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APPENDIX 1

DUST HAZARD CLASS (1988 Edition NFPA68)

Table D-1 Agricultural Products

Material	Median particle size (microns)	Lower Explosion Limit (LEL) (g/m^3)	P_{max} bar ga	$(dP/dt)_{max}$ bar/sec	K_{St} bar-m-sec	Dust Hazard Class
Cellulose	33	60	9.7	229	229	2
Cellulose, pulp	42	30	9.9	62	62	1
Cork	42	30	9.6	202	202	2
Corn	28	60	9.4	75	75	1
Egg White	17	125	8.3	38	38	1
Milk, powdered	83	60	5.8	28	28	1
Milk, non-fat, dry	60	-	8.8	125	125	1
Soy Flour	20	200	9.2	110	110	1
Corn Starch	7	-	10.3	202	202	2
Rice Starch	18	60	9.2	101	101	1
Wheat Starch	22	30	9.9	115	115	1
Sugar	30	200	8.5	138	138	1
Sugar, milk	27	60	8.3	82	82	1
Sugar, beet	29	60	8.2	59	59	1
Tapioca	22	125	9.4	62	62	1
Whey	41	125	9.8	140	140	1
Wood Flour	29	-	10.5	205	205	2

Table D-2 Carbonaceous Dusts

Material	Median particle size (microns)	Lower Explosion Limit (LEL) (g/m^3)	P_{max} bar ga	$(dP/dt)_{max}$ bar/sec	K_{St} bar-m-sec	Dust Hazard Class
Charcoal activated	28	60	7.7	44	44	1
Charcoal, wood	14	60	9	10	10	1
Coal, bituminous	24	60	9.2	129	129	1
Coke, petroleum	15	125	7.6	47	47	1
Lampblack	<10	60	8.4	121	121	1
Lignite	32	60	10	151	151	1
Peat, 15 % H_2O		58	60	10.9	157	1
Peat, 22 % H_2O		46	125	8.4	69	1
Soot, pine	<10	-	7.9	26	26	1

Table D-3 Chemical Dusts

Material	Median particle size (microns)	Lower Explosion Limit (LEL) (g/m^3)	P_{max} bar ga	$(dP/dt)_{max}$ bar/sec	K_{St} bar-m-sec	Dust Hazard Class
Adipic Acid	<10	60	8	97	97	1
Anthraquinone	<10	-	10.5	364	364	3
Ascorbic Acid	39	60	9	111	111	1
Calcium Acetate	92	500	5.2	9	9	1
Calcium Acetate	85	250	6.5	21	21	1
Calcium Stearate	12	30	9.1	132	132	1
Carboxy-methyl cellulose	24	125	9.2	136	136	1
Dextrin	41	60	8.8	106	106	1
Lactose	23	60	7.7	81	81	1
Lead Stearate	12	30	9.2	152	152	1
Methyl-cellulose	75	60	9.5	134	134	1
Paraform-aldehyde	23	60	9.9	178	178	1
Sodium Ascorbate	23	60	8.4	119	119	1
Sodium Stearate	22	30	8.8	123	123	1
Sulfur	20	30	6.8	151	151	1

Table D-4 Metal Dusts

Material	Median particle size (microns)	Lower Explosion Limit (LEL) (g/m^3)	P_{max} bar ga	$(dP/dt)_{max}$ bar/sec	K_{St} bar-m-sec	Dust Hazard Class
Aluminum	28	60	7.7	44	44	1
Bronze	14	60	9	10	10	1
Iron Carbonyl	24	60	9.2	129	129	1
Magnesium	15	125	7.6	47	47	1
Zinc	<10	60	8.4	121	121	1
Zinc	32	60	10	151	151	1

Table D-5 Plastics Dusts

Material	Median particle size (microns)	Lower Explosion Limit (LEL) (g/m^3)	P_{max} bar ga	$(dP/dt)_{max}$ bar/sec	K_{St} bar-m-sec	Dust Hazard Class
(poly)Acrylamide	10	250	5.9	12	12	1
(poly)Acrylonitrile	25	-	8.5	121	121	1
(poly)Ethylene (Low Pressure Process)	<10	20	8	156	156	1
Epoxy Resin	26	30	7.9	129	129	1
Melamine Resin	18	125	10.2	110	110	1
Melamine, molded (Wood flour and Mineral filled Phenol-Form-aldehyde)	15	60	7.5	41	41	1
Melamine, molded (Phenol-Cellulose)	12	60	10	127	127	1
(poly)Methyl Acrylate	21	30	9.4	269	269	2
(poly)Methyl Acrylate, Emulsion Polymer	18	30	10.1	202	202	2
Phenolic Resin	<10	15	9.3	129	129	1
(poly)Propylene	25	30	8.4	101	101	1
Terpene Phenol Resin	10	15	8.7	143	143	1
Urea-Formaldehyde/ Cellulose, Molded	13	60	10.2	136	136	1
(poly)Vinyl Acetate/ Ehtylene Copolymer	32	30	8.6	119	119	1
(poly)Vinyl Alcohol	25	60	8.9	128	128	1
(poly)Vinyl Butyral	65	30	8.9	147	147	1
(poly)Vinyl Chloride	107	200	7.6	46	46	1
(poly)Vinyl Chloride/ Vinyl Acetylene Emulsion Copolymer	35	60	8.2	95	95	1
(poly)Vinyl Chloride/ Ethylene/Vinyl Acetylene Suspension Copolymer	60	60	8.3	98	98	1

APPENDIX 2

Table Lyco-1 Measurement of LEL for lycopodium powder

(without drying of compressed air)

Test date	2-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Lycopodium		
Type of test powder	APPIE Standard test powder		
Particle size	25 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 28^0 C, Relative humidity: 58%		
Spark delay time	0.1 seconds		
Width of air flow channel	2 mm		
Distance of sparking electrode	5 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.0673	54.8	
2	0.0670	54.6	
3	0.0669	54.5	
Average		54.6	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-2 Measurment of LEL for lycopodium powder

(after improvement by installation of silica gel to dry compressed air)

Test date	4-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Lycopodium		
Type of test powder	APPIE Standard test powder		
Particle size	25 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 28^0 C, Relative humidity: 60%		
Spark delay time	0.1 seconds		
Width of air flow channel	2 mm		
Distance of sparking electrode	5 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.0624	50.8	
2	0.0624	50.8	
3	0.0620	50.5	
Average		50.7	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-3 Measurment of LEL for lycopodium powder
(after improvment by varying of spark delay time)

Test date	5-Feb	**Name**	Songchai	
Instrument	C.U. Explosibility Tester #1			
Name of test powder	Lycopodium			
Type of test powder	APPIE Standard test powder			
Particle size	25 microns+			
Pretreatment	Kept in a dessicator more than 1 day			
Drying condition	no	Temperature: C, Time: h, (Moisture: %)		
Atmospheric temperature and humidity	Temperature: 29^0 C, Relative humidity: 63%			
Spark delay time	0.1 seconds			
Width of air flow channel	2 mm			
Distance of sparking electrode	5 mm			
Compressed air	1.8 kg/cm^{3}G			
Filter paper	1 piece(s)	**Type:**	Whatman No. 93	
Number of measurements	3 Times			
Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**		**Remarks**
1	0.0623	50.7		
2	0.0621	50.6		
3	0.0620	50.5		
Average		50.6		
Evaluation (reference)	Explosibility: High			

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-4 Measurment of LEL for lycopodium powder

(after improvment by varying of spark delay time)

Test date	6-Feb	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Lycopodium		
Type of test powder	APPIE Standard test powder		
Particle size	25 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 28^0 C, Relative humidity: 56%		
Spark delay time	0.3 seconds		
Width of air flow channel	2 mm		
Distance of sparking electrode	5 mm		
Compressed air	1.8 kg/cm^3G		
Filter paper	1 piece(s)	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.0690	56.2	
2	0.0688	56.0	
3	0.0685	55.8	
Average		56.0	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-5 Measurment of LEL for lycopodium powder

(after improvment by varying of spark delay time)

