

Sensitizing Agents Inducers of Occupational Asthma, Hypersensitivity Pneumonitis and Eosinophilic Bronchitis

June, 2010

Joaquín Sastre. MD, PhD.

Fundación Jiménez Díaz

Servicio de Alergia

Universidad Autonoma de Madrid

jsastre@fjd.es

Santiago Quirce. MD, PhD

Hospital Universitario La Paz

Servicio de Alergia

Universidad Autonoma de Madrid

squirce@gmail.com

Agents	Abrev./ Scientific name	Occupation/ Process	References
Isocyanates			
1,3 bis isocyanatomethyl ciclohexane			Simpson C, et al. Hypersensitivity pneumonitis-like reaction and occupational asthma associated with 1,3- bis(isocyanatomethyl) cyclohexane pre-polymer. Am J Ind Med 1996: 30:48-

			55.
Diphenylmethane diisocyanate	MDI	Foundry, Plastics	Zammit-Tabona M, et al... Asthma caused by diphenylmethane diisocyanate in foundry workers. Clinical. bronchial provocation, and immunologic studies. Am Rev Respir Dis 1983;128:226-230.
HDI prepolymer	PHDI	Spray painting	Vandenplas O, et al.. Prepolymers of hexamethylene, diisocyanate as a cause of occupational asthma. J Allergy Clin Immunol 1993; 91:850-861.
Hexamethylene diisocyanate	HDI	Spray painting	Welinder H, et al. IgG antibodies against polyisocyanates in car painters. Clin Allergy 1988;18:85-93.
Isophorone diisocyanate	IPDI	Spray painter	Clarke CW, et al. Isophorone diisocyanate induced respiratory disease (IPDI). Aust N Z J Med 1981;11:290-292.
MDI prepolymer	PMDI	Mold makers	Vandenplas O, et al. . Hypersensitivity pneumonitis-like reaction among workers exposed to diphenylmethane diisocyanate (MDI). Am Rev Respir Dis 1993;147:338-346.
Methylisocyanate	MIC	Rubber Manufacturing	Avashia B, et al.. Effects of prolonged low exposure to methyl isocyanate. J Occup Environ Med 1996;38:625-630.
Naphthalene diisocyanate	NDI	Rubber Manufacturing	Harries MG, et al. Isocyanate asthma: respiratory symptoms due to 1.5-naphthylene di-

			<p>isocyanate. Thorax 1979; 34:762-766.</p> <p>Fuortes U, et al. An outbreak of naphthalene diisocyanate-induced asthma in a plastics factory. Arch Environ Health 1995;50:337-340.</p>
TDI prepolymer		Varnishers	<p>Vandenplas O, et al. Occupational asthma caused by a prepolymer but not the monomer of toluene diisocyanate (TDI). J Allergy Clin Immunol 1992; 89:1183-1188.</p>
TDI+HDI+MDI		Various industries	<p>Baur X.. Asthma caused by isocyanates. Allergologie 1986;9:487 –496.</p> <p>Baur X.. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) induced by isocyanates. J Allergy Clin Immunol 1995 ;95:1004-1010.</p>
Toluene diisocyanate	TDI	Polyurethane, Varnish, Plastics	<p>Sastre J, et al. Need of monitoring non-specific bronchial hyperresponsiveness before and after Isocyanate inhalation challenge. Chest 2003; 123:1276-1279.</p> <p>Mapp CE. et al. Persistent asthma due to isocyanates. A follow-up study of subjects with occupational asthma due to toluene diisocyanate(TDI). Am Rev Respir Dis 1988; 137:1326-1329.</p> <p>Moscato G. et al. Toluene</p>

			<p>diisocyanate-induced asthma: clinical findings and bronchial responsiveness studies in 113 exposed subjects with work-related respiratory symptoms. J Occup Med 1991;33:720-725.</p> <p>Baur X. Fruhmann G.. Specific IgE antibodies in patients with isocyanate asthma. Chest 1981;80:73-76.</p>
Anhydrides			Drexler H, et al. Int Arch Occup Environ Health 1194; 65:279-283.
Hexahydrophthalic anhydride	HHPA	Chemical industry	Moller DR, et al. Detection or IgE-mediated respiratory sensitization in workers exposed to hexahydrophthalic anhydride. J Allergy Clin Immunol 1985; 75:663-672.
Himic anhydride		Flame retardant	Rosenman KD, et al. Occupational asthma caused by himic anhydride. Scand J Work Environ Health 1987;13:150-154.
Maleic anhydride	MA	Polyester resin production	Lee HS, et al. Occupational asthma due to maleic anhydride. Br J Ind Med 1991;48: 283-285.
Methyl tetrahydrophthalic anhydride		Curing agent	<p>Welinder H, et al. Specific antibodies to methyltetrahydrophthalic anhydride in exposed workers. Clin Exp Allergy 1990;20:639-645.</p> <p>Drexler H, et al. Detection and clinical relevance of a type 1 allergy with occupational exposure to</p>

			hexahydrophthalic anhydride and methyltetrahydrophthalic anhydride. Int Arch Occup Environ Health 1994; 65:279-28315:154-155.
Methylhexahydrophthalic	MHHPA	Chemical industry	Tarvainen K, et al. Immunologic contact urticaria due to airborne methylhexahydrophthalic and methyltetrahydrophthalic anhydrides. Contact Dermatitis 1995; 32:204-209.
Phthalic anhydride	PA	Plastics, Production of resins	Wernfors M, et al. Phthalic anhydride-induced occupational asthma. Int Arch Allergy Appl Immunol 1986; 79:77-82. Nielsen J, et al.. Serum IgE and lung function in workers exposed to phthalic anhydride. Int Arch Occup Environ Health 1991;63:199-204.
Phthalic anhydride+ Maleic anhydride+ Trimellitic anhydride			Barker RD, et al. Risk factors for sensitisation and respiratory symptoms among workers exposed to acid anhydrides: a cohort study. Occup Environ Med 1998;55:684-691.
Pyromellitic dianhydride	PMDA	Epoxy adhesives	Meadway L.. Asthma and atopy in workers with an epoxy B adhesive. Br J Dis Chest 1980;74:149-154.
Pyromellitic dianhydride+ Phthalic anhydride+ Maleic anhydride			Baur X. et al.. A clinical and immunological study on 92 workers occupationally exposed to anhydrides. Int Arch Occup Environ Health 1995 ;67:395-403.

Tetrachlorophthalic anhydride	TPCA	Plastics, Epoxy resins	<p>Barker RD, et al. Occupational asthma caused by tetrachlorophthalic anhydride: a 12-year follow-up. <i>J Allergy Clin Immunol</i> 1998; 101:717-719.</p> <p>Liss GM, et al. Assessment of risk factors for IgE-mediated sensitization to tetrachlorophthalic anhydride. <i>J Allergy Clin Immunol</i> 1993;92:237-247.</p>
Triglycidyl isocyanurate		Painter (powder)	<p>Quirce S, et al. Hypersensitivity pneumonitis caused by triglycidyl isocyanurate. <i>Allergy</i> 2004; 59:1128.</p> <p>Piirilä P, et al. Occupational asthma caused by triglycidyl isocyanurate (TGIC). <i>Clin Exp Allergy</i> 1997; 27:510-4.</p>
Trimellitic anhydride	TMA	Plastics, Epoxy resins	<p>Zeiss RC, et al. A clinical and immunologic study of employees in a facility manufacturing trimellitic anhydride. <i>Allergy Proc.</i> 1992;13:193-198.</p>
Amines			
2-dimethylethanolamine		Spray painter	<p>Vallieres M, et al. Dimethylethanolamine-induced asthma. <i>Am Rev Respir Dis</i> 1977;115:867-871.</p>
2-ethanolamine		Spray painter Cutting oil	<p>Savonius B, et al. Occupational respiratory disease caused by ethanolamines <i>Clin Exp Allergy</i> 1994;49:877-881.</p>

			<p>Piipari R, et al. Diethanolamine-induced occupational, a case report. Clin Exp Allergy 1998;28: 358-362.</p>
3-dimethyl propanolamine		Ski manufacturing	<p>Brubaker RE, et al. Evaluation and control of a respiratory exposure to 3-(dimethylamine) propylamine. J Occup Med 1979; 21:688-690.</p> <p>Sargent EV, et al. Respiratory effects of occupational exposure to an epoxy resin system. Arch Environ Health 1976; 31:236-240.</p>
4-Methylmorpholine	NNM	Fur dyeing	<p>Belin L, et al. Amines: possible causative agents in the development of bronchial hyperreactivity in workers manufacturing polyurethanes from isocyanates. Br J Ind Med 1983 ; 40:251-25.</p>
Aliphatic amines		Chemical industry	<p>Ng TP, et al. Asthma in chemical workers exposed to aliphatic polyamines. Occup Med (Lond) 1995; 45:45-48.</p>
Aminoethanolamine		Welding, Cable joining	<p>Pepys J, Pickering CA. Asthma due to inhaled chemical fumes: Aminoethyl ethanolamine in aluminium soldering flux. Clin Allergy 1972;2:197-204.</p>
Ethylenediamine		Photography Lacquering	<p>Nakazawa T, Matsui S. Ethylenediamine-induced late asthmatic responses. J Asthma 1990; 27:207-212.</p>
Hexamethylenetetramine	HTMA	Lacquering	<p>Gamble JF, et al. Respiratory function and symptoms: an environmental-</p>

			epidemiological study of rubber workers exposed to a phenolformaldehyde type resin. Am Ind Hyg Assoc 1976;137:499-513.
Piperazine		Chemist	<p>Hagmar L, Welinder H. Prevalence of specific IgE antibodies against piperazine in employees of a chemical plant. Int Arch Allergy Appl Immunol 1986; 81:12-16.</p> <p>Welinder H, Hagmar L, et al. IgE antibodies against piperazine and N-methyl-piperazine in asthmatic subjects. Int Arch Allergy Appl Immunol 1986;79:259-262.</p> <p>Quirce S, et al. Occupational asthma due to piperazine citrate. J Investig Allergol Clin Immunol 2006;16:138-9.</p>
Quaternary amine	Benzalkonium	Cleaning products	Berstein JA, et al.. A combined respiratory and cutaneous hypersensitivity syndrome induced by work exposure to quaternary amines. J Allergy Clin Immunol 1994;94:257-259.
Triethylene tetramine	C6H18N4	Laquering	<p>Fawcett IW, et al. Asthma due to inhaled chemical agents—epoxy resin systems containing phthalic acid anhydride, trimellitic acid anhydride and triethylene tetramine. Clin Allergy 1977; 7:1-14</p> <p>Savonius B, et al. Occupational respiratory disease caused by acrylates.</p>

			Clin Exp Allergy 1993;23:416-424.
Turpentine		Art Painter	Dudek W, et al. Occupational asthma due to turpentine in art painter--case report. Int J Occup Med Environ Health. 2009;22:293-5
Metals			
Aluminum		Potroom	Sorgdrager B, et al. Factors affecting FEV1 in workers with potroom asthma after their removal from exposure. Int Arch Occup Environ Health. 2001;74:55-8.
Ammonium hexachloroplatinate	Cl ₆ H ₈ N ₂ Pt	Platinum refinery	Murdoch RD, et al. IgE antibody responses to platinum group metals: a large scale refinery survey. Br J Ind Med 1986; 43:37-43.
Chloroplatinum		Platinum refinery	Baker DB, et al. Cross-sectional study of platinum salts sensitization among precious metals refinery workers. Am J Ind Med 1990;18:653-664.
Chromium salts (VI)	Cr	Paints, Metal plating	Park HS. et al. Occupational asthma caused by chromium. Clin Exp Allergy 1994;24:676-681 Novey HS, Habib M, Wells ID. 1983. Asthma and IgE antibodies induced by chromium and nickel salts. J Allergy Clin Immunol 72:407-412.
Chromium sulphate	Cr ₂ (SO ₄) ₃	Paints, Metal plating	Sastre J, et al. Allergenic cross-reactivity in occupational asthma caused by chrome and nickel. J Allergy Clin Immunol 2001:

			108: 650-651.
Cobalt Stellite (cobalt-based alloy)	Co		<p>Shirakawa T, Morimoto K. Interplay of cigarette smoking and occupational exposure on specific immunoglobulin E antibodies to cobalt. Arch Environ Health 1997; 52:124-128</p> <p>Pisati G. Zedda S. Outcome of occupational asthma due to cobalt hypersensitivity. Sci Total Environ 1994 ; 150:167-171</p> <p>Hannu T, et al. Occupational asthma due to welding fumes from stellite. J Occup Environ Med 2007; 49:473-4.</p>
Cobalt sulphate	SO ₄ Co	Polishers	<p>Gheysens B, et al. Cobalt-induced bronchial asthma in diamond polishers. Chest 1985; 88: 740-744.</p> <p>Shirakawa T, et al. Hard metal asthma: cross immunological and respiratory reactivity between cobalt and nickel? Thorax 1990; 45:267-271.</p>
Hexachloroplatinate	Cl ₆ H ₂ Pt	Platinum refinery	Merget R, et al. Asthma due to the complex salts of platinum-a cross-sectional survey of workers in a platinum refinery. Clin Allergy 1988;18:569-580.
Iridium chloride	Cl ₃ Ir		Bergman A, et al. Contact urticaria with anaphylactic reactions caused by occupational exposure to iridium salt. Contact Dermatitis 1995; 32: 14-17.

