. *Environ Sci Eur* **2021**, *33* (1), 21. https://doi.org/10.1186/s12302-021-00466-2.

(208) 갤럽코트니; 후앙이-시오우; 비로아코스; 야오쳉린; 마이어케빈 지; 춘하루이스 클라우디오 비에이라 다; 페어펙스마크; 허즈번드브라이언; 리치버그존; 마틴마르샤. Use of pyrrolidine picolinamide compounds as fungicides for controlling plant pathogenic fungi in row crops. KR102555133B1, July 14, 2023. https://patents.google.com/patent/KR102555133B1/en?q=(Agnique)&oq=Agnique (accessed 2023-08-18).

(209) *GOHSENOL™*. https://www.mcpp-global.com/de/europa/produkte/brand/gohsenoltm/ (accessed 2023-08-17).

(210) Jones, S. A.; Brown, M.; Martin, G. P. Determination of Polyvinyl Alcohol Using Gel Filtration Liquid Chromatography. *Chromatographia* **2004**, *59* (1), 43–46. https://doi.org/10.1365/s10337-003-0142-3.

(211) Bertling, J.; Zimmermann, T.; Rödig, L. Kunststoffe in Der Umwelt: Emissionen in Landwirtschaftlich Genutzte Böden. **2021**. https://doi.org/10.24406/UMSICHT-N-633611.

(212) Brisander, M.; Demirbuker, M.; Derand, H.; Jesson, G.; Malmsten, M. A Pharmaceutical Composition Comprising Stable, Amorphous Hybrid Nanoparticles of at Least One Protein Kinase Inhibitor and at Least One Polymeric Stabilizing and Matrix-Forming Component. AU2019275513B2, March 10, 2022. https://patents.google.com/patent/AU2019275513B2/en?q=(Kollidon)&oq=Kollidon (accessed 2023-08-18).

(213) Technical Information - Kollidon VA 64, 2000. https://www.stobec.com/DATA/PRODUIT/2289~v~fiche-technique.pdf (accessed 2023-08-18).

(214) Technical Information - Kollidon VA 64, 2008. http://transchemcorp.com/wp-content/uploads/2017/09/Technical-Information_Kollidon-VA-64.pdf (accessed 2023-08-18).

(215) Ferrari, F.; Striani, R.; Esposito Corcione, C.; Greco, A. Valorization of Food Industries Wastes for the Production of Poly(Vinyl) Alcohol (PVA) Biodegradable Composites. *Frontiers in Materials* **2019**, *6*.

(216) *Polyvinyl alcohol | Kuraray Europe*. https://www.kuraray.eu/product-groups/polyvinyl-alcohol (accessed 2023-08-18).

(217) *LAICRIL P-1530 - Laiex*. https://coatings.specialchem.com/product/r-laiex-laicril-p-1530 (accessed 2023-08-17).

(218) *Sodium salt of poly(naphthaleneformaldehyde) sulfonate 3H-CXSO054 | CymitQuimica*. https://cymitquimica.com/de/produkte/3H-CXSO054/9084-06-4/sodium-polynaphthaleneformaldehyde-sulfonate/ (accessed 2023-08-17).

(219) *Lomar LS Liquid | GEO Specialty Chemicals*. http://www.geosc.com/products/lomar-ls-liquid (accessed 2023-08-17).

(220) *Luviskol® K 90 Powder by BASF Personal Care - Ross Organic an Azelis company*. https://rossorg.com/product/luviskol-k-90-powder/ (accessed 2023-08-18).

(221) *Genetico-biochemical Analysis on the Enzyme-activities in the House Fly by Agar Gel Electrophoresis*. https://www.jstage.jst.go.jp/article/ggs1921/37/6/37_6_518/_article/-char/ja/ (accessed 2023-08-18).

(222) Grundt, W.; Sass, V.; HEUER, B. Volumengebender Haarfestiger. DE102008040102A1, January 7, 2010. https://patents.google.com/patent/DE102008040102A1/en?q=(Luviskol+VA)&oq=Luviskol+VA (accessed 2023-08-18).

(223) クラウゼ，ベルント; ボスケッティーデーフィエーロ，アドリアーナ; フォークト，マヌエル； ゲッケラー，ヨハンネス； シュバイガー，フェルディナント. Filter membrane and devices. JP7080816B2, June 6, 2022.

https://patents.google.com/patent/JP7080816B2/en?q=(Luvitec)&oq=Luvitec (accessed 2023-08-18).

(224) Technical Information - Luvitec VA Products, 2017. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjf5qiC-9H_AhV9zAIHHUOyA4IQFnoECAYQAQ&url=https%3A%2F%2Fdispersions-resins.basf.com%2Fadhesives%2FLuvitec_VA_TI_e.pdf&usg=AOvVaw3HJqovQgaNIifNtWmerEXF&opi=89978449 (accessed 2023-08-18).