Test date	7-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Lycopodium		
Type of test powder	APPIE Standard test powder		
Particle size	25 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 30^0 C, Relative humidity: 65%		
Spark delay time	0.5 seconds		
Width of air flow channel	2 mm		
Distance of sparking electrode	5 mm		
Compressed air	1.8 kg/cm^3G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.0790	64.4	
2	0.0783	63.8	
3	0.0780	63.5	
Average		63.9	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-6 Measurment of LEL for lycopodium powder
(after improvement by adjusting the air flow channel)

Test date	10-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Lycopodium		
Type of test powder	APPIE Standard test powder		
Particle size	25 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 31^0 C, Relative humidity: 60%		
Spark delay time	0.1 seconds		
Width of air flow channel	1.5 mm		
Distance of sparking electrode	5 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.0590	48.1	
2	0.0589	48.0	
3	0.0586	47.7	
Average		47.9	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-7 Measurment of LEL for lycopodium powder

(after improvement by adjusting the air flow channel)

Test date	11-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Lycopodium		
Type of test powder	APPIE Standard test powder		
Particle size	25 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 32^0 C, Relative humidity: 55%		
Spark delay time	0.1 seconds		
Width of air flow channel	1.0 mm		
Distance of sparking electrode	5 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.0580	47.2	
2	0.0580	47.2	
3	0.0577	47.0	
Average		47.2	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-8 Measurment of LEL for lycopodium powder

(after improvement by adjusting the air flow channel)

Test date	12-Feb	Name	Songchai	
Instrument	C.U. Explosibility Tester #1			
Name of test powder	Lycopodium			
Type of test powder	APPIE Standard test powder			
Particle size	25 microns+			
Pretreatment	Kept in a dessicator more than 1 day			
Drying condition	no	Temperature: C, Time: h, (Moisture: %)		
Atmospheric temperature and humidity	Temperature: 32^0 C, Relative humidity: 55%			
Spark delay time	0.1 seconds			
Width of air flow channel	0.5 mm			
Distance of sparking electrode	5 mm			
Compressed air	1.8 kg/cm^{3}G			
Filter paper	1 piece(s)	Type:	Whatman No. 93	
Number of measurements	3 Times			
Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks	
1	0.0587	47.8		
2	0.0585	47.7		
3	0.0584	47.6		
Average		47.7		
Evaluation (reference)	Explosibility: High			

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-9 Measurment of LEL for lycopodium powder

(after improvement by adjusting the gap between the sparking electrode)

Test date	14-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Lycopodium		
Type of test powder	APPIE Standard test powder		
Particle size	25 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 32^0 C, Relative humidity: 60%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	6 mm		
Compressed air	1.8 kg/cm^3G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.0585	47.7	
2	0.0584	47.6	
3	0.0583	47.5	
Average		47.6	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-10 Measurment of LEL for lycopodium powder

(after improvement by adjusting the gap between the sparking electrode)

Test date	15-Feb	**Name**	Songchai	
Instrument	C.U. Explosibility Tester #1			
Name of test powder	Lycopodium			
Type of test powder	APPIE Standard test powder			
Particle size	25 microns+			
Pretreatment	Kept in a dessicator more than 1 day			
Drying condition	no	Temperature: C, Time: h, (Moisture: %)		
Atmospheric temperature and humidity	Temperature: 31° C, Relative humidity: 58%			
Spark delay time	0.1 seconds			
Width of air flow channel	1 mm			
Distance of sparking electrode	4 mm			
Compressed air	1.8 kg/cm^{3}G			
Filter paper	1 piece(s)	**Type:**	Whatman No. 93	
Number of measurements	3 Times			
Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**	
1	0.0580	47.2		
2	0.0579	47.2		
3	0.0578	47.1		
Average		47.2		
Evaluation (reference)	Explosibility: High			

Note + : Mass-average particle size was measured using the micron photo sizer

Table Lyco-11 Measurment of LEL for lycopodium powder

(after improvement by varying the number of filter paper)

Test date	17-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Lycopodium		
Type of test powder	APPIE Standard test powder		
Particle size	25 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 32^0 C, Relative humidity: 62%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^{3}G		
Filter paper	2 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.0592	48.2	
2	0.0588	47.9	
3	0.0586	47.7	
Average		48.0	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table HDPE-1 Measurement of LEL for HDPE powder

Test date	20-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	HDPE		
Type of test powder	Plastic powder		
Particle size	33.6 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 32^0 C, Relative humidity: 60%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	4 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.0338	27.5	
2	0.0335	27.3	
3	0.0300	24.4	
4	0.0300	24.4	
Average		25.9	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Dextrin-1 Measurement of LEL for Dextrin powder

Test date	22-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Dextrin		
Type of test powder	Agricultural powder		
Particle size	55 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 31.5^0 C, Relative humidity: 62%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	5 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.0745	60.7	
2	0.0725	59.1	
3	0.0707	57.6	
4	0.0704	57.3	
5	0.0696	56.7	
Average		58.3	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Sulfur-1 Measurement of LEL for Sulfur powder

Test date	26-Feb	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Sulfur		
Type of test powder	Chemical powder		
Particle size	29 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 33^0 C, Relative humidity: 65%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8 kg/cm^3G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	5 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.0464	37.8	
2	0.0455	37.1	
3	0.0449	36.6	
4	0.0448	36.5	
5	0.0442	36.0	
Average		36.8	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Toner(F)-1 Measurement of LEL for fresh toner (new) powder

Test date	10-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Toner (Virgin)		
Type of test powder	XEROX powder		
Particle size	19.4 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 34^0 C, Relative humidity: 64%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.0 kg/cm^3G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.0497	40.5	
2	0.0495	40.3	
3	0.0492	40.1	
Average		40.3	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Toner(U)-2 Measurement of LEL for used toner (once-through) powder

Test date	11-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Toner (Waste)		
Type of test powder	XEROX powder		
Particle size	22.8 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 33^0 C, Relative humidity: 58%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.0 kg/cm^3G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.0614	50.0	
2	0.0582	47.4	
3	0.0555	45.2	
Average		47.5	
Evaluation (reference)	Explosibility: High		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Cas-1 Measurement of LEL for cassava flour powder

Test date	14-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Cassava flour (towyaymom)		
Type of test powder	Agricultural powder		
Particle size	<45 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 8.7 %)	
Atmospheric temperature and humidity	Temperature: 31^0 C, Relative humidity: 61%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.7 kg/cm^3G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	4 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2028	165.2	
2	0.1979	161.2	
3	0.1965	160.1	
4	0.1962	159.8	
Average		161.6	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the standard sieve

Table Cas-2 Measurement of LEL for cassava flour powder

Test date	15-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Cassava flour (towyaymom)		
Type of test powder	Agricultural powder		
Particle size	45-53 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 7.8 %)	
Atmospheric temperature and humidity	Temperature: 32.5^0 C, Relative humidity: 59%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.7 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	5 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2049	166.9	
2	0.2023	164.8	
3	0.2000	162.9	
4	0.1986	161.8	
5	0.1970	160.5	
Average		164.1	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the standard sieve

Table Cas-3 Measurement of LEL for cassava flour powder

Test date	16-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Cassava flour (towyaymom)		
Type of test powder	Agricultural powder		
Particle size	53-75 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 7.1 %)	
Atmospheric temperature and humidity	Temperature: 31.5^0 C, Relative humidity: 64%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2547	207.5	
2	0.2545	207.3	
3	0.2539	206.8	
Average		207.2	
Evaluation (reference)	Explosibility: Low		

Note @ : Mass-average particle size was measured using the standard sieve

Table Cas-4 Measurement of LEL for cassava flour powder

Test date	18-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Cassava flour (dagon fish brand)		
Type of test powder	Agricultural powder		
Particle size	<45 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 9.2 %)	
Atmospheric temperature and humidity	Temperature: 31.5^0 C, Relative humidity: 62%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.1410	114.9	
2	0.1409	114.8	
3	0.1402	114.2	
Average		114.6	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the standard sieve