Iron		Welding	Muñoz X, et al. Occupational Asthma Caused by Metal Arc Welding of Iron. <i>Respiration</i> 2009;78:455-459.
Nickel sulphate	SO ₄ Ni	Metal plating	Sastre J, et al. Allergenic cross-reactivity in occupational asthma caused by chrome and nickel. <i>J Allergy Clin Immunol</i> 2001; 108: 650-651. Malo JL, et al.. Occupational asthma caused by nickel sulfate. <i>J Allergy Clin Immunol</i> 1982;69:55-59. Estlander T, et al. Immediate and delayed allergy to nickel with contact urticaria, rhinitis, asthma and contact dermatitis. <i>Clin Exp Allergy</i> 1993;23:306-310.
Potassium dichromate	Cr ₂ O ₇ K ₂	Tanning, Plating, Various occupations	Keskinen H. et al. Occupational asthma due to stainless steel welding fumes. <i>Clin Allergy</i> 1980;10:151-159 Bright P, et al. Occupational asthma due to chrome and nickel electroplating. <i>Thorax</i> 1997;52:28-32.
Potassium hexachloroplatinate	Cl ₆ Pt K ₂	Platinum refinery	Bolm-Audorff U. et al. Prevalence of respiratory allergy in a platinum refinery. <i>Int Arch Occup Environ Health</i> 1992;64: 257-260.
Rhodium salts		electroplating	Merget R, et al. Occupational immediate-type asthma and rhinitis due to rhodium salts. <i>Am J Ind Med</i> 2010;53:42-6.

Tungsten	C W2	Grinder	Bruckner HC. Extrinsic asthma in a tungsten carbide worlcer. J Occup Med 1967; 9:518-519.
Zinc (fumes)	Zn	Welders	Malo JL, et al. Occupational asthma due to zinc. Eur Respir 1993;16:447-450.
Zinc chloride and ammonium		Welders	Weir DC, et al. Occupational asthma due to soft corrosive soldering fluxes containing zinc chloride and ammonium chloride. Thorax 1989; 44:220-223.
Drugs			
Aescin		Pharmaceutical	Munoz X, et al. Occupational asthma related to aescin inhalation. Ann Allergy Asthma Immunol 2006.; 96:494-6.
Alendronate		Pharmaceutical	Pala G, et al. Occupational rhinitis to sodium alendronate. Allergy. 2008;63:1092-3.
5.aminosalicylic acid		Pharmaceutical	Sastre et al. Occup Env Med. 2010-in press-
Aminophylline		Pharmaceutical	Rosenberg M, et al. Asthmatic responses to inhaled aminophylline: a report of two cases. Ann Allergy 1984;52: 97-98.
Ampicillin		Pharmaceutical	Davies RJ, et al. Asthma due to inhaled chemical agents: arnpicillin, benzyl penicillin, 6 amino penicillanic acid and related substances. Clin Allergy 1974;4:227-247.
Amprolium		Pharmaceutical	Greene SA, Freedman S. Asthma due to inhaled

			chemical agents: Amprolium hydrochloride. Clin Allergy 1976; 6:105-108.
Cefadroxil		Pharmaceutical	Sastre J, et al.. Occupational asthma induced by cephalosporins.. Eur Respir J; 1993;13:1189-1191.
Cephalosporine C		Pharmaceutical	Stenton SC, et al. Occupational asthma due to ceftazidime. Eur Respir J 1995; 8:1421-1423. Coutts IL, et al. Asthma in workers manufacturing cephalosporins. Br Med (Clin Res Ed) 1981;283:950. Pala G, et al. Occupational asthma and rhinitis induced by a cephalosporin intermediate product: description of a case. Allergy. 2009;64:1390-1.
Chlorhexidine		Healthcare	Waclawski ER, et al. Occupational asthma in nurses caused by chlorhexidine and alcohol aerosols. BMJ 1989;298:929-930.
Chloroquine hydroxychloroquine		Pharmaceutical	Meier H, et al. Occupationally-induced contact dermatitis and bronchial asthma in a unusual delayed reaction to hydroxychloroquine. Hautarzt 1999; 50:665-669.
Cimetidine		Pharmaceutical	Coutts IL, et al. Respirator y symptoms related to work in a factory manufacturing cimetidine tablets. Br Med (Clin Res Ed) 1984; 288:1418.
Ciprofloxacin		Pharmaceutical	Brodine HC. et al.

			Occupational asthma in a ciprofloxacin production. <i>Arbeitsmed Sozialmed Umweltmed</i> 1996; 31: 156-158.
Colistin		Pharmaceutical	Gómez-Ollés S, et al. Occupational asthma due to colistin in a pharmaceutical worker. <i>Chest</i> 2010;137:1200-2
Enflourane		Healthcare	Schwettmann RS, Casterline CL. Delayed asthmatic response following occupational exposure to enflourane. <i>Anesthesiology</i> 1976; 44:166-169.
Hydralazine		Pharmaceutical	Perrin B; et al. Occupational asthma in a pharmaceutical worker exposed to hydralazine. <i>Thorax</i> 1990;45:980-981.
Ipecacuanha		Pharmaceutical	Luczynska CM, et al. Occupational allergy due to inhalation of ipecacuanha dust. <i>Clin Allergy</i> 1984; 14:169-175.
Isonicotinic acid		Pharmaceutical	Asai S, et al. Occupational asthma caused by isonicotinic acid hydrazide (INH) inhalation. <i>J Allergy Clin Immunol</i> 1987; 80:578-582. Shimoda T. Detection of IgE antibodies specific to isonicotinic acid hydrazide and its metabolite by enzyme-linked immunosorbent assay and the mechanism of sensitization by inhalation or ingestion of this compound.

			Jpn J Allergol 1990; 39:567-576.
Methotrexate		Healthcare	Jones G, et al. Methotrexate-induced asthma. Am Rev Respir Dis 1991; 143:179-181.
Methyldopa		Pharmaceutical	Harries MG, et al. Bronchial asthma due to alpha-methyldopa. Br Med J 1979;1:1461.
Mitoxantrone		Healthcare	Walusiak J, et al. Occupational asthma due to mitoxantrone. Allergy. 2002;57:461.
Opiate compounds		Pharmaceutical	Biagini RE, et al. Evaluation of cutaneous responses and lung function from exposure to opiate compounds among ethical narcotics-manufacturing workers. J Allergy Clin Immunol 1992; 89: 108-118.
Penicillamine		Pharmaceutical	Lagier F, et al. Occupational asthma in a pharmaceutical worker exposed to penicillamine. Thorax 1989;44: 157-158.
Penicillins		Pharmaceutical	Davies RJ, et al. Asthma due to inhaled chemical agents: ampicillin, benzyl penicillin, 6 amino penicillanic acid and related substances. Clin Allergy 1974; 4:227-247. Shmunes E. et al. Immunologic reactions in penicillin factory workers. Ann Allergy 1976, 36:313-323. Stejskal VD, et al. Side-chain-specific lymphocyte responses in workers with

			occupational allergy induced by penicillins. Int Arch Allergy Appl Immunol 1987; 82:461-464.
Phenylglycine		Pharmaceutical	Kammermeyer JK, Mathews KP. Hypersensitivity to phenylglycine acid chloride. J Allergy Clin Immunol 1973;52:73-84.
Piperacillin		Pharmaceutical	Moscato G, et al. Occupational asthma, rhinitis and urticaria due to piperacillin sodium in a pharmaceutical worker. Eur Respir J 1995; 8: 467-469.
Psyllium		Pharmaceutical Healthcare	Vaswani SK, et al. Psyllium laxative-induced anaphylaxis, asthma, and rhinitis. Allergy 1996; 51:266-268. Aleman A, et al. Asthma related to inhalation of <i>Plantago ovata</i> . Med Clin (Barc). 2001;116:20-2.
Salbutamol		Pharmaceutical	Agius RM, et al. Occupational asthma in salbutamol process workers. Occup Environ Med 1994;51:397-399.
Senna		Healthcare workers Pharmaceutical	Marks GB, et al. Asthma and allergy J associated with occupational exposure to ispaghula and senna: Products in a pharmaceutical work force. Am Rev Respir Dis 1991;144: 1065-1069. Helin T, Makinen-Kiljunen S. Occupational asthma and rhinoconjunctivitis caused by senna. Allergy 1996; 51:181-184.

Sevoflurane and isoflurane		anaesthetic staff	Vellore AD, et al .Occupational asthma and allergy to sevoflurane and isoflurane in anaesthetic staff. Allergy2006;6:1485-6
Spiramycin		Pharmaceutical	Malo JL, Callier A. Occupational asthma in workers of a pharmaceutical company processing spiramycin. Thorax 1988; 43: 371-377.
Tetrachloroisophthalonitrile		Fungicide	Honda I, et al. Occupational asthma induced by the fungicide tetrachloroisophthalonitrile. Thorax 1992; 47:760-761.
Tetracycline		Pharmaceutical	Menon MP. Das AK. Tetracycline asthma-a case report. Clin Allergy 1977; 7:285-290.
Tributyl tin oxide		Fungicide	Shelton D, et al. Occupational asthma induced by a carpet fungicide-tributyl tin oxide. J Allergy Clin Immunol 1992; 90: to 274-275.
Tylosin tartrate		Pharmaceutical	Lee HS, et al. Occupational asthma due to tylosin tartrate. Br J Ind Med 1989; 46:498-499.
Vancomycin		Pharmaceutical	Choi GS, et al. A case of occupational asthma caused by inhalation of vancomycin powder. Allergy 2009; 64:1391-2.
Plastics (including their monomers)			
Alkyl aryl polyether alcohol+ polipropylene glycol		Welders	Stevens JJ. Asthma due to soldering flux: a polyether alcohol-polypropylene glycol mixture. Ann Allerev

			1976; 36:419-422.
Alkylcyanoacrylate		Adhesive	Savonius B, et al. Occupational respiratory disease caused by acrylates. Clin Exp Allergy 1993; 23:416-424.
Cyanoacrylates		Adhesive	Quirce S, et al .Occupational asthma caused by exposure to cyanoacrylate. Allergy 2001;56:446-449.
		Artificial fingernails	Jurado-Palomo J et al. Occupational asthma caused by artificial cyanoacrylate fingernails. Ann Allergy Asthma Immunol. 2009;102:440-1.
Diacrylate		Adhesive	Weytjens K, et al. Occupational asthma to diacrylate. Allergy 1999; 54; 287-296.
Methylcyanoacrylate		Adhesive	Savonius B, Keskinen H, Tuppurainen M, Kanerva L. 1994. Occupational asthma caused by ethanolamines. Allergy 49:877-881.
Methylmethacrylate		Adhesive	Lozewicz S, et al. Occupational asthma due to methyl methacrylate and cyanoacrylates. Thorax 1985; 40:836-839.
		Thermal printer	Sánchez-Garcia S, et al. Asthma induced by a thermal printer.N Engl J Med 2009 28;360:2375-6
Plexiglas (dust)		Glass fibers	Kennes B. et al. Asthma from plexiglas powders. Clin Allergy 1981;11:49-54.
Polyethylene		Cable coating, Paper wrapping	Stenton SC; et al. Occupational asthma due to

			<p>a repair process for polyethylene-coated electrical cables. J Soc Occup Med 1989; 39:33-34.</p> <p>Gannon PF, et al. Occupational asthma due to polyethylene shrink wrapping (paper wrapper's asthma). Thorax 1992;47:759.</p>
Polypropylene		Plastic	Malo JL, et al. Occupational asthma due to heated polypropylene. Eur Respir 1994;7:415-417.
Polyvinylchloride		Meat wrappers	Lee HS, et al. Occupational asthma due to unheated polyvinylchloride resin dust. Br J Ind Med 1989; 46:820-822.
Styrene		Plastic	<p>Fernandez-Nieto M, et al. Airway inflammation in occupational asthma caused by styrene. J Allergy Clin Immunol 2006.;117:948-50.</p> <p>Hayes JP, et al. Occupational asthma due to styrene. Thorax 1991;46:396-397.</p> <p>Moscato G. et al. Occupational asthma due to styrene: two case reports. Occup Med 1987; 29:957-960.</p>
Synthetic textile fibres (rayon, nylon)		Textile	Muitari et al. Natural and synthetic fibers as causes of asthma and rhinitis. Ann Allergy 1978; 41: 48-50.
Polyester (orlon, terylene)			
Dyes			
Basic blue 99 (hair dye)		Hairdressing	Wigger-Alberú W, et al. Immediate-type allergy to

			the hair dye basic blue 99 in a hairdresser. <i>Allergy</i> 1996;51:64-65.
Carmine	<i>Dactylopius coccus</i> . E-120	Carmine extraction Food industry	<p>Quirce S, et al. Occupational asthma and immunologic responses induced by inhaled carmine among employees at a factory making natural dyes. <i>J Allergy Clin Immunol</i> 1994; 93:44-52.</p> <p>Stücker W, et al. Asthmatic reaction after occupational exposure to the food colouring material cochineal carmine. <i>Allergo J</i> 1996; 5:143-146.</p>
Dyes for textile fibers		Textile dye	<p>Zuskin E, et al. Respiratory function of textile workers employed in dyeing cotton and wool fibers. <i>Am J Ind Med</i> 1997; 31:344-352.</p> <p>Park HS, et al. Clinical and immunologic evaluations of reactive dye-exposed workers. <i>J Allergy Clin Immunol</i> 1991;87:639-49.</p>
Henna black	<i>Indigofera argentea</i>	Hairdressing	Scibilia J, et al. Occupational asthma caused by black henna. <i>Allergy</i> 1997;52:231-232.
Henna red	<i>Lawsonia alba</i>	Hairdressing	Starr JC, et al. Immediate type I asthmatic response to henna following occupational exposure in hairdressers. <i>Ann Allergy</i> 1982; 48: 98-9.
Ink for ECG			Keskinen H, et al.. ECG ink as a cause of asthma. <i>Allergy</i> 1981; 36:275-276.