(225) *Luvitec® VA 64 (PVP) by BASF: Technical Datasheet*. https://adhesives.specialchem.com/product/p-basf-luvitec-va-64 (accessed 2023-08-18).

(226) *Maxi Bond SS | PDF | Chemical Substances | Chemistry*. https://de.scribd.com/document/354047007/Maxi-Bond-SS (accessed 2023-08-17).

(227) *MonoSol® für MonoSol, LLC | UL Prospector*. https://www.ulprospector.com/plastics/de/datasheet/31238/monosol-m8534 (accessed 2023-08-17).

(228) *PVOH/M8534/MonoSol, LLC*. https://www.51pla.com/spec/qgm38v7q4k.html (accessed 2023-08-17).

(229) *Mowilith® DC (Acrylic Copolymers) by Celanese: Technical Datasheet*. https://adhesives.specialchem.com/product/p-celanese-mowilith-dc (accessed 2023-08-17).

(230) Jelinska, N.; Kalnins, M.; Kovalovs, A.; Chate, A. Design of the Elastic Modulus of Nanoparticles-Containing PVA/PVAc Films by the Response Surface Method. *Mech Compos Mater* **2015**, *51* (5), 669–676. https://doi.org/10.1007/s11029-015-9537-0.

(231) Reuber, L. Klebstoffe für die Rissverklebung an Leinengeweben, Hochschulbibliothek der Technischen Hochschule Köln, 2010. https://epb.bibl.th-koeln.de/frontdoor/index/index/docId/209 (accessed 2023-08-17).

(232) Doménech-Carbó, M. T.; Bitossi, G.; de la Cruz-Cañizares, J.; Bolívar-Galiano, F.; López-Miras, M. del M.; Romero-Noguera, J.; Martín-Sánchez, I. Microbial Deterioration of Mowilith DMC 2, Mowilith DM5 and Conrayt Poly(Vinyl Acetate) Emulsions Used as Binding Media of Paintings by Pyrolysis-Silylation-Gas Chromatography–Mass Spectrometry. *Journal of Analytical and Applied Pyrolysis* **2009**, *85* (1), 480–486. https://doi.org/10.1016/j.jaap.2008.10.010.

(233) Elhami, V.; Antunes, E. C.; Temmink, H.; Schuur, B. Recovery Techniques Enabling Circular Chemistry from Wastewater. *Molecules* **2022**, *27* (4), 1389. https://doi.org/10.3390/molecules27041389.

(234) http://www.cs2.ch, C. A.-S.-. *Dolder - EMULSIONS*. https://www.dolder.com/de/specialty-chemicals/produkte/celanese-mowilithr/?trk=organization-update_share-update_update-text&chash=718f071ded55365300a9dfc51ee69a73&chash=f1de56907e586ed0205b09e08103843b (accessed 2023-08-17).

(235) Pintus, V.; Viana, C.; Angelin, E. M.; De Sá, S. F.; Wienland, K.; Sterflinger, K.; Ferreira, J. L. Applicability of Single-Shot and Double-Shot Py-GC/MS for the Detection of Components in Vinyl Acetate-Based Emulsions Used in Modern-Contemporary Art. *Journal of Analytical and Applied Pyrolysis* **2022**, *168*, 105782. https://doi.org/10.1016/j.jaap.2022.105782.

(236) Meder, M. Biologische Besiedlung von Fassadenbeschichtungen in Abhängigkeit von Dispersion Und PigmentVolumen-Konzentration, 2008. https://d-nb.info/99134359X/34.

(237) Sviridov, A. V.; Fedotov, A. A. Untersuchung Des Einflusses Von Modifikationen Auf Die Eigenschaften Von Phenoloformaldehyd-Binder Und Fsf-Sperrholz.

(238) Платонов, А. П.; Трутнев, А. А.; Ковчур, А. С.; Ковчур, С. Г. *Дорожные строительные и лакокрасочные материалы*; Витебский государственный технологический университет, 2012.

(239) *Mowiplus® XW 330 - Clariant- Technical Datasheet*. https://coatings.specialchem.com/product/a-clariant-mowiplus-xw-330 (accessed 2023-08-17).

(240) Kurańska, M.; Polaczek, K.; Auguścik-Królikowska, M.; Prociak, A.; Ryszkowska, J. Open-Cell Rigid Polyurethane Bio-Foams Based on Modified Used Cooking Oil. *Polymer* **2020**, *190*, 122164. https://doi.org/10.1016/j.polymer.2020.122164.