Table Cas-5 Measurement of LEL for cassava flour powder

Test date	18-Mar	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Cassava flour (dagon fish brand)		
Type of test powder	Agricultural powder		
Particle size	45-53 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 8.9 %)	
Atmospheric temperature and humidity	Temperature: 31.5^0 C, Relative humidity: 62%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8-1.9 kg/cm^{3}G		
Filter paper	1 piece(s)	Type:	Whatman No. 93
Number of measurements	5 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.1554	126.6	
2	0.1523	124.1	
3	0.1456	118.6	
4	0.1430	116.5	
5	0.1425	116.1	
Average		120.4	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the standard sieve

Table Cas-6 Measurement of LEL for cassava flour powder

Test date	19-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Cassava flour (dagon fish brand)		
Type of test powder	Agricultural powder		
Particle size	53-75 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 8.7 %)	
Atmospheric temperature and humidity	Temperature: 33^0 C, Relative humidity: 60%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.9-2.0 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	4 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.1532	124.8	
2	0.1513	123.2	
3	0.1475	120.1	
4	0.1464	119.3	
Average		121.9	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the standard sieve

Table Cas-7 Measurement of LEL for cassava flour powder

Test date	20-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Cassava flour (dagon fish brand)		
Type of test powder	Agricultural powder		
Particle size	75-106 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 9.0 %)	
Atmospheric temperature and humidity	Temperature: 33.5^0 C, Relative humidity: 56%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.4 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	5 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2128	173.3	
2	0.2090	170.2	
3	0.2016	164.2	
4	0.1965	160.1	
5	0.1964	160.0	
Average		165.6	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the standard sieve

Table Cas-8 Measurement of LEL for cassava flour powder

Test date	2-Apr	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	As bought (dried) Type F1 cassava flour		
Type of test powder	Agricultural powder		
Particle size	<45-180 microns#		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 4.5 %)	
Atmospheric temperature and humidity	Temperature: 34^0 C, Relative humidity: 65%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.3600	293.2	
2	0.3560	290.0	
3	0.3510	285.9	
Average		289.7	
Evaluation (reference)	Explosibility: Low		

Note # : untreated (as boughtl flour)

Table Cas-9 Measurement of LEL for cassava flour powder

Test date	3-Apr	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	As bought (undried) Type F1 cassava flour		
Type of test powder	Agricultural powder		
Particle size	<45-180 microns#		
Pretreatment	No pretreatment		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 35^0 C, Relative humidity: 62%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^3G		
Filter paper	1 piece(s)	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.3800	309.5	
2	0.3775	307.5	
3	0.3750	305.5	
Average		307.5	
Evaluation (reference)	Explosibility: Low		

Note # : untreated (As bought flour)

Table Cas-10 Measurement of LEL for cassava flour powder

Test date	4-Apr	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	As bought (dried) Type F2 cassava flour		
Type of test powder	Agricultural powder		
Particle size	<45-180 microns#		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 3.9 %)	
Atmospheric temperature and humidity	Temperature: 34.5^0 C, Relative humidity: 55%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^{3}G		
Filter paper	1 piece(s)	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.3110	253.3	
2	0.3100	252.5	
3	0.3060	249.3	
Average		251.7	
Evaluation (reference)	Explosibility: Low		

Note # : untreated (As bought flour)

Table Cas-11 Measurement of LEL for cassava flour powder

Test date	5-Apr	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	As bought (undried) Type F2 cassava flour		
Type of test powder	Agricultural powder		
Particle size	<45-180 microns#		
Pretreatment	No pretreatment		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 35^0 C, Relative humidity: 63%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^3G		
Filter paper	1 piece(s)	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.3250	264.7	
2	0.3160	257.4	
3	0.3145	256.2	
Average		259.4	
Evaluation (reference)	Explosibility: Low		

Note # : untreated (As bought flour)

Table Rice-1 Measurement of LEL for Rice flour powder

Test date	21-Mar	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Rice flour (Erawan brand)		
Type of test powder	Agricultural powder		
Particle size	106-150 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 6.5 %)	
Atmospheric temperature and humidity	Temperature: 33^0 C, Relative humidity: 61%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^3G		
Filter paper	1 pieces	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.1278	104.1	
2	0.1260	102.6	
3	0.1254	102.1	
Average		103.0	
Evaluation (reference)		Explosibility: Medium	

Note @ : Mass-average particle size was measured using the Standard sieve

Table Rice-2 Measurement of LEL for Rice flour powder

Test date	22-Mar	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Rice flour (Erawan brand)		
Type of test powder	Agricultural powder		
Particle size	150-180 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 6.8 %)	
Atmospheric temperature and humidity	Temperature: 32^0 C, Relative humidity: 59%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.6 kg/cm^3G		
Filter paper	1 pieces	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.1530	124.6	
2	0.1495	121.8	
3	0.1490	121.4	
Average		122.6	
Evaluation (reference)		Explosibility: Medium	

Note @ : Mass-average particle size was measured using the Standard sieve

Table Rice-3 Measurement of LEL for Rice flour powder

Test date	23-Mar	Name	Songchai	
Instrument	C.U. Explosibility Tester #1			
Name of test powder	Rice flour (Erawan brand)			
Type of test powder	Agricultural powder			
Particle size	>180 microns@			
Pretreatment	Kept in a dessicator more than 1 day			
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 6.2 %)		
Atmospheric temperature and humidity	Temperature: 33^0 C, Relative humidity: 65%			
Spark delay time	0.1 seconds			
Width of air flow channel	1 mm			
Distance of sparking electrode	4 mm			
Compressed air	2.7 kg/cm^3G			
Filter paper	1 pieces	Type:	Whatman No. 93	
Number of measurements	3 Times			

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.1750	142.5	
2	0.1740	141.7	
3	0.1740	141.7	
Average		142.0	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Corn-1 Measurement of LEL for Corn flour powder

Test date	24-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Corn flour (Tamfood brand)		
Type of test powder	Agricultural powder		
Particle size	<45 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 4.2 %)	
Atmospheric temperature and humidity	Temperature: 32^0 C, Relative humidity: 56%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.7 kg/cm^{3}G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.1920	156.4	
2	0.1921	156.5	
3	0.1900	154.8	
Average		155.9	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Corn-2 Measurement of LEL for Corn flour powder

Test date	25-Mar	**Name**	Songchai	
Instrument	C.U. Explosibility Tester #1			
Name of test powder	Corn flour (Tamfood brand)			
Type of test powder	Agricultural powder			
Particle size	45-53 microns@			
Pretreatment	Kept in a dessicator more than 1 day			
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 4.0 %)		
Atmospheric temperature and humidity	Temperature: 33.5^0 C, Relative humidity: 60%			
Spark delay time	0.1 seconds			
Width of air flow channel	1 mm			
Distance of sparking electrode	4 mm			
Compressed air	1.8 kg/cm^{3}G			
Filter paper	1 pieces	**Type:**	Whatman No. 93	
Number of measurements	3 Times			

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.1959	159.6	
2	0.1943	158.3	
3	0.1940	158.0	
Average		158.6	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Corn-3 Measurement of LEL for Corn flour powder

Test date	26-Mar	**Name**	Songchai	
Instrument	C.U. Explosibility Tester #1			
Name of test powder	Corn flour (Tamfood brand)			
Type of test powder	Agricultural powder			
Particle size	53-75 microns@			
Pretreatment	Kept in a dessicator more than 1 day			
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 3.95 %)		
Atmospheric temperature and humidity	Temperature: 32^0 C, Relative humidity: 58%			
Spark delay time	0.1 seconds			
Width of air flow channel	1 mm			
Distance of sparking electrode	4 mm			
Compressed air	1.8 kg/cm^{3}G			
Filter paper	1 pieces	**Type:**	Whatman No. 93	
Number of measurements	3 Times			

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2052	167.1	
2	0.2039	166.1	
3	0.2035	165.8	
Average		166.3	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Corn-4 Measurement of LEL for Corn flour powder

Test date	27-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Corn flour (Tamfood brand)		
Type of test powder	Agricultural powder		
Particle size	75-106 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 3.83 %)	
Atmospheric temperature and humidity	Temperature: 33^0 C, Relative humidity: 62%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.9 kg/cm^{3}G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2220	180.8	
2	0.2216	180.5	
3	0.2195	178.8	
Average		180.0	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Corn-5 Measurement of LEL for Corn flour powder