Lanasol 4G yellow		Dyeing	Romano C, et al. A new case of occupational asthma from reactive dyes with severe anaphylactic response to the specific challenge. <i>Am J Ind Med</i> 1992; 21:209-216.
Pyrazolone		Photography	Nakano Y, et al.. Occupational asthma caused by pyrazolone derivative used in silver halide photographic paper. <i>Chest</i> 2000; 118:246-8.
Remazol black(dye for textile fibers)		Textile dye	Nilsson R, et al. Asthma, rhinitis, and dermatitis in workers exposed to reactive dyes. <i>Br J Ind Med</i> 1993; 50:65-70.
Other chemicals			
1,2-benzisothiazoline-3 Isothiazolinone		Chemical industry	Moscato G, et al. Occupational asthma and rhinitis caused by 1,2-benzisothiazolin-3-in a chemical worker. <i>Occup Med (Oxf)</i> 1997; 47:249-251.
1H-benzotriazol-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate	TBTU	Biochemistry laboratories	Miralles JC, Occupational rhinitis and bronchial asthma due to TBTU and HBTU sensitization. <i>J Investig Allergol Clin Immunol</i> 2003; 13:133-4.
Ammonium chloride		Soldering	Weir DC, et al. Occupational asthma due to soft corrosive soldering fluxes containing zinc chloride and ammonium chloride. <i>Thorax</i> 1989;44:220-223.
Aziridine		Chemical industry	Kanerva L, et al. Occupational respiratory and skin sensitisation caused by polyfunction alaziride hardener. <i>Clin Exp Allergy</i>

			1995.; 25:432-39
Azodicarbonamide		Plastics, rubber	<p>Normand JC, et al. Occupational asthma after exposure to azodicarbonamide: report of four cases. Br J Ind Med 1989; 46:60-62.</p> <p>Slovak AJ. Occupational asthma caused by a plastics blowing agent, azodicarbonamide. Thorax 1981; 36:906-909.</p>
Captafol		Pesticide	Royce S, et al. Occupational asthma in a pesticides manufacturing worker. Chest 1993;103:295-296.
Chloramine-T		Cleaners Healthcare	<p>Kramps JA. et al. Occupational asthma due to inhalation of chloramine-T. II. Demonstration of specific IgE antibodies. Int Arch Allergy Appl Immunol 1981; 64:428-438.</p> <p>Kujala VM, et al. Occupational asthma due to chloramine-T solution. Respir Med 1995; 89:693-695.</p> <p>Dijkman JH, et al. Occupational asthma due to inhalation of chloramine-T. I. Clinical observations and inhalation-provocation studies. Int Arch Allergy Appl Immunol 1981; 64:422-427.</p>
Cutting oils /metal working fluid		Metallic molding	Hendy MS, Beattie BE, Burge PS. 1985. Occupational asthma due to an emulsified oil mist. Br

			Ind Med; 42:51-54. Robertson W, et al. Clinical investigation of an outbreak of alveolitis and asthma in a car engine manufacturing plant. Thorax 2007; 62 :928-9.
Diazonium		Photocopying Fluoro polymers	Graham VA, Coe ML, Davies RJ. Occupational asthma after exposure to a diazonium salt. Thorax 1981; 36:950-951 Luczynska CM, et al. Occupational asthma and specific IgE to a diazonium salt intermediate used in the polymer industry. J Allergy Clin Immunol 1990; 85:1076-1082.
EPO 60		Mold making	Lamboum EM, et al. Occupational asthma due to EPO 60. Br J Ind Med 1992; 49:294-295.
Ethylcyanoacrylate		Adhesives	Quirce S, et al. Occupational asthma caused by exposure to cyanoacrylate. Allergy 2001.; 56:446-449. Kopp SK, et al. Asthma and rhinitis due to ethylcyanoacrylate instant glue. Ann Intern Med 1985;102:613-615.
Ethylene dioxide		Healthcare	Verraes S. Michel O. Occupational asthma induced by ethylene oxide. Lancet 1995; 346:1434-1435.
Ethyleneimine		Plastics	Kanerva L; et al. Occupational allergic contact

			dermatitis and contact urticaria caused by polyfunctional aziridine hardener. Contact Dermatitis 1995; 33:304-309.
Eugenol	4 allyl-2-methoxy phenol; C ₁₀ H ₁₂ O ₂	Hairdresser	Quirce S, et al. Occupational asthma and rhinitis caused by eugenol in a hairdresser . Allergy. 2008;63:137-8.
Fluazinam and chlorothalonil		Pesticides	Draper A, et al. Occupational asthma from fungicides fluazinam and chlorothalonil. Occup Environ Med 2003.; 60:76-7.
Formaldehyde		Resins, Varnish, Healthcare	Lemiere C, et al. Occupational asthma due to formaldehyde resin dust with and without reaction to formaldehyde gas. Eur Respir J 1995; 8: 861-865. Burge PS, et al. Occupational asthma due to formaldehyde. Thorax 1985; 40:255-260. Gannon PF, et al. Occupational asthma due to glutaraldehyde and formaldehyde in endoscopy and x ray departments. Thorax 1995; 50:156-159.
Freon		Refrigeration	Malo JL, et al. Occupational asthma due to heated freon. Thorax 1984;39:628-629.
Furfuryl alcohol		Mold makers	Cockcroft DW, et al. Asthma caused by occupational exposure to a furan-based binder system. J Allergy Clin Immunol 1980; 66:458-463.
Glutaraldehyde		Healthcare	.Quirce S, et al. Occupational asthma caused

			<p>by glutaraldehyde in a nurse in a renal dialysis unit. Allergy 1999;54:1121-2</p> <p>Curran AD, et al. Clinical and immunologic evaluation of workers exposed to glutaraldehyde. Allergy 1996; 51:826-832.</p>
Hexachlorophene		Healthcare	<p>Nagy L, Orosz M. Occupational asthma due to hexachlorophene. Thorax 1984; 39:630-631.</p>
Iso-nonyl oxybenzene sulfonate		Laboratory	<p>Hendrick DJ, et al. Occupational asthma due to sodium iso-nonyl oxybenzene sulphonate, a newly developed detergent ingredient. Thorax 1988; 43:501-502.</p> <p>Stenton SC, et al. Asthmagenic properties of a newly developed detergent ingredient: sodium iso-nonyl oxybenzene sulphonate. Br J Ind Med 1990; 47:405-410.</p>
Isothiazolinone		Chemical industry	<p>Bourke SJ, et al. Occupational asthma in an isothiazolinone manufacturing plant. Thorax 1997; 52:746-748.</p>
Lasamide	2,4-dichloro-5-sulfamoylbenzoic acid	Pharmaceutical	<p>Klusackova P, et al. Occupational asthma and rhinitis in workers from a lasamide production line. Scand J Work Environ Health 2007.;33:74-8.</p>
Lauryl dimethyl benzyl ammonium chloride		Pharmacist	<p>Burge PS, Richardson MN. Occupational asthma due to indirect exposure to lauryl dimethyl benzyl ammonium manufacturing plant. Thorax</p>

			1994.; 52:746-8.
Metabisulfite		Agricultural	Malo JL, et al. Occupational asthma caused by dry metabisulphite. Thorax 1995; 50:585-586.
Methyl blue		Healthcare	Rodenstein D, Stanescu DC. Bronchial asthma following exposure to ECG ink. 1982. Ann Allergy 1982.; 48:351-2.
Nihydrin		Laboratory	Stenton SC, et al. Asthmagenic properties of a newly developed detergent ingredient: sodium isononanoyl oxybenzene sulphonate. Br J Ind Med 1990;47:405-410. Piiirila P, et al. Rhinitis caused by ninhydrin develops into occupational asthma. Eur Respir J 1997;10:1918-1921.
Ortho-phthalaldehyde		Healthcare	Fujita H, Ogawa M, Endo Y. A case of occupational bronchial asthma and contact dermatitis caused by ortho-phthalaldehyde exposure in a medical worker. J Occup Health 2006;48:413-6
Persulphates (Na, K)		Hairdressing	Parra FM, et al. Occupational asthma in a hairdresser caused by persulphate salts. Allergy 1992; 47:656-660.
Pulverized fuel		Power station	Davison AG, et al. Asthma caused by pulverised fuel ash. Br Med J 1986; 292:1561.
Sulphathiazoles		Healthcare	Rosberg M. Asthme bronchiale caused by sulphathiazole. 1946. Acta Med Scand 1946: 126:185-

			90.
Tetrazene		Detonators	Burge PS, et al. Occupational asthma, rhinitis, and dermatitis due to tetrazene in a detonator manufacturer. <i>Thorax</i> 1984; 39:470-471.
Tooth enamel dust		Dentists	Ousholder GT, Chan JT. Tooth enamel dust as an asthma stimulus. <i>Oral Surg Oral Med Oral Pathol</i> 1993;75:599-601.
Triglycidyl isocyanurate		Painters	Piirila P, et al. Occupational asthma caused by triglycidyl isocyanurate (TGIC). <i>Clin Exp Allergy</i> 1997; 27: 510-514. Quirce S. et al. Hypersensitivity pneumonitis caused by triglycidyl isocyanurate. <i>Allergy</i> 2004;59:1128
Animals			
Storage mites <i>Tyrophagus longior</i> , <i>T. putrescentiae</i> , <i>Glycyphagus destructor</i> , <i>G. domesticus</i> , <i>Acarus siro</i> , <i>A. farris</i> , <i>Dermatophagoides pteronyssinus</i> , <i>D. farinae</i> , <i>Ornithonyssus sylviarum</i>		Agricultural	Lutsky I, et al. Occupational asthma due to poultry mites. <i>J Allergy Clin Immunol</i> 1984;73:56-60. Oertmann C, et al. Allergy by house dust mites in the poultry house. <i>Allergologie</i> 1995;18:327-330. van Hage-Hamsten M, et al. Bronchial provocation studies in farmers with positive RAST to the storage mite <i>Lepidoglyphus destructor</i> . <i>Allergy</i> 1988; 43:545-551. Blainev AD. et al. Allergic

			respiratory disease in grain workers. The role of storage mites. J Allergy Clin Immunol 1989;84:296-303.
<i>Tetranychus urticae</i> , <i>Panonychus ulmi</i>	Red Spider	Greenhouse workers	<p>Delgado L, et al. Occupational allergy in greenhouse workers: sensitization to <i>Tetranychus urticae</i>. Clin Exp Allergy 1997; 27:640-645.</p> <p>Burches E, et al. Occupational allergy due to spidermites: <i>Tetranychus urticae</i> (Koch) and <i>Panonychus citri</i> (Koch). Clin Exp Allergy 1996; 26: 1262-1267.</p> <p>Musk AW, et al. Respiratory symptoms, lung function, and sensitisation to flour in a British bakery. Br J Ind Med 1989; 46:636-642.</p> <p>Kim YK, et al. Spider mite allergy in apple-cultivating farmers: European red mite (<i>Panonychus ulmi</i>) and two-spotted spider mite (<i>Tetranychus urticae</i>) may be important allergens in the development of work-related asthma and rhinitis symptoms. J Allergy Clin Immunol 1999; 104:1285-1292.</p>
<i>Panonychus citri</i>		Orange agriculture	<p>See : Burches et al.</p> <p>Kim YK, et al. Citrus red mite (<i>Panonychus citri</i>) is the most common sensitizing allergen of asthma and rhinitis in citrus farmers. Clin Exp Allergy 1999 :</p>