(241) Bánhegyi, A.; Vilaboy, J. T.; Marossy, K. N-Alkyl Pyrrolidones for Plasticizing Polyurethane Elastomers. *Materials Science Forum* **2015**, *812*, 9–13. https://doi.org/10.4028/www.scientific.net/MSF.812.9.

(242) Patel, V. I.; Dave, R. H. Evaluation of Colloidal Solid Dispersions: Physiochemical Considerations and In Vitro Release Profile. *AAPS PharmSciTech* **2013**, *14* (2), 620–628. https://doi.org/10.1208/s12249-013-9947-z.

(243) *Plasdone™ K-29/32 pharmaceutical grade PVP Polymer von Ashland - Körperpflegemittel & Kosmetik*. https://www.ulprospector.com/de/eu/PersonalCare/Detail/4989/95514/Plasdone-K-29-32-pharmaceutical-grade-PVP-Polymer (accessed 2023-08-18).

(244) *Povidone*. https://www.drugfuture.com/chemdata/Povidone.html (accessed 2023-08-18).

(245) *Definition of Polyplasdone XL*. https://www.xmri.com/resource-center/conditions.html?term=91272 (accessed 2023-08-18).

(246) *Buy Primal ECO™-934TK - soft acrylic binder for nonwovens with resiliency 50-00-0, 2682-20-4 by Acril - Nova srl online on CheMondis!* https://chemondis.com/marketplace/p/primal-ecotm-934tk-soft-acrylic-binder-for-nonwovens-with-resiliency/cc7fbe5b-1ad5-404e-906f-c3ad5c082973/ (accessed 2023-08-17).

(247) Tensiofix-FS-Formulation-V2022-11-01-Screen, 2022. https://www.tensiofix.com/wp-content/uploads/2023/03/Tensiofix-FS-Formulation-V2022-11-01-Screen.pdf.

(248) *PVP | Polyvinylpyrrolidon K30*. https://phygenera.de/PVP-Polyvinylpyrrolidon-K30 (accessed 2023-08-18).

(249) *Polyvinylpyrrolidon K 30, 100 g, CAS No. 9003-39-8 | von A bis Z | Chemikalien | Carl Roth - Deutschland*. https://www.carlroth.com/de/de/von-a-bis-z/polyvinylpyrrolidon-k-30/p/4607.1 (accessed 2023-08-18).

(250) *Rheovis® AS 1125 (Viscosity Modifier) by BASF - Technical Datasheet*. https://adhesives.specialchem.com/product/a-basf-rheovis-as-1125 (accessed 2023-08-17).

(251) Formulation Additives for Construction, 2019. https://www.basf.com/global/documents/en/products-and-industries/architectural-coatings/20190222_Construction_Formulation_Additives.pdf.

(252) Neplenbroek, A. M.; Suk, B.; Angevaare, P. A.; Portier, P. M.; Idelon, B. Warewashing Method Using a Cleaning Composition Containing Low Levels of Surfactant. US8876982B2, November 4, 2014.

https://patents.google.com/patent/US8876982B2/en?q=(Sokalan)&oq=Sokalan (accessed 2023-08-17).

(253) Lang, F.-P. Dye Transfer Inhibiting Polymers with Improved Storage Stability and Processability for Laundry Detergents and Cleaners. US20120225025A1, September 6, 2012. https://patents.google.com/patent/US20120225025A1/en?q=(Sokalan+HP)&oq=Sokalan+HP (accessed 2023-08-18).

(254) Technical Information - Sokalan HP 50, 2016. https://assets.website-files.com/5fc9222730707183b6adc32a/60ae1ac3d65540301d30cf3f_Sokalan-HP-50-30042848.pdf.

(255) *Sokalan® K 30 P*. https://www.if.basf.us/formulation-technologies-products/30581847# (accessed 2023-08-18).

(256) Additives for Specialty Chemistry Formulations per Function, 2014. https://pdf4pro.com/cdn/additives-for-specialty-chemistry-formulations-per-function-492eb9.pdf.

(257) *POLYVINYL ALCOHOL | CAMEO Chemicals | NOAA*. https://cameochemicals.noaa.gov/chemical/7523 (accessed 2023-08-17).

(258) *Vinamul® | Emulsion Polymers | Celanese*. https://www.celanese.com/products/vinamul (accessed 2023-08-17).

(259) Anguste, M.; Aiyub, S.; Baum, S.; Burei, P.; Mu'erqu'en, P.; Stoke, D.; Williams, J. Crop Safeners. CN102131391A, July 20, 2011. https://patents.google.com/patent/CN102131391A/en (accessed 2023-08-17).

(260) Schlatter, C.; Ramachandran, R. Aqueous Compositions for Seed Treatment. US6884754B1, April 26, 2005. https://patents.google.com/patent/US6884754B1/en (accessed 2023-08-17).