Test date	27-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Corn flour (Tamfood brand)		
Type of test powder	Agricultural powder		
Particle size	106-150 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 3.80 %)	
Atmospheric temperature and humidity	Temperature: 33^0 C, Relative humidity: 62%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.0 kg/cm^3G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2260	184.1	
2	0.2258	183.9	
3	0.2255	183.7	
Average		183.9	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Rice-4 Measurement of LEL for Rice flour powder

Test date	6-Apr	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	As bought (dried) Type F3 rice flour		
Type of test powder	Agricultural powder		
Particle size	53-180 microns#		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 6.6 %)	
Atmospheric temperature and humidity	Temperature: 34.5^0 C, Relative humidity: 65%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.5 kg/cm^3G		
Filter paper	1 pieces	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.1585	129.1	
2	0.1580	128.7	
3	0.1570	127.9	
Average		128.6	
Evaluation (reference)		Explosibility: Medium	

Note # : untreated (as bought flour)

Table Corn-6 Measurement of LEL for Corn flour powder

Test date	28-Mar	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Corn flour (Tamfood brand)		
Type of test powder	Agricultural powder		
Particle size	150-180 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 3.68 %)	
Atmospheric temperature and humidity	Temperature: 31^0 C, Relative humidity: 57%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^3G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2332	190.0	
2	0.2316	188.7	
3	0.2315	188.6	
Average		189.1	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Corn-7 Measurement of LEL for Corn flour powder

Test date	8-Apr	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	As bought (dried) Type F4 corn flour		
Type of test powder	Agricultural powder		
Particle size	<45-180 microns#		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 3.7 %)	
Atmospheric temperature and humidity	Temperature: 34.5^0 C, Relative humidity: 59%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^{3}G		
Filter paper	1 pieces	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.2375	193.5	
2	0.2365	192.6	
3	0.2360	192.2	
Average		192.8	
Evaluation (reference)	Explosibility: Medium		

Note # : untreated (as bought flour)

Table Corn-8 Measurement of LEL for Corn flour powder

Test date	9-Apr	**Name**	Songchai		
Instrument	C.U. Explosibility Tester #1				
Name of test powder	As bought (undried) Type F4 corn flour				
Type of test powder	Agricultural powder				
Particle size	<45-180 microns#				
Pretreatment	No pretreatment				
Drying condition	no	Temperature: C, Time: h, (Moisture: %)			
Atmospheric temperature and humidity	Temperature: 35^0 C, Relative humidity: 66%				
Spark delay time	0.1 seconds				
Width of air flow channel	1 mm				
Distance of sparking electrode	4 mm				
Compressed air	2.2 kg/cm^{3}G				
Filter paper	1 pieces	**Type:**	Whatman No. 93		
Number of measurements	3 Times				
Sample no.	**Weight of dust sample (g)**		**Lower Explosion Limit (g/m^3)**		**Remarks**
1	0.4560		371.4		
2	0.4441		361.8		
3	0.4140		337.2		
Average			356.8		
Evaluation (reference)	Explosibility: Low				

Note # : untreated (as bought flour)

Table Wheat-1 Measurement of LEL for Wheat flour powder

Test date	11-Apr	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Wheat flour (Australian wheat))		
Type of test powder	Agricultural powder		
Particle size	106-150 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 5.2 %)	
Atmospheric temperature and humidity	Temperature: 36^0 C, Relative humidity: 60%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^3G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2064	168.1	
2	0.1952	159.0	
3	0.1950	158.8	
Average		162.0	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Wheat-2 Measurement of LEL for Wheat flour powder

Test date	12-Apr	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Wheat flour (Australian wheat))		
Type of test powder	Agricultural powder		
Particle size	150-180 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 4.96 %)	
Atmospheric temperature and humidity	Temperature: 36^0 C, Relative humidity: 64%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.3 kg/cm^3G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2358	192.1	
2	0.2305	187.8	
3	0.2294	186.9	
Average		188.9	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Wheat-3 Measurement of LEL for Wheat flour powder

Test date	13-Apr	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Wheat flour (Australian wheat))		
Type of test powder	Agricultural powder		
Particle size	>180 microns@		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 4.68 %)	
Atmospheric temperature and humidity	Temperature: 35.5^0 C, Relative humidity: 59%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.4 kg/cm^3G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2350	191.4	
2	0.2325	189.4	
3	0.2325	189.4	
Average		190.1	
Evaluation (reference)	Explosibility: Medium		

Note @ : Mass-average particle size was measured using the Standard sieve

Table Wheat-4 Measurement of LEL for Wheat flour powder

Test date	14-Apr	**Name**	Songchai	
Instrument	C.U. Explosibility Tester #1			
Name of test powder	As bought (dried) Type F5 wheat flour			
Type of test powder	Agricultural powder			
Particle size	45-180 microns#			
Pretreatment	Kept in a dessicator more than 1 day			
Drying condition	yes	Temperature: 50 C, Time: 24 h, (Moisture: 4.78 %)		
Atmospheric temperature and humidity	Temperature: 34^0 C, Relative humidity: 64%			
Spark delay time	0.1 seconds			
Width of air flow channel	1 mm			
Distance of sparking electrode	4 mm			
Compressed air	2.2 kg/cm^{3}G			
Filter paper	1 pieces	**Type:**	Whatman No. 93	
Number of measurements	3 Times			

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.2041	166.3	
2	0.2040	166.2	
3	0.2000	162.9	
Average		165.1	
Evaluation (reference)	Explosibility: Medium		

Note # : untreated (as bought flour)

Table Wheat-5 Measurement of LEL for Wheat flour powder

Test date	15-Apr	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	As bought (undried) Type F5 wheat flour		
Type of test powder	Agricultural powder		
Particle size	45-180 microns#		
Pretreatment	No pretreatment		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 34.5^0 C, Relative humidity: 60%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.2 kg/cm^{3}G		
Filter paper	1 pieces	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.2290	186.5	
2	0.2250	183.3	
3	0.2200	179.2	
Average		183.0	
Evaluation (reference)	Explosibility: Medium		

Note # : untreated (as bought flour)

Table Modi-starch-1 Measurement of LEL for Modified starch powder

Test date	22-Apr	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	CATO-304(Cassava starch)		
Type of test powder	Agricultural powder		
Particle size	20.7 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 34^0 C, Relative humidity: 53%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 pieces	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.1650	134.4	
2	0.1648	134.2	
3	0.1650	134.4	
Average		134.3	
Evaluation (reference)	Explosibility: Medium		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Modi-starch-2 Measurement of LEL for Modified starch powder

Test date	23-Apr	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	CATO-3210(Cassava starch)		
Type of test powder	Agricultural powder		
Particle size	24.3 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 32.5^0 C, Relative humidity: 60%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.1606	130.8	
2	0.1560	127.1	
3	0.1557	126.8	
Average		128.2	
Evaluation (reference)	Explosibility: Medium		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Modi-starch-3 Measurement of LEL for Modified starch powder

Test date	24-Apr	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Purity-4(Cassava starch)		
Type of test powder	Agricultural powder		
Particle size	20.9 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 34^0 C, Relative humidity: 56%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8 kg/cm^3G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.1577	128.5	
2	0.1560	127.1	
3	0.1556	126.7	
Average		127.4	
Evaluation (reference)	Explosibility: Medium		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Modi-starch-4 Measurement of LEL for Modified starch powder

Test date	25-Apr	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Absorbo HP(Corn starch)		
Type of test powder	Agricultural powder		
Particle size	26.5 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 34^0 C, Relative humidity: 61%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	1.8 kg/cm^{3}G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.1653	134.6	
2	0.1631	132.9	
3	0.1630	132.8	
Average		133.4	
Evaluation (reference)	Explosibility: Medium		

Note + : Mass-average particle size was measured using the micron photo sizer

Table Bisphe-1 Measurement of LEL for Bisphenol-A powder

Test date	8-May	Name	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Bisphenol-A		
Type of test powder	Chemical powder		
Particle size	32.4 microns+		
Pretreatment	Kept in a dessicator more than 1 day		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 32.5^0 C, Relative humidity: 53%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.4 kg/cm^3G		
Filter paper	1 pieces	Type:	Whatman No. 93
Number of measurements	3 Times		