			29:1102-1109.
<i>Amblyseius cucumeris</i>		Horticulture	Giséle CM et al. Prevalence of sensitization to the predatory mite <i>Amblyseius cucumeris</i> as a new occupational allergen in horticulture. <i>Allergy</i> 2002; 57: 614.
Cellar spider <i>Holocnemus pluchei</i>		Agricultural	Bobolea et al. Arginine kinase from cellar spider (<i>Holocnemus pluchei</i>): a new asthma-causing allergen. <i>Int Arch Allergy Immunol</i> (in press)
Insects			Dyne D, et al. Occupational ailergy among workers producing arthropods for organic pest conrol purposes. <i>Ann Agric Environ Med</i> 1996; 3:33 -36.
<i>Anisakis simplex</i>	<i>Anisakis simplex</i>	Fishmonger	Armentia A, et al. Occupational asthma by <i>Anisakis simplex</i> . <i>J Allergy Clin Immunol</i> 1998; 102:831-4.
Beetles	<i>Tenebrio monitor</i> , <i>Alphitobius</i> , <i>Diaperinus domestica</i>	Fishing bait Grain handlers	Siracusa A, et al. Asthma caused by live fish bait. <i>J Allergy Clin Immunol</i> 1994; 93: 424-430. Schroeckenstein DC, et al. Occupational sensitivity to <i>Tenebrio molitor Linnaeus</i> (yellow mealworm). <i>J Allergy Clin Immunol</i> 1990; 86:182-188. Friedrich H. Mealworm asthma. A contribution to the allergic occupational asthma. <i>Allergologie</i> 1986; 9:519-

			521. Sheldon JM, Johnston JH. Hypersensitivity to beetles (coleoptera). Report of a case. J Allergy 1941; 12:493-7. Cuesta J, Asthma caused by <i>Dermestidae</i> (Black carpet beetle): a new allergen in house dust. J Allergy Clin Immunol 1997; 99:147-9.
Book louse	<i>Liposcelis bostrychophilus</i>	Cleaners, Millworkers	Wittich FW. The nature of various mill dust allergens. Lancet 1940; 60:418-21.
Caddis fly	<i>Trichoptera</i>		Kagen SL. Inhalant allergy to arthropods: Insects, arachnids and crustaceans. In: Inhalant Allergy to Arthropods. De SL Kagen. Clinical Reviews in Allergy 1986; 8:1-125.
Chironomid midges	<i>Chironomus thumi</i>	Fish feeders	Liebers V, et al.. Humoral immune response to the insect allergen Chi t 1 in aquarists and fish-food factory workers. Allergy 1993;48:236-239.
<i>Chrysonilla sitophila</i>		Carpenters	Tarlo SM, et al. Occupational asthma induced by <i>Chrysonilia sitophila</i> in the logging industry. J Allergy Clin Immunol 1996; 97:1409-1413.
Cockroach	<i>Blatella germanica</i>	Laboratory	Steinberg DR, et al. Cockroach sensitization in laboratory workers. J Allergy Clin Immunol 1987;80:586-590.
Cricket	<i>Achatea domestica</i>	Laboratory	Harfi HA. Immediate hypersensitivity to cricket.

			Ann Allergy 198.; 44:162-3. Bagenstose AH, et al. Inhalant allergy due to crickets. J Allergy Clin Immunol 1980;65:71-74. Linares T, et al. Occupational rhinitis and asthma due to crickets. Ann Allergy Asthma Immunol 2008 ;100:566-9
Dermestidae spp		Museum personnel	Brito FF, et al.. Occupational rhinoconjunctivitis and asthma in a wool worker caused by <i>Dermestidae</i> spp. Allergy 2002;57:1191-4.
<i>Ech inodorus plamosus</i> (larvae)	<i>Echinodorus plamosus</i>	Bait, fish-feeders	Resta O, et al. Occupational asthma from fish-feed <i>Echinodorus plamosus</i> larva. Med Lav 1982 73:234-236.
<i>Eurygaster</i> and <i>Ephestia</i>		Agriculture	Armentia A, et al. Occupational asthma due to grain pests <i>Eurygaster</i> and <i>Ephestia</i> . J Asthma 2004;41:99-107.
Fruit fly	<i>Drosophila melanogaster</i>	Laboratory	Spieksma F, et al. Respiratory allergy to laboratory fruit flies (<i>Drosophila melanogaster</i>). J Allergy Clin Immunol 1986; 77:108-113.
Gipsy moth	<i>Limantria dispar</i>	Entomologists	Etkind PH, et al. The gypsy moth caterpillar: a significant new occupational and public health problem. Occup Med 1982; 24:659-662.
Grain weevil	<i>Sitophilus granarius</i> , <i>Sitophilus zeamais</i>	Grain handlers	Lunn JA, Huges DT. Pulmonary hypersensitivity to the grain weevil. Br J Ind Med 1967;24:158-61.
Grasshopper	<i>Melanonlus</i>	Laboratory	Von Der Biil VWF. Asthma

	<i>sanguinipes</i>		als berfsskankheit: Allergi gegen heuschrecken. Allergi und Asthma 1963;9:154-5.
Green bottle	<i>Lucilia caesar</i>	Fishing bait	Siracusa A, et al. Asthma caused by live fish bait. J Allergy Clin Immunol 1994; 93: 424-430.
Ground bugs	<i>Lygaeidae</i>	Bottling	Garcia Lazaro MA, et al. Occupational asthma caused by hypersensitivity to ground bugs. 1 Allergy Clin Immunol 1997; 99:267-268
Honey-bee	<i>Apis mellifera</i>	Food industry-honey	Ostrom NK, et al. Occupational allergy to honeybee-body dust in a honey-processing plant. J Allergy Clin Immunol 1986, 77:736-740. Johnson A, Dittrick M, Chan-Yeung M. Occupational asthma caused by honey. Allergy 1999; 54:183-90.
Locust	<i>Locusta migratoria</i>	Laboratory workers	Soparkar GR, et al. Inhalant atopic sensitivity to grasshoppers in research laboratories. J Allergy Clin Immunol 1993;92:61-65. Tee RD, et al. Occupational allergy to locusts: an investigation of the sources of the allergen. J Allergy Clin Immunol 1988;81:517-525. Hernandez MD, et al. Occupational rhinoconjunctivitis and asthma due to <i>Locusta migratoria</i> (LM). Clin Allergy 1980; 10:235-6.

Moths, butterflies	<i>Galleria mellonella</i> , <i>Ephestia kuehniella</i>	Bait Grain handlers	Siracusa A, et al. Asthma caused by live fish bait. J Allergy Clin Immunol 1994;93: 424-430 Cabanieu C, et al. Recherche des anticorps precipitants dans l'allergie a <i>Ephestia kuehniella</i> . Rev Francai Allergol 1971; 11:257-63
Mushroom fly	<i>Brachycera spp.</i>	Mushroom workers	Cimarra M, et al. Occupational asthma caused by champignon flies. Allergy 1999; 54: 521-5.
Sewer fly	<i>Psychoda alternata</i>	Sewer workers	Gold BL, Mathews KP, Burge HA. Occupational asthma caused by sewer flies. Am Rev Respir Dis 1985; 131:949-952
Sheep blowfly	<i>Lucilia cuprina</i>	Laboratory	Kaufman GL, et al. Occupational llergy in an entomological research centre. Clinical aspects of reactions to the sheep blowfly <i>Lucilia cuprina</i> . Br J Ind Med 1989; 46:473-478.
Silkworm	<i>Bombyx mori</i>	Silkworkers	Harindranath N, Prakash O, Subba Rao PV. Prevalence of occupational asthma in silk filatures. Ann Allergy 1985; 55:511-515
Water Flea	<i>Daphnia</i>		Meister W. Professional asthma owing to <i>Daphnia</i> - allergy. Allergie und Immunologie 1978 ; 24:191-193.
Shellfish			
Clams		Food industry	Desjardins A, et al. Occupational IgE-mediated sensitization and asthma caused by clam and shrimn.

			J Allergy Clin Immunol 1995 ; 96:608-617.
Lobster		Food industry	Lemiere C, et al. Occupational asthma to lobster and shrimp. Allergy 1996;51:272-273.
Nacre		Pearl industry	Orriols R, et al. High prevalence of mollusc shell hypersensitivity pneumonitis in nacre factory workers. Eur Respir J 1977;10: 780-86.
Shrimp		Food industry	Desjardins A, Occupational IgE-mediated sensitization and asthma caused by clam and shrimp. J Allergy Clin Immunol 1995;9.:608-617. Lemiere C, et al. Occupational asthma to lobster and shrimp. Allergy 1996; 51:272-273.
Snow crab		Food industry	Cartier A, et al. IgE sensitization in snow crab- processing worlcers. J Allergy Clin Immunol 1986; 78:344-348.
Fish			
Salmon, tuna, sardine, trout		Food industry	Douglas JD, et al. Occupational asthma caused by automated salmon processing. Lancet 1995; 346:737-740. Rodriguez J, et al. Occupational asthma caused by fish inhalation. Allergy 1997; 52:866-869. Sherson D, Hansen I, Sigsgaard T. Occupationally related respiratory symptoms in trout-processing workers. Allergy 1989; 44: 336-341.

Octopus		Food industry	Rosado A, et al. Occupational asthma caused by octopus particles. Allergy. 2009;64:1101-2.
Animal products			
Casein		Tanners	Olaguibel JM, et al. Basomba A. Occupational asthma caused by inhalation of casein. Allergy 1990;45: 306-308. Rossi GL, Corsico A, Moscato G. Occupational asthma caused by milk proteins: report on a case. J Allergy Clin Immunol 1994; 93: 799-801.
Bovine serum albumin		Food Industry	Choi GS, et al. Occupational asthma caused by inhalation of bovine serum albumin powder. Allergy Asthma Immunol Res 2009;1:45-7.
Cow dander		Farmers	Hinze S, Bergmann K-C. Cow hair asthma: symptoms and clinical course. Allergo J 1995; 4:97-101
Deer dander		Farmers	Nahm DH, Park JW, Hong CS. Occupational asthma due to deer dander. Ann Allergy Asthma Immunol 1996; 76:423-426.
Egg		Food industry	Smith AB, et al. Evaluation of occupational asthma from airborne egg. Ches 1990; 98:398-404. Bernstein JA, et al. Occupational asthma induced by inhaled egg lysozyme. Chest 1993; 103:532-535.
Feathers		Farmers	Perfetti L, Cartier A. Malo JL. Occupational asthma in

			poultry-slaughterhouse workers. Allergy 1997; 52:594-595.
Frogs		Frog fisherman	Armentia A, □aldiv-Santos J, Subiza J, et al. Occupational asthma due to frogs. Ann Allergy 1988; 60:209-210.
Ivory dust		Ivory workers	Arrnstrong RA, Neill P, Mossop RT. Asthma induced by ivory dust: a new occupational cause. Thorax 1988; 43:737-738.
Laboratory animal danders: Rat, mouse, guinea pig, rabbit, gerbil, hamster, cat, dog		Laboratory	Krakowiak A, Szulc B, Gorski P. Occupational respiratory diseases in laboratory animal workers: initial results. Int J Occup Med Environ Health 1997;10:31-36. Bush RK, Wood RA. Laboratory animal allergy. J Allergy Clin Immunol 1998; 102:99-112. Hollander A, Doekes G, Heederik D. Cat and dog allergy and total IgE as risk factors of laboratory animal allergy. J Allergy Clin Immunol 1996; 98:545-554.
Laboratory animal urine		Laboratory workers	Venables KM, et al. Laboratory animal allergy in a pharmaceutical company. Br J Ind Med 1988; 45: 660-666.
Lactoalbumin		Food industry	Rossi GL, Corsico A, Moscato G. Occupational asthma caused by milk proteins: report on a case. J Allergy Clin Immunol 1994; 93: 799-801.

Mink urine		Farmers	Jimenez Gomez I, et al. Occupational asthma caused by mink urine. <i>Allergy</i> 1996; 51:364-365.
Pig urine		Laboratory	Haries MG, Cromwell O. Occupational asthma caused by allergy to pigs' urine. <i>Br Med J (Clin Res Ed)</i> 1982; 284:867.
Pigeon, dove, cockatiel, parakeet, duck, turkey: Feathers and droppings		Breeders	Calvert JE, et al. Pigeon fancier's lung: A complex disease. <i>Clin Exp Allergy</i> 1999;29: 166-75.
Roe Deer		Animal rehabilitation center	Carballada F, et al . Occupational respiratory allergy to roe deer. <i>Ann Allergy Asthma Immunol</i> 2006.;97:707-10
Shark cartilage		Dietetic product industry	San-Juan S, et al. Occupational asthma caused by shark cartilage dust. <i>J Allergy Clin Immunol</i> 2004; 114:1227-8.
Plants			
3-carene	Terpene	Carpenters	Eriksson KA, et al. Terpene exposure and respiratory effects among workers in Swedish joinery shops. <i>Scand Work Environ Health</i> 1997;23:114-120.
Albilfloxia	<i>Tradescantia</i>	Floral workers	Wuthrich B, Johansson SG. Allergy to the ornamental indoor green plant <i>Tradescantia</i> (Albilfloxia). <i>Allergy</i> 1997;52:556-59.
Algae	<i>Alage chorella</i>	Pharmacist	Ng TP, Tan WC, Lee YK. Occupational asthma in a pharmacist induced by <i>Chorella</i> , a unicelular algae preparation. <i>Respir Med</i> 1994;88:555-7.