Sample no.	Weight of dust sample (g)	Lower Explosion Limit (g/m^3)	Remarks
1	0.1310	106.7	
2	0.1300	105.9	
3	0.1305	106.3	
Average		106.3	
Evaluation (reference)		Explosibility: Medium	

Note + : Mass-average particle size was measured using the micron photo sizer

Table Bisphe-2 Measurement of LEL for Bisphenol-A powder

Test date	9-May	**Name**	Songchai
Instrument	C.U. Explosibility Tester #1		
Name of test powder	Bisphenol-A		
Type of test powder	Chemical powder		
Particle size	32.4 microns+		
Pretreatment	No pretreatment		
Drying condition	no	Temperature: C, Time: h, (Moisture: %)	
Atmospheric temperature and humidity	Temperature: 33^0 C, Relative humidity: 58%		
Spark delay time	0.1 seconds		
Width of air flow channel	1 mm		
Distance of sparking electrode	4 mm		
Compressed air	2.4 kg/cm^3G		
Filter paper	1 pieces	**Type:**	Whatman No. 93
Number of measurements	3 Times		

Sample no.	**Weight of dust sample (g)**	**Lower Explosion Limit (g/m^3)**	**Remarks**
1	0.1808	147.3	
2	0.1808	147.3	
3	0.1820	148.3	
Average		147.6	
Evaluation (reference)	Explosibility: Medium		

Note + : Mass-average particle size was measured using the micron photo sizer

Particle size Analysis (Standard sieve)

Table ana-cas1 Particle size distribution of cassava flour group F1
(Tradename : tawyaymom)

Nominal particle size (microns)	Weight of dust on sieve (g)	% Weight on sieve (g)	% cumulative
22.5	14.31	15	15
49	18.23	20	35
64	40.43	44	79
90.5	7.64	8	87
128	6.84	7	94
165	5.23	6	100
	92.68	100	

Weight 50 % Average 52 microns

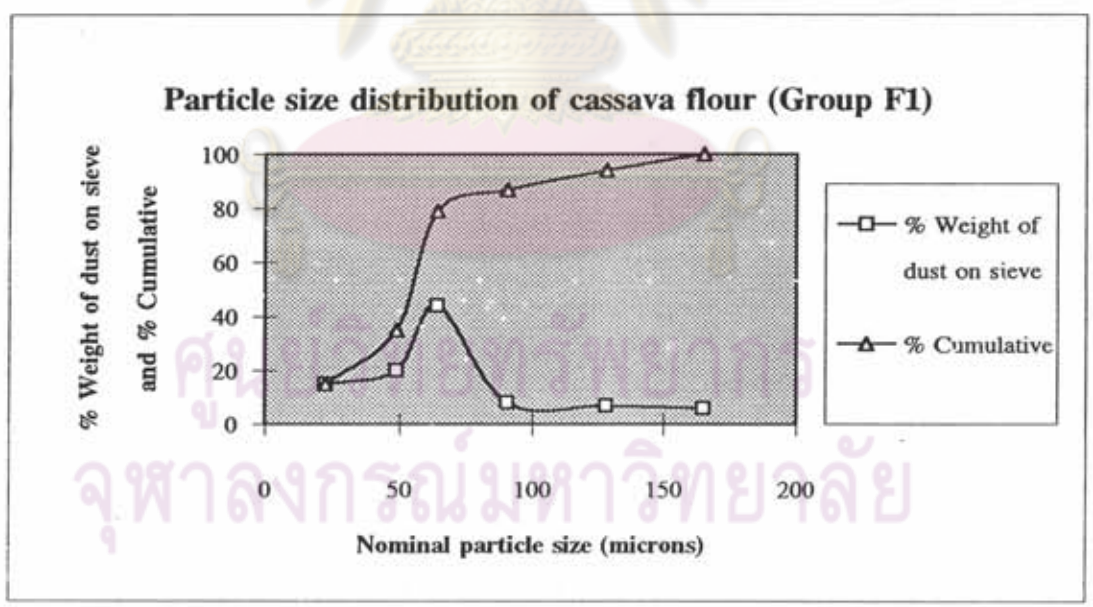


Table ana-cas2 Particle size distribution of cassava flour group F2
(Tradename : dragon fish)

Nominal particle size (microns)	Weight of dust on sieve (g)	% Weight on sieve (g)	% cumulative
22.5	17.51	18	18
49	19.34	20	37
64	21.56	22	59
90.5	29.17	29	88
128	4.39	4	93
165	7.10	7	100
	99.07	100	

Weight 50 % Average 57 microns

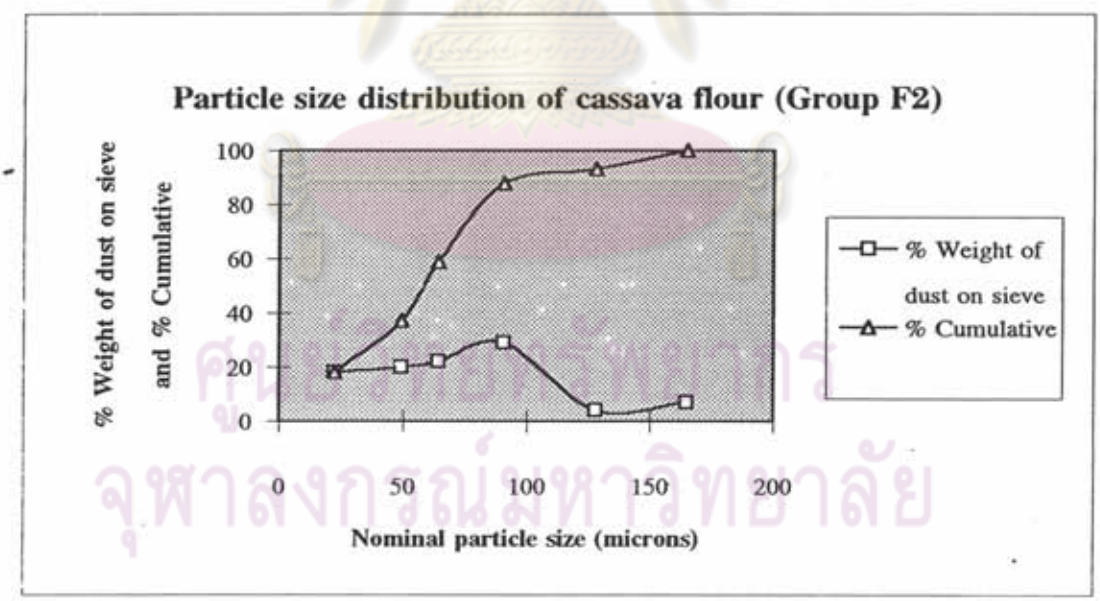


Table ana-rice Particle size distribution of rice flour group F3
(Tradename : Erawan)

Nominal particle size (microns)	Weight of dust on sieve (g)	% Weight on sieve (g)	% cumulative
64	2.47	2	2
90.5	1.74	2	4
128	27.92	28	32
165	47.44	48	80
180	19.97	20	100
	99.54	100	