Amaryllis	<i>Amaryllidaceae</i>	Horticultural	Jansen AP, et al. Occupational asthma to amaryllis. Allergy 1996; 51:847-849.
Aniseed	<i>Pimpinella anisum</i>	Food industry	Fraj J, et al. Occupational asthma induced by aniseed. Allergy 1996;51:337-339.
Arabidopsis thaliana		Laboratory worker	Yates B, et al. Occupational asthma caused by Arabidopsis thaliana: a case of laboratory plant allergy. Eur Respir J. 2008;32:1111-2
Aromatic herbs		Herbalist	Lemiere C, et al. Occupational asthma caused by aromatic herbs. Allergy 1996; 51:647-649.
Artichoke	<i>Cynara scolymus</i>	Agriculture, Food industry	Miralles JC, Occupational rhinitis and bronchial asthma due to artichoke (<i>Cynara scolymus</i>). Ann Allergy Asthma Immunol. 2003; 9:92-5.
Asparagus	<i>Asparagus o.</i>	Food industry	Lopez-Rubio A, et al. Occupational asthma caused by exposure to asparagus: detection of allergens by immunoblotting. Allergy 1998;53 1216-1220.
Baby's breath	<i>Gypsophila paniculata</i>	Floral workers	Antepara I, et al. Occupational asthma related to fresh <i>Gypsophila paniculata</i> . Allergy 1994; 49:478-480. Twiggs JT, et al. Occupational asthma in a florist caused by the dried plant, baby 's breath. J Allergy Clin Immunol 1982; 69:474-48.
Bells of Ireland	<i>Molucella laevis</i>	Plant growers	Miesen WM, et al.. Occupational asthma due to

			IgE mediated allergy to the flower <i>Molucella laevis</i> (Bells of Ireland). Occup Environ Med 2003; 60:701-3.
Brasil Gingseng or Voacanga africana	<i>Pfaffia paniculata</i>	Pharmaceutical	Subiza J, et al. Occupational asthma caused by Brazil ginseng dust. J Allergy Clin Immunol 1991; 88:731-736.
Cabbage	<i>Brassica oleracea</i>	Food industry	Quirce S, et al. Occupational asthma due to the inhalation of cauliflower and cabbage vapors. Allergy 2005;60:969-70
Cacao	<i>Theobroma cacao</i>	Food industry	Perfetti L, et al. Occupational asthma caused by <i>cacao</i> . Allergy 1997; 52:778-780.
Carnation	<i>Dianthus caryophyllus</i>	Floral workers	Sanchez-Guerrero I, et al. Occupational allergy caused by carnation (<i>Dianthus caryophyllus</i>). J Allergy Clin Immunol 1999; 104:181-185.
Cauliflower and broccoli pollen	<i>Brassica oleracea botrytis</i> <i>B. oleracea italica/cymosa</i>	Agriculture	Hermanides HK, et al. Brassica oleracea pollen, a new source of occupational allergens. Allergy 2006;61:498-502.
Chamomile		tea-packing plant	Vandenplas O, et al. Occupational asthma caused by chamomile. Allergy 2008 ;63:1090-2
Chicory	<i>Chichorium intybus</i>	Food industry	Nemery B, Demedts M.. Occupational asthma in a chicory grower. Lancet 1989;1:672-673. Pirson F, Detry B, Pilette C. Occupational rhinoconjunctivitis and asthma caused by chicory and oral allergy syndrome

			associated with bet v 1-related protein. J Investig Allergol Clin Immunol. 2009;19:306-10
Chrysanthemum	<i>Chrysanthemum</i>	Floral workers	Blamoutier E. Un cas de sensibilisation au chrysanteme (jeuilles et fleurs) asthme et dermite du visage. Sem Hop Paris 1956; 32:2865. Schuberl H, Prater E, Diener C. Pollinosis bei Chrysanthemenzüchtern. Z Gesamte Hyg 1990; 36:162-166. Suzuky S, et al. Chrysanthemum pollinosis in Japan. Int Arch Allergy Appl Immunol 1975; 48:800-811.
Coriander	<i>Coriandrum sativum</i>	Food industry	Schwartz HJ, et al. Occupational rhinoconjunctivitis and asthma due to fennel seed. Ann Allergy Astha Immunol 1997; 78:37-40
<i>Diplotaxis erucooides</i> (pollen)		Vine growers	Garcia-Ortega P, et al. Allergy to <i>Diplotaxis erucooides</i> pollen: occupational sensitization and cross-reactivity with other common plants. Allergy 2001 56:679-683.
Entada gigas	<i>Entada scandens</i>	Floral workers	Rubin JM, Duke MB. Unusual cause of bronchial asthma. Cacoon seed used for decorative purposes. N Y State J Med 1974; 74 538-539.
Fennel	<i>Foeniculum vulgare</i>	Food industry	Schwartz HJ, Occupational allergic rhinoconjunctivitis and asthma due to fennel

			seed. Ann Allergy Asthma Immunol 1997;78:37-40.
Fenugreek	<i>Trigonella foenumgraecum</i>	Food industry	Dugue J, Bel J, Figueredo M. Le fenugrec responsable d'un nouvel asthme professionnel. Presse Medd 1993; 22:922.
Fibers: Linen, jute, stipa grass	<i>Linen usitatissimum,</i> <i>Corchorus olitorius,</i> <i>Stipa tenacissima</i>	Fiber processors Plaster workers	Muittari A, Veneskoski T. Natural and synthetic fibers as causes of asthma and rhinitis. Ann Allergy 1978;41:48-50 Baz G, et al. Occupational asthma caused by esparto grass (<i>Stipa tenacissima</i>) fibers. Allergy 1999; 54:86-7.
Ficus	<i>Ficus benjamina</i>	Plant keepers	Diez-Gomez ML, et al. Asthma caused by <i>Ficus benjamina</i> latex: Evidence of cross-reactivity with fig fruit and papain. Ann Allergy Asthma Immunol 1998 ;80:24-30. Axelsson IG, Johansson SGO, Zetterstrom O. Occupational allergy to weeping fig in plant keepers. Allergy 1987;42:161-167.
Flowers and dry flowers		Floral workers	Piirila I, et al. Occupational asthma caused by decorative flowers: review and case reports. Int Arch Occup Environ Health 1994, 66:131-36.
Freesia	<i>Freesia</i> spp.	Horticulture	Toorenbergen van AW, Dieges PH. Occupational allergy in horticulture: demonstration of immediate-type allergic reactivity of freesia and papriha plants. Int Arch Allergy Appl

			Immunol 1984; 75:44-47.
Garlic dust	<i>Allium sativa</i>	Food industry	Falleroni AE, Zeiss CR, Levitz D. Occupational asthma secondary to inhalation of garlic dust. J Allergy Clin Immunol 1981; 68: 156-160.
Gluten		Bakers	Lachance P, et al. Occupational asthma from reactivity to an alkaline hydrolysis derivative of gluten. J Allergy Clin Immunol 1988; 81:385-390.
Grass	<i>Lolium p.</i>	Gardeners	Subiza J, et al. Occupational asthma caused by grass juice. J Allergy Clin Immunol 1995; 96:693-695.
Green and roasted coffee	<i>Coffea arabica</i>	Coffee processors	<p>Larese F, et al. Sensitization to green coffee beans and work-related allergic symptoms in coffee workers. Am J Ind Med 1998; 34: 623-627.</p> <p>Zuskin E, et al. Bronchial reactivity in green coffee exposure. Br J Ind Med 1985; 42:415-420.</p> <p>Jones RN, et al. Lung function consequences of exposure and hypersensitivity in workers who process green coffee beans. Am Rev Respir Dis 1982; 125:199-202.</p> <p>Lemiere C, et al. Occupational asthma caused by roasted coffee: immunologic evidence that roasted coffee contains the same antigens as green coffee. but at a lower</p>

			concentration. J Allergy Clin Immunol 1996 ; 98:464-466.
Green bean	<i>Phaseolus</i>	Homemakers	Igea JM, et al. Green bean hypersensitivity: an occupational allergy in a homemaker. J Allergy Clin Immunol 1994; 94:33-35
Hop	<i>Humulus lupulus</i>	Brewing Industry	Newmark FM. Hops allergy and terpene sensitivity: an occupational disease. Ann Allergy 1978; 41:311-312.
Ivy	<i>Hedera helix</i>	Florist	Hannu T, et al. Occupational asthma to ivy (<i>Hedera helix</i>). Allergy 2008 ;63:482-3.
Korean ginseng - Sanyak		Pharmaceutical	Lee JY, et al. A case of occupational asthma and rhinitis caused by Sanyak and Korean ginseng dusts. Allergy 2006;61:392-3
Limonium	<i>Limonium tataricum</i>	Floral workers	Quirce S, et al. Occupational asthma from dried flowers of <i>Limonium tataricum</i> . Allergy 1993; 48: 285-29.
Linseed oilcake	<i>Linum usitatissimum</i>	Chemist	Vandenplas O, et al.. Occupational asthma caused by linseed oilcake. Allergy. 2008;63:1250-1
Liquorice root	<i>Glycyrrhiza glabra</i>	Herbalist	Cartier A, Malo JL, Labreque M, Occupational asthma due to liquorice roots. Allergy 2002; 57:863.
Madagascar Jasmine	<i>Stephanotis floribunda</i>	Greenhouse workers	Van der Zee JS, et al.. Outbreak of occupational allergic asthma in a <i>Stephanotis floribunda</i> nursery. J Allergy Clin Immunol 1999; 103:950-2.
Marianne thistle	<i>Silybum marianum</i>	Floral workers	Wollemann G, Seifert H-U, Borew. Berufsbedingte Rhinoconjunctivitis auf Mariendistelsamen (<i>Silybum marianum</i>). Allergologie

			1987; 10: 505-508.
Mimosa	<i>Acacia floribunda</i>	Florist	Ariano R, et al..Pollen allergy to mimosa (<i>Acacia floribunda</i>) in a Mediterranean area: an occupational disease. Ann Allergy 1991; 66: 253-6.
Mushroom	<i>Agaricus bisporus</i>	Mushroom processors	Symington IS, Kerr JW, McLean DA. Type I allergy in mushroom soup processors. Clin Allergy 1981;11:43-47.
Narcissus	<i>Narcissus pseudonarcissus</i>	Florist	Concalo S, Freitas JD, Sousa I. Contact dermatitis and respiratory symptoms from <i>Narcissus pseudonarcissus</i> . Contact Dermatitis 1987; 16:115-17.
Nutmeg	<i>Myristicia fragans</i>	Food industry	Sastre J, et al. Occupational asthma due to different spices. Allergy 1996; 51:117-120.
Onion	<i>Allium spp</i>	Food industry or Agriculture	Navarro JA, et al. Allium cepa sedes:a new occupational allergen. J Allergy Clin Immunol 1995; 96: 690-3.
Opium	<i>Papaver s.</i>	Pharmaceutical	Moneo I, et al. Occupational asthma o caused by <i>Papaver somlliferum</i> . Allergol Immunopathol (Madr) 1993;21:145-148.
Paprika	<i>Capsicum annum</i>	Food industry	Sastre J, et al. Occupational asthma due to different spices. Allergy 1996; 51:117-120.
Pea	<i>Lathyrus odoratus</i>	Horticultural	Jansen A, et al. Occupational asthma in horticulture caused by <i>Lathyrus odoratus</i> . J Allergy Proc 1995;16:135-139.
Pectin		Food industry	Cohen AJ. Forse MS. Tarlo

			SM.. Occupational asthma caused by pectin inhalation during the manufacture of jam. Chest 1993;103:309-311.
Raspberry		Food industry	Sherson D, et al. Occupational asthma due to freeze-dried raspberry. Ann Allergy Asthma Immunol. 2003 ;90:660-3.
Rice		Food industry	Kim JH, et al. Three cases of rice-induced occupational asthma. Ann Allergy Asthma Immunol 2010;104:353-4
Ricine	<i>Ricinus communis</i>	Pharmaceutical	Merget R, et al. Seasonal occupational asthma in an agricultural products merchant-a case report. Allergy 1994;49:897-901.
Rose	<i>Rosa rugosa.</i>	Pharmaceutical Greenhouse workers	Kwaselow A, et al. Rose hips: a new occupational allergen. J Allergy Clin Immunol 1990; 85:704-708. Demir AU, Karakaya G, Kalyoncu AF. Allergy symptoms and IgE immune response to rose: an occupational and an environmental disease. Allergy 2002;57:936-9.
Saffron	<i>Crocus sativus</i>	Saffron processors	Feo F, et al. Occupational allergy in saffron workers. Allergy 1997; 52:633-641.
Sarsaparilla	<i>Smila</i>	Herbalist	Vandenplas O, et al. Occupational asthma caused by sarsaparilla root dust. J Allergy Clin Immuno 1996; 97:1416-1418.
Sesame	<i>Sesame indicum</i>	Food industry	Keskinen H, et al. A case of occupational asthma. Rhinitis and urticaria due to sesame seed. Clin Exp

			Allergy 1991;21: 623-624.
Sisal	<i>Agave sisalana</i>	Sisal workers	Zuskin E, et al. Respiratory function and immunological reactions in sisal workers. Int Arch Occup Environ Health 1994; 66:37-42.
Spatheflower	<i>Spathiphyllum wallisii</i> , <i>Spathiphyllum tloribundum</i>	Floral workers	Kanerva L, et al. Occupational allergy caused by Spatheflower (<i>Spathiphyllum wallisii</i>). Allergy 1995;50: 174-178. Cahen YD, Lundberg, M, Wüthrich B Indoor Allergy to Spatheflower (<i>Spathiphyllum tloribundum</i>) Allergy 1997; 52:114-115.
Sunflower	<i>Helianthus annua</i>	Agricultural	Bousquet J, et al. Occupational allergy to sunflower pollen. J Allergy Clin Immunol 1985; 75: 70-74. Quirce S, et al. Occupational asthma and contact urticaria sunflower pollen. J Allergy Clin Immunol 198; 75: 70-74. Vandenplas O, et al. Occupational asthma caused by sunflower seed dust. Allergy 1998; 53:907-8.
Sunflower, pollen and seeds	<i>Helianthenum annuus</i>	Agricultural, Laboratory	Vandenplas O, et al. Occupational asthma caused by sunflower-seed dust. Allergy 1998; 53:907 –908. Bousquet J, et al. Occupational allergy to sunflower pollen. J Allergy Clin Immunol 1985; 75:70-74.

Tea	<i>Camelia sinensis</i>	Tea processing	<p>Cartier A, Malo JL. Occupational asthma due to tea dust. Thorax 1990; 45:203-206.</p> <p>Shirai T, Sato A, Hara Y. Epigallocatechin gallate. The major causative agent of green tea-induced asthma. Chest 1994;106:1801-5.</p>
Tomato		Greenhouse worker	Vandenplas O, et al. Tomato-induced occupational asthma in a greenhouse worker. J Allergy Clin Immunol. 2008;122:1229-31
Tobacco dust	<i>Nicotiana tabacum</i>	Tobacco workers	<p>Lander F, Gravesen S. Respiratory disorders among tobacco workers. Br J Ind Med 1988; 45:500-502.</p> <p>Baur X. Occupational hypersensitivity against tobacco dust. Allergologie 1993;16:94-95.</p>
Tulip, lily	<i>Tulipa,</i> <i>Lilium longiflorum</i>	Floral workers	<p>Äuer A. Contact urticaria and respiratory symptoms from tulip and lilies. Contact Dermatitis 1986; 14: 317 – 319.</p> <p>Piirila P, et al. Occupational IgE-mediated asthma, rhinoconjunctivitis, and contact urticaria caused by Easter lily (<i>Lilium longiflorum</i>) and tulip. Allergy 1999;54:273-7.</p>
Vetch	<i>Vicia sativa</i>	Agriculture	Juste-Picon S, et al. Occupational asthma caused by vetch (<i>Vicia sativa</i>). J Allergy Clin Immunol 1991 88:135-136.
Yarrow and Safflower	<i>Achillea</i>	Florist	Combes E et al.

	<i>millefolium,</i> <i>Carthamus tinctorious</i>		Occupational asthma from dried flowers of <i>Carthamus tinctorious</i> (safflower) and <i>Achillea millefolium</i> (yarrow). <i>Allergy</i> 2006;61:1239-40.
Vegetable gums			
Arabic or acacia gum	<i>Acacia del senegal</i>	Printers Food industry	Fowler PBS. Printer's asthma. <i>Lancet</i> 1952; 2:755-7. Aleman A, Quirce S. Asma ocupacional por goma arábica en la industria alimentaria. <i>Rev Esp Alergol Inmunol Clin</i> 1999;14:2-3.
Carob bean gum	<i>Ceratonia siliqua</i>	Food industry	Scoditti A, et al. Asthma to carob bean flour. <i>Ann Allergy Asthma Immunol</i> 1996; 77: 81.
Guar gum	<i>Cypamopsis tetragonolobus</i>	Carpet manufacturing	Malo JL. Prevalence of occupational asthma and immunologic sensitization to guar gum among employees at a carpet-manufacturing plant. <i>J Allergy Clin Immunol</i> 1990;86:562-569.
Karaya gum	<i>Sterculea urens</i>	Hairdresser	Wagner W. Karaya gum hypersensitivity in an enterostomal therapist. <i>JAMA</i> 1980; 243:432.
Natural rubber latex	<i>Hevea brasiliensis</i>	Health care Latex processing	Vandenplas O, et al. Occupational asthma in symptomatic workers exposed to natural rubber latex: evaluation of diagnostic procedures. <i>J Allergy Clin Immunol</i> 2001;107:542-7. Yassin MS, et al. Lalex allergy in hospital employees. <i>Ann Allergy</i>

			<p>1994;72:245-249.</p> <p>Baur X; et al. Relevance of latex aeroallergen for healthcare workers. <i>Allergology International</i> 1995; 20:105-111.</p> <p>Grzybowski M, et al. The prevalence of anti-latex IgE antibodies among registered nurses. <i>J Allergy Clin Immunol</i> 1996;98:535-544.</p>
Tragacanth gum	<i>Astragalus gummifer</i>	Food industry	Danoff D, et al. "Big Mac Attack". <i>N Engl J Med</i> 1978; 298:1095-6.
Flours			
Barley	<i>Hordeum vulgare</i>	Bakers	Vidal C, Gonzalez-Quintela A. Food-induced and occupational asthma due to barley flour. <i>Ann Allergy Asthma Immunol</i> 1995;75:121-124.
Buckwheat	<i>Fagopyrum esculentum</i>	Bakers	<p>Park HS, Nahm DH. Buckwheat flour hypersensitivity: an occupational asthma in a noodle maker. <i>Clin Exp Allergy</i> 1996; 26: 423-427.</p> <p>Fernandez R, et al. Occupational asthma and contact urticaria caused by buckwheat flour. <i>Ann Allergy</i> 1989; 63:149-52.</p>
Corn	<i>Zea mays</i>	Food processing	Martin-Garcia C, et al. Corn-induced hypersensitivity pneumonitis. <i>Allergy</i> 2003.;58:534-5.
		Pharmaceutical industry	Maniu CM et al. Maize: a new occupational allergen in the pharmaceutical industry.

			Allergy 2010 (in press)
Grass pea	<i>Lathyrus sativus</i>	Carpenter	Anton Girones M, et al.. Occupational rhinoconjunctivitis and asthma by exposure to <i>Lathyrus sativus</i> flour. Allergol Immunopathol (Madr) 2005;33:326-8.
Lupin seed /flour	<i>Lupinus albus</i>	Bakers	Crespo J, et al. Occupational IgE mediated allergy after exposure to lupine seed flour. J Allergy Clin Immunol 2001; 108: 295-297. Campbell CP, et al.. Occupational sensitization to lupin in the workplace: occupational asthma, rhinitis, and work-aggravated asthma. J Allergy Clin Immunol 2007; 119:1133-9.
Malt		Food processing	Miedinger D, Malo JL, Cartier A, Labrecque M. Malt can cause both occupational asthma and allergic alveolitis. Allergy. 2009;64:1228-9
Oilseed rape	<i>Brassica napus</i>	Grain handlers	Suh CH, et al. Oilseed rape allergy presented as occupational asthma in the grain industry. Clin Exp Allergy 1998; 28:1159-63.
Pea	<i>Lathyrus odoratus</i>	Food industry	Bhagat R, Swystun VA, Cockcroft DW. Occupational asthma caused by pea flour. Chest 1995;107:1772.
Rye	<i>Secale cereale</i>	Bakers	Baur X, Degens PO, Sander I. Baker's asthma: still among the most frequent occupational respiratory disorders. J Allergy Clin

			Immunol 1998; 102:984-997.
Soy: bean, flour, lectine, trypsin inhibitor	<i>Glycine max</i>	Bakers	<p>Quirce S, et al. Occupational asthma caused by soybean flour in bakers-differences with soybean-induced epidemic asthma. Clin Exp Allergy 2000;30:839-846.</p> <p>Quirce S., et al. Soy-bean trypsin inhibitor is an occupational inhalant allergen. J Allergy Clin Immunol 2002; 109:178.</p> <p>Alvarez MJ, et al. Diversity of allergens causing occupational asthma among cereal workers as demonstrated by exposure procedures. Clin Exp Allergy 1996; 26:147-153.</p> <p>Baur X, et al. Inhalant allergens in modern baking industry. Immunol Allergy Pract 1989; 11:13-15.</p> <p>Lavaud F, et al. Baker's asthma related to soybean lecithin exposure. Allergy 1994; 49:159-162.</p>
Wheat	<i>Triticum aestivum</i>	Bakers	<p>Baur X, Degens PO, Sander 1. Baker's asthma: still among the most frequent occupational respiratory disorders. J Allergy Clin Immunol 1998;102:984-997.</p> <p>De Zotti R, et al. Allergic airway disease in Italian bakers and pastry makers. Occup Environ Med 1994, 51:548-552.</p>

			Houba R, Heederik D, Doekes G. Wheat sensitization and work-related symptoms in the baking industry are preventable. An epidemiologic study. <i>Am J Respir Crit Care Med</i> 1998; 158:1499-1503.
Woods			
alpha-amylase inhibitor		Sawmill, furniture	López-Rico R, et al.. Cereal alpha-amylase inhibitors cause occupational sensitization in the wood industry. <i>Clin Exp Allergy</i> 1998; 28:1286-91
Abiruana	<i>Pouteria</i>		Booth BH, Lefoltdt RH, Moffit EM. Hypersensitivity to wood dust. <i>J Allergy Clin Immunol</i> 1976; 57:352-7.
African maple	<i>Triplochiton scleroxylon</i>	Sawmill, furniture	S Quirce, et al. Identification of obeche wood (<i>Triplochiton scleroxylon</i>) allergens causing occupational asthma. <i>J Allergy Clin Immunol</i> 2000; 106:400-401. Hinojosa M, et al.. Occupational asthma caused by African maple (Obeche) and Ramin: evidence of cross reactivity between these two woods. <i>Clin Allergy</i> 1986;16:145-153. Oertmann C, Bergmann K-C. Airway diseases in woodworkers. <i>Allergologie</i> 1993; 16:334-340. Kersten W. von Wahl PG. Occupational disease in the wood-processing industrv.

			Allergologie 1994;17:55-60.
African zebrawood	<i>Microberlinia</i>	Sawmill, furniture	Bush RK, Yunginger JW, Reed CE. Asthma due to African zebrawood (<i>Microberlinia</i>) dust. Am Rev Respir Dis 1978; 117: 601-603.
Alder	<i>Alnus alginosa</i>	Sawmill, furniture	Ahman M, et al. IgE-mediated allergy to wood dusts probably does not explain the high prevalence of respiratory symptoms among Swedish woodwork teachers. Allergy 1995; 50:559-562.
Antiaris	<i>Antiaris</i>		Higuero, et al. Occupational asthma caused by IgE-mediated reactivity to <i>Antiaris</i> wood dust. J Allergy Clin Immunol 2001;107: 554-556.
Ash	<i>Fraxinus excelsior</i>	Sawmill, furniture	Fenandez-Rivas M, et al. Occupational asthma and rhinitis caused by ash (<i>Fraxinus excelsior</i>) wood dust. Allergy 1997; 52:196-199. Oertmann C, Bergmann K-C. Airway diseases in woodworkers. Allergologie 1993; 16:334-340. Spiewak R et al., Occupational asthma due to wood dust exposure (ash, oak, beech and pine) -a case study. Ann Agric Environ Med 1994;1:73-76.
Beech	<i>Fagus sylvatica</i>	Sawmill, furniture	Oertmann C, Bergmann K-C. Airway diseases in woodworkers. Allergologie 1993; 16:334-340.