Weight 50 % Average 140 microns

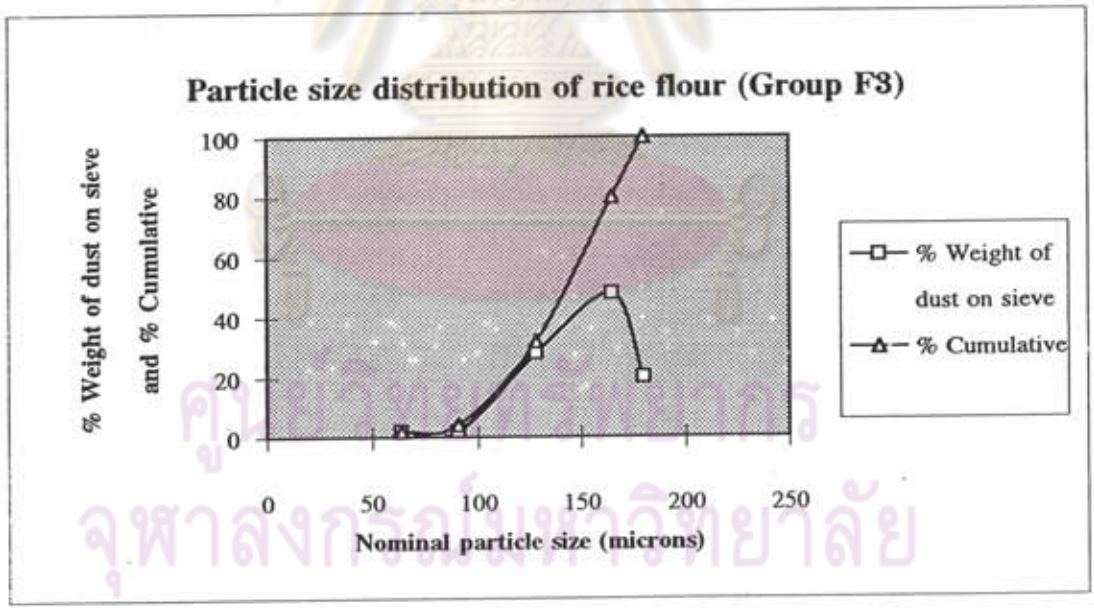


Table ana-corn Particle size distribution of corn flour group F4
(Tradename : Tamfood)

Nominal particle size (microns)	Weight of dust on sieve (g)	% Weight on sieve (g)	% cumulative
22.5	3.33	4	4
49	8.92	10	13
64	36.02	39	52
90.5	34.34	37	89
128	7.28	8	97
165	2.75	3	100
	92.64	100	

Weight 50 % Average 60 microns

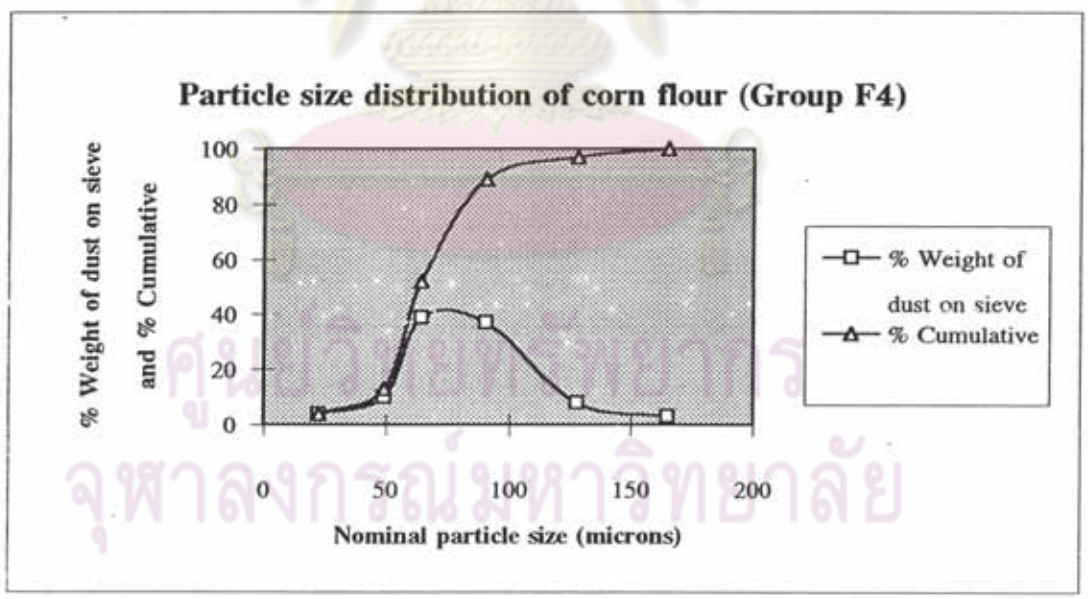
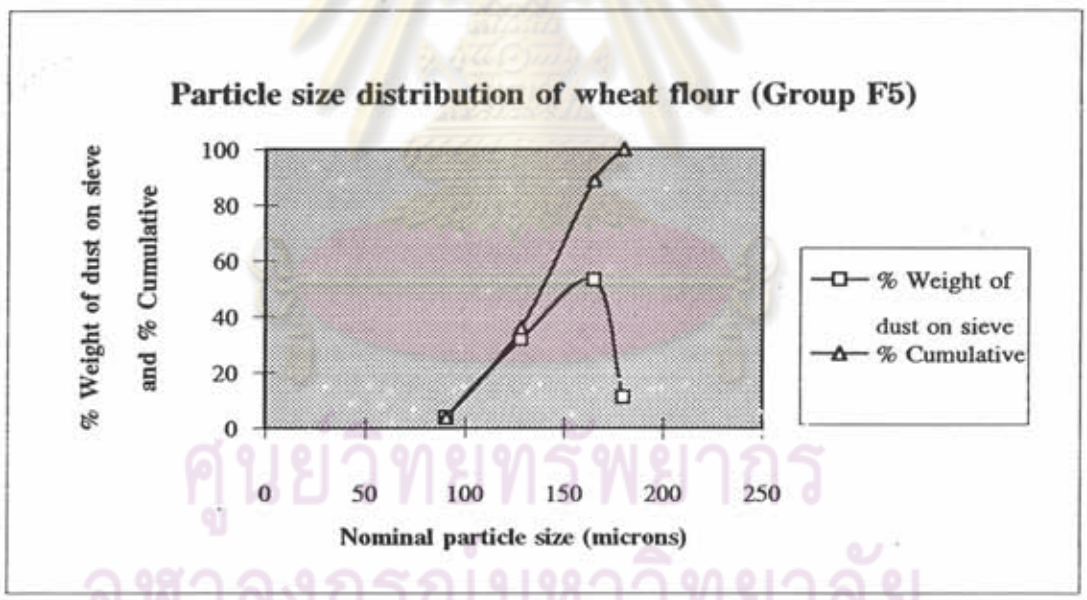


Table ana-wheat Particle size distribution of wheat flour group F5

(Tradename : Australian wheat)

Nominal particle size (microns)	Weight of dust on sieve (g)	% Weight on sieve (g)	% cumulative
90.5	3.94	4	4
128	29.69	32	36
165	50.06	53	89
180	10.03	11	100
	93.72	100	

Weight 50 % Average 138 microns



Particle Size Analysis

Table ana-lyco-1 Particle size distribution of lycopodium

Sample	Lycopodium
Sample Density, g/cc.	1.05
Dispersion Medium	Ethanol
Medium Density, g/cc.	0.789
Medium Viscosity, cp	1.135
Room Temperature, C	23
Medium Temperature, C	23
Dispersion Method	S-K Disperser
Date	9/2/95
Maximum Size, microns	70

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<8	0.116	0.116	0.86
8<16	1.768	1.884	14.0
16<18	1.872	3.756	27.9
18<20	2.278	6.034	44.8
20<25	0.231	6.265	46.5
25<35	2.486	8.751	64.9
35<50	3.247	12.00	89.0
50<70	1.482	13.48	100