			Kersten W. von Wahl PG. Occupational disease in the wood-processing industry. <i>Allergologie</i> 1994;17:55-60.
Bethabara			Yacoub MR, et al.. Occupational asthma due to bethabara wood dust. <i>Allergy</i> 2005; 60:1544-5
Cabreuva wood		Furniture	Pala G, et al. Occupational rhinitis and asthma due to cabreuva wood dust. <i>Ann Allergy Asthma Immunol.</i> 2010;104:268-9
Cedar of Lebanon	<i>Cedra libani</i>	Sawmill	Greenberg, M. Respiratory symptoms following brief exposure to cedar of Lebanon (<i>Cedra libani</i>) dust. <i>Clin Allergy</i> 1972; 2: 219-224
Cedrorana	<i>Cedrelinga catenaeformis</i> <i>Ducke</i>		Eire MA, et al. Occupational rhinitis and asthma due to cedroarana (<i>Cedrelinga catenaeformis</i> Ducke) wood dust allergy. <i>J Investig Allergol Clin Immunol.</i> 2006;16:385-7.
Central American walnut	<i>Juglans olanchana</i>	Furniture	Bush RK, Clayton O. Asthma due to Central American Walnut (<i>Juglans olanchana</i>) dust. <i>Clin Allergy</i> 1983;13: 389-394.
Chengal wood		Sawmill	Lee LT, Tan KL. Occupational asthma due to exposure to chengal wood dust. <i>Occup Med (Lond).</i> 2009 ;59:357-9
Cherry	<i>Prunus avium</i>	Sawmill, furniture	Abendroth RR, Kalveram CM, Kalveram KJ. Wood dust allergy: clinical findings, diagnosis, prognosis, new trends in protection at work. <i>Allergologie</i> 1992;15:300-

			303.
Cinnamon	<i>Cinnamomum zelanicum</i>	Sawmill	Uragoda. 1984. Asthma and other symptoms in cinnamon workers. Br J Ind Med 41:224-7.
Cocabolla	<i>Dalbergia retusa</i>	Furniture	Eaton, K.K Respiratory allergy to exotic wood dust. Clin Allergy 1973; 3: 307-310.
Colophony, abietic acid		Welders	Burge PS, et al. Bronchial provocation studies in workers exposed to the fumes of electronic soldering fluxes. Clin Allergy 1980;10: 137-149. Burge PS. et al. Occupational asthma in a factory making flux-cored solder containing colophony. Thorax 1981;36:828-834. So SY, Lam WK, Yu D. Colophony-induced asthma in a poultry vender. Clin Allergy 1981;11: 395-399.
Eastern white cedar	<i>Thuja occidentalis</i>	Sawmill, furniture	Cartier A, et al. Occupational asthma caused by eastern white cedar (<i>Thuja occidentalis</i>) with demonstration that plicatic acid is present in this wood dust and is the causal agent. J Allergy Clin Immunol 1986 ; 77:639-645. Malo JL et al. Prevalence of occupational asthma among workers exposed to eastern white cedar. Am J Respir Crit Care Med 1994;150: 11697-1701.
Falcata wood	<i>Albizia falcataria</i>	furniture	Tomioka K, et al. A case of occupational asthma induced

			by falcata wood (<i>Albizia falcataria</i>). <i>J Occup Health</i> 2006 ;48:392-5.
Fernanbouc	<i>Caesalpinia echinata</i>	Furniture	Hausen BM, Herrmann B. Bow-makers disease: an occupational disease in the manufacturing of bows for string instrument. <i>Dtsch Med Wochenschr</i> 1990; 115:169-173.
Gabon		Sawmill, furniture	Kersten W. von Wahl PG. Occupational disease in the wood-processing industry. <i>Allergologie</i> 1994; 17:55-60.
Imbuia (Brazilian walnut)	<i>Phoebe porosa</i>	Sawmill, furniture	Jeebhay MF, et al. Occupational asthma caused by imbuia wood dust. <i>J Allergy Clin Immunol</i> 1996;97: I 1025-1027
Iroko	<i>Cholophora excelsa</i>	Sawmill, furniture	Kersten W. von Wahl PG. Occupational disease in the wood-processing industry. <i>Allergologie</i> 1994; 17:55-60
Jatoba wood (Brazilian cherry)	<i>Hymenaea courbaril</i>		Quirce S, et al. Occupational asthma caused by tali and jatoba wood dusts, <i>J Allergy Clin Immunol</i> 2004; 113: 361-3.
Kejaat	<i>Pterocarpus angolensis</i>	Furniture	Ordman, D. Wood dust as an inhalant allergen. Bronchial asthma caused by kejaat wood (<i>Pterocarpus angolensis</i>). <i>S Afr Med</i> 1949; 23: 973-975
Limba	<i>Terminalia superba</i>	Sawmill, furniture	Oertrnann C, Bergmann K-C. Airway diseases in woodworkers. <i>Allergologie</i> 1993;16:334-340.
Mahagoni african	<i>Khaya anthoteca</i>	Sawmill, furniture	Oertrnann C, Bergmann K-C. Airway diseases in woodworkers. <i>Allergologie</i> 1993;16:334-340.

Mahagoni american	<i>Swietenia mahagoni</i>	Sawmill, furniture	Kersten W. von Wahl PG. Occupational disease in the wood-processing industry. <i>Allergologie</i> 1994; 17:55-60.
Makone	<i>Tieghemella heckeli</i>	Sawmill, furniture	Oertrnann C, Bergmann K-C. Airway diseases in woodworkers. <i>Allergologie</i> 1993;16:334-340. Kersten W. von Wahl PG. Occupational disease in the wood-processing industry. <i>Allergologie</i> 1994; 17:55-60.
Mukali	<i>Aningeria robusta</i>	Sawmill, furniture	Garces Sotillos MM, et al. Occupational asthma and contact urticaria caused by mukali wood dust (<i>Aningeria robusta</i>). 1 Investig Allergol Clin Immunol 1995; 5:113-114.
Oak	<i>Quercus robur</i>	Sawmill, furniture	Abendroth RR, Kalveram CM, Kalveram KJ. Wood dust allergy: clinical findings, diagnosis, prognosis, new trends in protection at work. <i>Allergologie</i> 1992; 15:300-303. Malo JL et al. Occupational asthma caused by oak wood dust. <i>Chest</i> 1995; 108: 856-858. Oertrnann C, Bergmann K-C. Airway diseases in woodworkers. <i>Allergologie</i> 1993; 16:334-340.
Pau marfin	<i>Balfourodendron riedelianum</i>	Sawmill, furniture	Basomba A, et al. . Occupational rhinitis and asthma caused by inhalation of <i>Balfourodendron riedelianum</i> (<i>Pau Marfim</i>) wood dust. <i>Allergv</i>

			1991;46: 316-318
Picea	<i>Picea abis</i>	Sawmill, furniture	Kersten W. Von Wahl PG. Occupational disease in the wood-processing industry. Allergologie 1994; 17:55-60. Oertrnann C, Bergmann K- C. Airway diseases in woodworkers. Allergologie 1993;16:334-340.
Pine	<i>Pinus sylvestris</i>	Sawmill, furniture	Kersten W. von Wahl PG. Occupational disease in the wood-processing industry. Allergologie 1994;17:55-60 Spiewak R, et al. Occupational asthma due to wood dust exposure (ash, oak, beech and pine)-a case study. Ann Agric Environ Med 1994;1:73-76
Ramin	<i>Gonystylus bancanus</i>	Furniture	Hinojosa M et al.. Occupational asthma caused by African maple (obeche) and ramin: evidence of cross reactivity between these two woods. Clin Allergy 1986;16:145-153.
Sequoia-California redwood	<i>Sequoia sempervirens</i>	Sawmill	Chan-Yeung, M., Abboud, R. Occupational asthma due to California redwood (<i>Sequoia sempervirens</i>) dust. Am Rev Respir Dis 1976; 114: 1027-1031.
Soapbark	<i>Quillaja saponaria</i>	Sawmill, furniture	Raghuprasad P, et al. <i>Quillaja</i> bark (soapbark)- induced asthma. J Allergy Clin Immunol 1980; 65:285- 287
Spindle tree	<i>Eunomimus europaeus</i>	Furniture	Herold DA, et al. Occupational wood-dust sensitivity from <i>Euonymus europaeus</i> (spindle tree) and

			investigation of cross reactivity between wood and <i>Artemisia vulgaris</i> pollen (mugwort). <i>Allergy</i> 1991; 46: 186-190.
Tali wood	<i>Erythrophleum suaveolens</i>	Furniture	Quirce S, et al. Occupational asthma caused by tali and jatoba wood dusts. <i>J Allergy Clin Immunol</i> 2004; 113: 361-3.
Tall oil	Pine resin	Rubber tyres	Tarlo SM. Occupational asthma induced by tall oil in the rubber tyre industry. <i>Clin Exp Allergy</i> 1992; 22:99-101.
Tanganika aningre		Furniture	Paggiaro PL, et al. Bronchial asthma due to inhaled wood dust. <i>Tanganyika aningre</i> . <i>Clin Allergy</i> 1980; 11: 605-610.
Teka	<i>Tectona grandis</i>	Sawmill, furniture	Oertmann C, Bergmann K-C. Airway diseases in woodworkers. <i>Allergologie</i> 1993;16:334-340.
Western red cedar, plicatic acid	<i>Thuja plicata</i>	Sawmill, furniture	<p>Chan-Yeung M, Desjardins A. Bronchial hyperresponsiveness and level of exposure in occupational asthma due to western red cedar (<i>Thuja plicata</i>). Serial observations before and after development of symptoms. <i>Am Rev Respir Dis</i> 1992; 146:1606-1609.</p> <p>Lam S, et al. Relationship between types of asthmatic reaction. Nonspecific bronchial reactivity, and specific IgE antibodies in patients with red cedar asthma. <i>J Allergy Clin</i></p>

			Immunol 1983; 72:134-139. Cote I, Kennedy S, Chan-Yeung M. Sensitivity and specificity of PC20 and peak expiratory flow rate in cedar asthma. Allergy Clin Immunol 1990; 85:592-598.
Microorganisms			
Molds			
<i>Aspergillus fumigatus</i>		Bakers, Refuse collection workers	Allmers H, Huber H, Baur X. Bronchopulmonary mould allergy of a refuse collection worker. Arbeitsmed Sozialmed Umweltmed 1997; 32:64-67. Quirce S, et al. Respiratory allergy to <i>Aspergillus</i> - derived enzymes in bakers. Asthma. J Allergy Clin Immunol 1992;90: 970-978.
<i>Aspergillus niger</i>		Laboratory workers	Seaton A, Wales D. Clinical reactions to <i>Aspergillus niger</i> in a biotechnology plant: an eight year follow up. Occup Environ Med 1994;51:54-56.
<i>Cryptococcus albidus</i> <i>Trichosporum spp.</i> <i>Gyrodontium versicolor</i>		Summer-type hypersensitivity pneumonitis	Miyagawa T, Hamagami S, Tanigawa N. Cryptococcus albidus-induced summer-type hypersensitivity pneumonitis. Am J Respir Crit Care Med 2000;161:961-6. Yoshizawa Y, et al. Chronic hypersensitivity pneumonitis in Japan: a nationwide epidemiologic survey. J Allergy Clin Immunol 1999;103:315-20.
<i>Debaryomyces hansenii</i>		Humidifiers	Yamamoto Y. et al..

			Extrinsic allergic alveolitis induced by the yeast <i>Debaryomyces hansenii</i> . Eur Respir J 2002; 20:1351-3.
<i>Dictyostelium discoideum</i>	Slime mould	Cleaners	Gottlieb SJ, et al. Occupational asthma to the slime mold <i>Dictyostelium discoideum</i> . J Occup Med 1993; 35:1231-1235.
Dust with molds		Bakers	Musk AW, et al. Respiratory symptoms, lung function, and sensitisation to flour in a British bakery. Br J Ind Med 1989; 46:636-642. Wallenstein G, et al. Occupational respiratory diseases due to moulds in millers and bakers. Z Erkrank Alm-Org 1980; 154:229-233.
<i>Neurospora spp.</i>		Carpenters Coffee dispenser	Cote I, et al. Occupational asthma caused by exposure to neurospora in a plywood factory worker. Br J Ind Med 1991; 48:279-282. Heffler E, et al. Occupational asthma caused by <i>Neurospora sitophila</i> sensitization in a coffee dispenser service operator. Ann Allergy Asthma Immunol. 2009;102:168-9
<i>Paecilomyces spp.</i>		Carpenters	Wilhelmsson B., et al. Nasal hypersensitivity in wood furniture workers. Rhinology 1985; 23:297-302.
<i>Penicillium citrinum</i>		Mushroom worker	Yoshikawa S, et al. Hypersensitivity pneumonitis induced by spores of <i>Penicillium citrinum</i> in a worker

			cultivating Enoki mushroom. Intern Med 2006;45:537-41
<i>Penicillium nalgiovensis</i>		Food industry	Talleu C, et al. Allergic asthma due to sausage mould. Rev Mal Respir. 2009;26(5):557-9
<i>Plasmopara viticola</i>		Agricultural	Wenzel W, et al. Occupational sensitization to <i>Plasmopara viticola</i> . J Allergy Clin Immunol 1994; 93: 457-463.
<i>Saccharomyces cerevisiae</i>		Bakers	Belchi-Henandez I, et al. Baker's asthma caused by <i>Saccharomyces cerevisiae</i> in dry powder form. J Allergy Clin Immunol 1996;97:131-134. Baldo BA, Baker RS. Inhalant allergies to fungi: reactions to bakers' yeast (<i>Saccharomyces cerevisiae</i>) and identification of baker's yeast enolase as an important allergen. Int Arch Allergy Appl Immunol 1988;86:201-208.
<i>Termophilic actinomycetes</i>		Farmers	Bourke SJ, et al. Hypersensitivity pneumonitis: Current concepts. Eur Respir J Suppl 2001.; 32: 81s-92s.
Gram (-): <i>Acinetobacter Iwoffii</i> <i>Klebsiella oxytoca</i> , <i>Pseudomonas fluorescens</i> ,		Humidifiers	Selman M. Hypersensitivity pneumonitis: a multifaceted deceiving disorder. Clin Chest Med 2004.;25:531-47

<p><i>Amoebas:</i></p> <p><i>Acanthamoeba castellani</i>; <i>Amoeba proteus</i>; <i>Naegleria gruber</i>,</p>		Humidifiers	<p>van Assendelft A, et al. Humidifier-associated extrinsic allergic alveolitis. Scand J Work Environ Health. 1979;5:35-41.</p>
<p><i>Mycobacteria</i></p> <p><i>Mycobacterium immunogenum</i></p> <p><i>Mycobacterium avium</i></p>		Metal removal fluids	<p>Trout D, et al. Evaluation of hypersensitivity pneumonitis among workers exposed to metal removal fluids. Appl Occup Environ Hyg 2003;18:953-60.</p> <p>Marras TK, et al. Hypersensitivity pneumonitis reaction to <i>Mycobacterium avium</i> in household water. Chest 2005;127:664-71</p>
<p>Mushrooms:</p> <p><i>Lyophyllum aggregatum</i> (Shimeji), <i>Pleurotus ostreatus</i>, <i>Lentinus edodes</i> (Shiitake), <i>Hypsizigus marmoreus</i> (Bunashimeji or Japanese mushroom)</p>		Mushroom workers	<p>Moore JE, et al. Hypersensitivity pneumonitis associated with mushroom worker's lung: an update on the clinical significance of the importation of exotic mushroom varieties. Int Arch Allergy Immunol 2005;136:98-102</p> <p>Tsushima K, et al. Hypersensitivity pneumonitis induced by spores of <i>Lyophyllum aggregatum</i>. Chest. 2001; 120:1085-93.</p> <p>Sastre J, et al. Respiratory and immunological reactions among Shiitake (<i>Lentinus edodes</i>) workers. Clin Allergy 1990; 20:13-19.</p> <p>Vereda A, et al. Occupational asthma due to</p>

			spores of <i>Pleurotus ostreatus</i> . Allergy 2007;62:211-2
Enzymes			
Alcalase from <i>Bacillus subtilis</i>		Detergent industry	Johnsen CR, et al. Allergy risk in an enzyme producing plant: A retrospective follow up study. Occup Environ Med 1997; 54: 671-675. Franz T, et al. Clinical, immunologic, and physiologic observations in factory workers exposed to <i>B. subtilis</i> enzyme dust. Allergy 1971; 47: 170-180.
Bromeline		Pharmaceutical	Gailhofer G, et al. Allergic asthma caused by Bromelin. Dermatosen 1987; 35: 174-176.
Cellulase from <i>Aspergillus niger</i>		Bakers Wood industry	Losada et al. Occupational asthma caused by cellulase. J Allergy Clin Immunol 1986;77: 635-639. Sander I, et al. Allergy to <i>Aspergillus</i> -derived enzymes in the baking industry: Identification of beta-xylosidase from <i>Aspergillus niger</i> as a new allergen (Asp n 14). J Allergy Clin Immunol 1998;102: 256-264. Tarvainen K, et al. Allergy from cellulase and xylanase enzymes. Clin Exp Allergy 1991; 21: 609-615. Kim HY, et al. Occupational asthma and IgE sensitization to cellulase in a textile industry worker. Ann Allergy Asthma Immunol

			1999;82:174-8.
Empynase		Health care workers	Bahn JW, et al .Sensitization to Empynase (pronase B) in exposed hospital personnel and identification of the empynase allergen. Clin Exp Allergy 2006; 36:352-8.
Esperase		Detergent industry	Zachariae H, et al. Detergent enzymes and occupational safety. Observations on sensitization during esperase production. Allergy 1981; 36:513-516. Johnsen CR, et al. Allergy risk in an enzyme producing plant: a retrospective follow up study. Occup Environ Med 1997; 54:671-675.
Glucoamylase		Bakers	Quirce S, et al, Glucoamylase: Another fungal enzyme associated with baker's asthma. Ann Allergy Asthma Immunol 2002;89: 197-202. Sander I, et al. Allergy to <i>Aspergillus</i> -derived enzymes in the baking industry: identification of beta-xylosidase from <i>Aspergillus niger</i> as a new allergen (Asp n 14). J Allergy Clin Immunol 1998;102:256-264.
Glucose oxidase from <i>Aspergillus niger</i>		Bakers	Baur X. Isolated enzymes of bacterial, plant and mould origin as potent inhalent and potential ingestiye antigens. Allergologie 1981; 4: 87-89.
Hemicellulase		Bakers	Baur X, et al. Inhalant allergens in modern baking industry. Immunol Allergy Pract 1989;11: 13-15.

Lactase		Pharmaceutical	Muir DC, et al. Occupational sensitization to lactase. Am J Ind Med 1997;31: 570-571
Lypase		Detergent industry	Brant A, et al. Occupational asthma caused by cellulase and lipase in the detergent industry. Occup Environ Med 2004;61:793-5.
Lysozyme		Food industry Pharmaceutical	Bemstein JA, et al. Occupational asthma induced by inhaled egg lysozyme. Chest 1993 ;103:532-535. Anibarro Bausela B, Fontela JL. Occupational asthma in a cheese worker. Allergy 1996 ; 51:960-961. Park HS. Nahm DH. Buckwheat flour hypersensitivity: an occupational asthma in a noodle maker. Clin Exp Allergy 1996;26: 423-427.
Pancreatin from pig		Food industry	Aiken T, et al. Occupational asthma due to porcine pancreatic amylase. Occup Environ Med 1997;54: 762-764. Wiessmann KJ, Baur X. Occupational asthma following long-term inhalation of pancreatic extracts. Eur J Respir Dis 1985; 66: 13-20.
Papain		Pharmaceutical	Baur X, et al. Clinical symptoms and results of skin test, RAST and bronchial provocation test in thirty-three papain workers: Evidence for strong immunogenic potency and

			<p>clinically relevant proteolytic effects of airborne papain. Clin Allergy 1982;12:9-17</p> <p>Merget R, Bergmann E. Schiirling B. Severe occupational asthma from papain. Allergo J 1995; 4:365-369.</p>
Pepsin		Food industry (cheese)	<p>Anibarro Bausela B, Fontela JL. Occupational asthma in a cheese worker. Allergy 1996; 51:960-961.</p> <p>Drexler H, Beyer B. Occupational asthma due to pepsin powder in a women checking meat for <i>Trichinae</i>. Arbeitsmed Sozialmed Umweltmed 1997;32:145-147.</p> <p>L. Belleri, et al. Occupational exposure to pectinase. Allergy 2002;57: 755.</p>
Peptidase from <i>serratia</i>		Pharmaceutical, Food industry	<p>Park HS. Nahm DH. New occupational allergen in a phannaceutical industry: serratial peptidase and Iysozyme chloride. Ann Allergy Asthma Immunol 1997.; 78:225-229.</p>
Phytase from <i>Aspergillus niger</i>		Animal formula feed	<p>Straburger K, et al. Sensitization due to the enzymes phytase and xylanase. 1998. In: Hallier E, Bünger J, editors. 38. Jahrestagung Dtsch Ges Arbeits Umweltmedizin, Fulda, p525-527.</p> <p>Doekes G. et al.</p>

			<p>Occupational IgE sensitisation to phytase, a phosphatase derived from <i>Aspergillus niger</i>. <i>Occup Environ Med</i> 1999;56:454-459.</p> <p>van Heemst RC, et al. Hypersensitivity pneumonitis caused by occupational exposure to phytase. <i>Eur Respir J</i>. 2009;33:1507-9.</p>
Proteases		Detergent industry	<p>Franz T, et al. Clinical, immunologic, and physiologic observations in factory workers exposed to <i>B. subtilis</i> enzyme dust. <i>Allergy</i> 1971; 47:170-180.</p>
β -xylanase from <i>Asp niger</i>		Laboratory	<p>Baur X, et al. Baker's asthma due to enzyme xylanase-a new occupational allergen. <i>Clin Exp Allergy</i> 1998;28: 1591-1593.</p> <p>Sander I, et al. Allergy to <i>Aspergillus</i>-derived enzymes in the baking industry: Identification of β-xylosidase from <i>Aspergillus niger</i> as a new allergen (Asp n 14). <i>J Allergy Clin Immunol</i> 1998;102: 256-264.</p> <p>Tarvainen K, et al. Allergy from cellulase and xylanase enzymes. <i>Clin Exp Allergy</i> 1991; 21: 609-615.</p>
Suparen	Rennet of <i>Endothica parasitica</i>	Cheese makers	<p>Niinimaki A, Saari S. Dermatological and allergic hazards of cheesemakers. <i>Scand J Work Environ Health</i> 1978;4: 262-263.</p>

Trypsin from cow and pig		Plastic, Pharmaceutical	<p>Colten HR, et al. Immediate hypersensitivity to hog trypsin resulting from industrial exposure. N Eng J Med 1975.;292: 1050-1053.</p> <p>Johnsen CR, et al. Allergy risk in an enzyme producing plant: a retrospective follow up study. Occup Environ Med 1997; 54:671-675.</p>
α -amylase from <i>Aspergillus oryzae</i>		Bakers	<p>Baur X, Chen Z, Sander I. Isolation and denomination of an important allergen in baking additives: α-amylase from <i>Aspergillus oryzae</i> (Asp o 1). Clin Exp Allergy 1994; 24:465-470.</p> <p>Quirce S, et al. Respiratory allergy to <i>Aspergillus</i>-derived enzymes in baker's asthma. J Allergy Clin Immunol 1992;90: 970-978.</p> <p>Losada et al. Occupational asthma caused by α-amylase inhalation: Clinical and immunological findings and bronchial response patterns. J Allergy Clin Immunol 1992; 89: 118-125.</p> <p>Vanhanen M, et al. Enzyme exposure and enzyme sensitisation in the baking industry. Occup Environ Med 1996;53: 670-676.</p>

OCCUPATIONAL EOSINOPHILIC BRONCHITIS			
---	--	--	--

Acrylate		Industry	Lemiere C, Efthimiadis A, Hargreave FE. Occupational eosinophilic bronchitis without asthma: an unknown occupational airway disease. J Allergy Clin Immunol 1997;100:852-3.
Bunashimeji or Japanese mushroom	<i>Hypsizigus marmoreus</i>	Mushroom worker	Tanaka H, et al. Workplace-related chronic cough on a mushroom farm. Hypsizigus marmoreus (Bunashimeji) Chest 2002;122:1080-5
Chloramine T		Health care worker	Krakowiak AM, et al. Occupational eosinophilic bronchitis without asthma due to chloramine exposure. Occup Med 2005;55:396-8
Formaldehyde			Yacoub MR, et al. Occupational eosinophilic bronchitis. Allergy 2005;60:1542-4.
Latex	<i>Hevea brasiliensis</i>	Health care worker	Quirce S, et al. Chronic cough due to latex-induced eosinophilic bronchitis. J Allergy Clin Immunol 2001;108:143.
Lysozyme		Baker	Quirce S. Eosinophilic bronchitis in the workplace. Curr Opin Allergy Clin Immunol 2004;4:87-91.
Stainless steel (welding)		Industry	Yacoub MR, et al. Occupational eosinophilic bronchitis. Allergy 2005;60:1542-4.
Tetrahydro phthalic anhydride.		Industry	Kobayashi O. A case of eosinophilic bronchitis due to epoxy resin system hardener, methylene tetrahydro phthalic anhydride. Arerugi 1994;43:660-2.

Toluene diisocyanate	TDI	Industry	Di Stefano F, et al. Occupational eosinophilic bronchitis in a foundry worker exposed to isocyanate and a baker exposed to flour. Thorax 2007;62:368-70.
Wheat flour		Baker	Di Stefano F, et al. Occupational eosinophilic bronchitis in a foundry worker exposed to isocyanate and a baker exposed to flour. Thorax 2007;62:368-70.
Fungal alpha-amylase		Baker	Barranco P, et al. Nonasthmatic eosinophilic bronchitis in a baker caused by fungal alpha-amylase and wheat flour. J Investig Allergol Clin Immunol. 2008;18:494-5
Styrene		Painter	Fernández-Nieto M, et al. Changes in sputum eicosanoids and inflammatory markers after inhalation challenges with occupational agents. Chest. 2009;136:1308-15