Weight 50% Average 26 microns

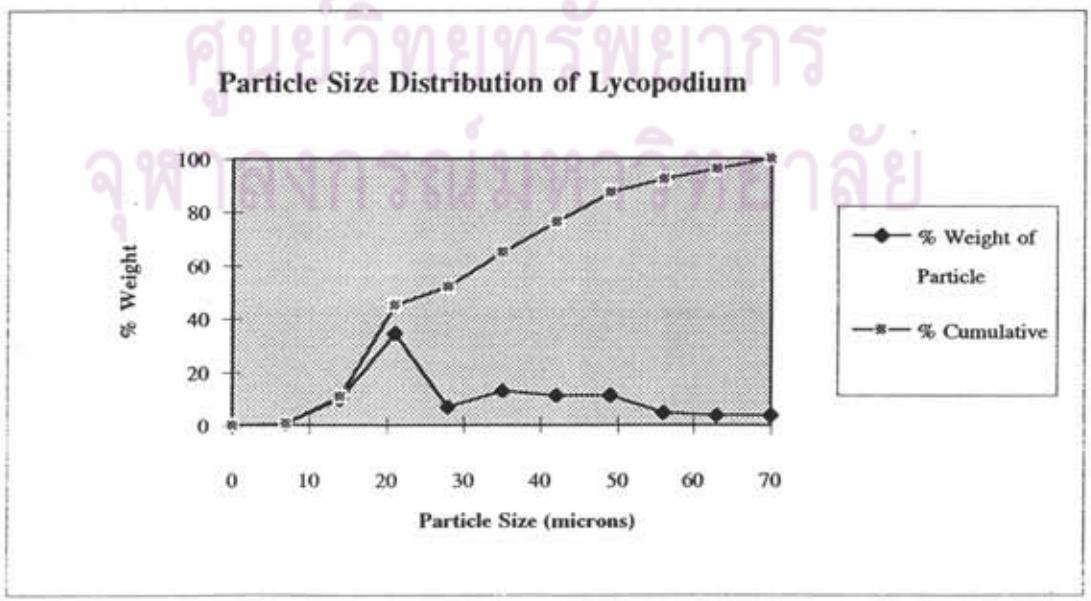


Table ana-HDPE-1 Particle size distribution of HDPE

Sample	HDPE
Sample Density, g/cc.	0.96
Dispersion Medium	Ethanol
Medium Density, g/cc.	0.789
Medium Viscosity, cp	1.115
Room Temperature, C	24
Medium Temperature, C	24
Dispersion Method	S-K Disperser
Date	28/04/1995
Maximum Size, microns	70

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<4	0.031	0.031	0.18
4<8	0.057	0.088	0.50
8<16	1.151	1.239	7.02
16<20	1.755	2.994	17.0
20<25	2.076	5.070	28.7
25<30	1.805	6.875	38.9
30<35	2.681	9.556	54.1
35<40	0.916	10.472	59.3
40<50	3.425	13.897	78.7
50<70	3.762	17.659	100

Weight 50% Average 33.6 microns

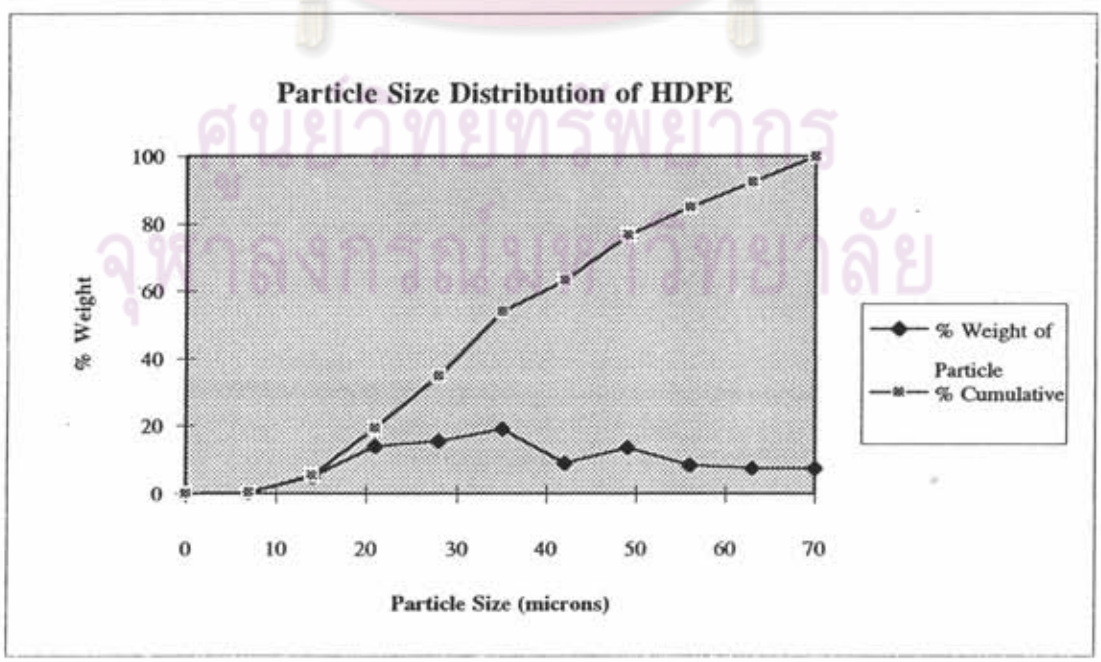


Table ana-dext-1 Particle size distribution of Dextrin

Sample	Dextrin
Sample Density, g/cc.	1.038
Dispersion Medium	Ethanol
Medium Density, g/cc.	0.789
Medium Viscosity, cp	1.075
Room Temperature, C	25
Medium Temperature, C	26
Dispersion Method	S-K Disperser
Date	15/03/1995
Maximum Size, microns	120

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<6	0.026	0.026	0.09
6<12	0.052	0.078	0.28
12<25	1.481	1.559	5.55
25<35	2.000	3.559	12.7
35<60	12.64	16.20	57.6
60<90	11.17	27.37	97.4
90<120	0.738	28.11	100

Weight 50% Average 55 microns

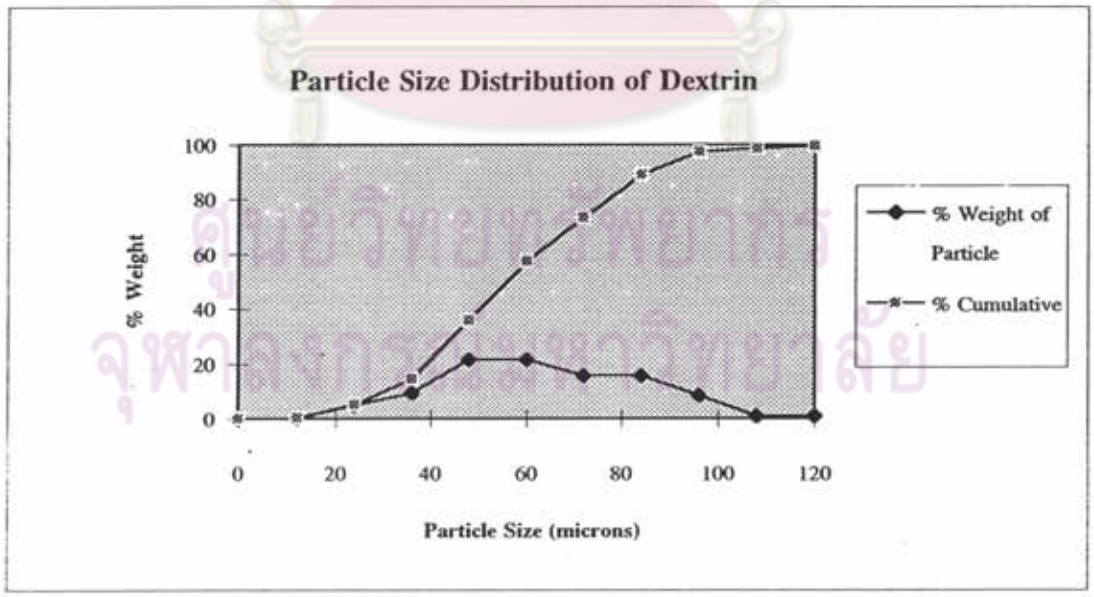


Table ana-sulfur-1 Particle size distribution of Sulfur

Sample	Sulfur
Sample Density, g/cc.	2.046
Dispersion Medium	Iso Butanol
Medium Density, g/cc.	0.805
Medium Viscosity, cp	3.29
Room Temperature, C	25
Medium Temperature, C	26
Dispersion Method	S-K Disperser
Date	14/03/1995
Maximum Size, microns	80

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<4	0.183	0.183	1.60
4<8	0.136	0.319	2.79
8<18	1.487	1.806	15.8
18<25	2.145	3.951	34.5
25<30	1.88	5.830	50.9
30<40	3.02	8.848	77.3
40<60	2.334	11.18	97.7
60<80	0.269	11.45	100

Weight 50% Average 29 microns

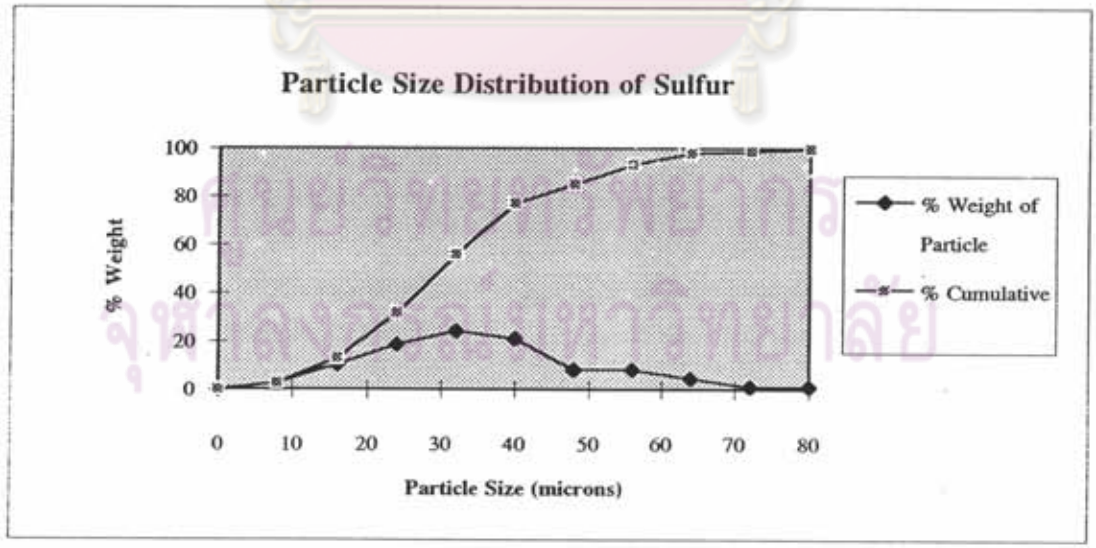


Table ana-modi-1 Particle size distribution of cassava modified starch

Sample	CATO-304
Sample Density, g/cc.	1.50
Dispersion Medium	Ethanol
Medium Density, g/cc.	0.789
Medium Viscosity, cp	1.035
Room Temperature, C	28
Medium Temperature, C	28
Dispersion Method	S-K Disperser
Date	24/04/1995
Maximum Size, microns	75

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<8	0.232	0.232	2.65
8<16	2.684	2.916	33.3
16<20	1.279	4.195	47.9
20<30	2.438	6.633	75.8
30<50	1.190	7.823	89.4
50<75	0.926	8.749	100

Weight 50% Average 20.7 microns

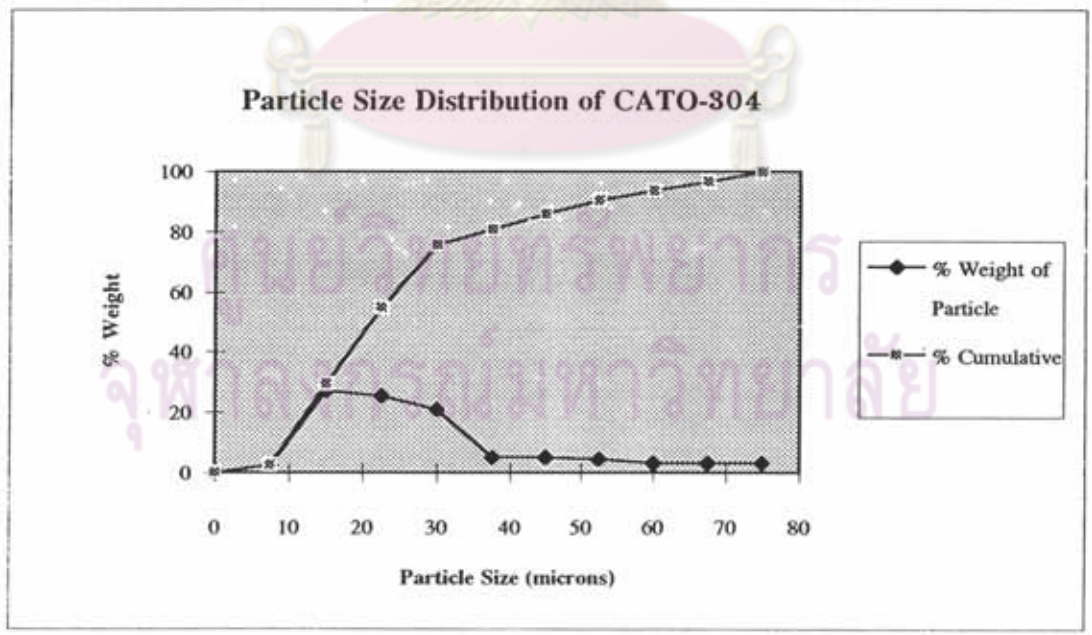


Table ana-modi-2 Particle size distribution of cassava modified starch

Sample	CATO-3210
Sample Density, g/cc.	1.50
Dispersion Medium	Iso Butanol
Medium Density, g/cc.	0.805
Medium Viscosity, cp	3.19
Room Temperature, C	27
Medium Temperature, C	27
Dispersion Method	S-K Disperser
Date	26/4/1995
Maximum Size, microns	80

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<4	0.043	0.043	0.37
4<9	0.340	0.383	3.31
9<18	2.290	2.673	23.1
18<20	0.070	2.743	23.7
20<25	3.583	6.326	54.6
25<30	1.415	7.741	66.8
30<40	2.257	9.998	86.3
40<50	0.905	10.903	94.2
50<60	0.357	11.26	97.2
60<80	0.320	11.58	100

Weight 50% Average 24.3 microns

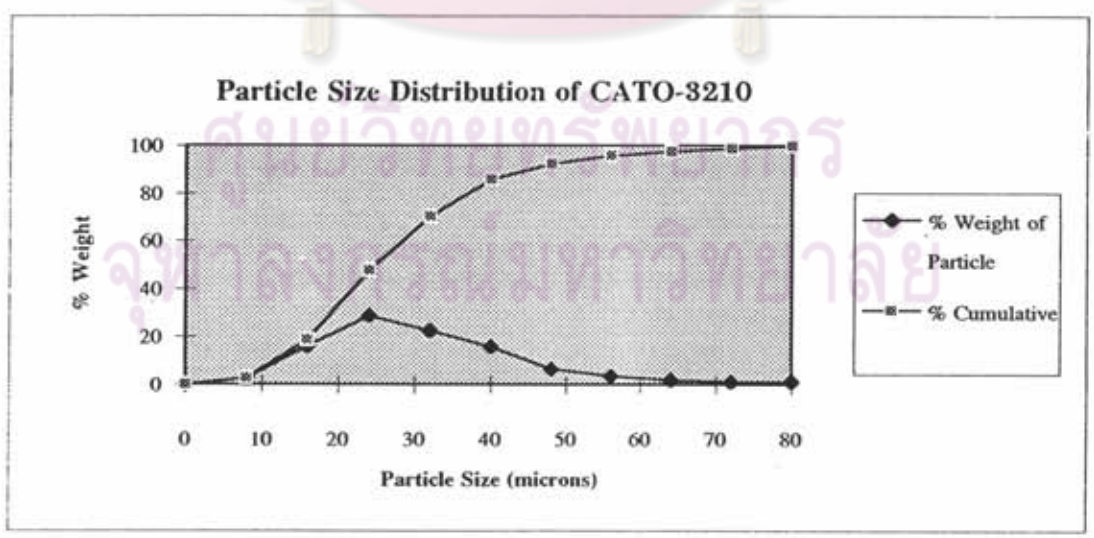


Table ana-modi-3 Particle size distribution of cassava modified starch

Sample	Purity-4
Sample Density, g/cc.	1.50
Dispersion Medium	Iso Butanol
Medium Density, g/cc.	0.805
Medium Viscosity, cp	3.09
Room Temperature, C	28
Medium Temperature, C	28
Dispersion Method	S-K Disperser
Date	25/04/1995
Maximum Size, microns	120

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<6	0.097	0.097	0.86
6<12	0.376	0.473	4.19
12<25	7.487	7.960	70.5
25<40	1.413	9.373	83.1
40<60	0.955	10.33	91.5
60<90	0.414	10.74	95.2
90<120	0.541	11.28	100

Weight 50% Average 20.9 microns

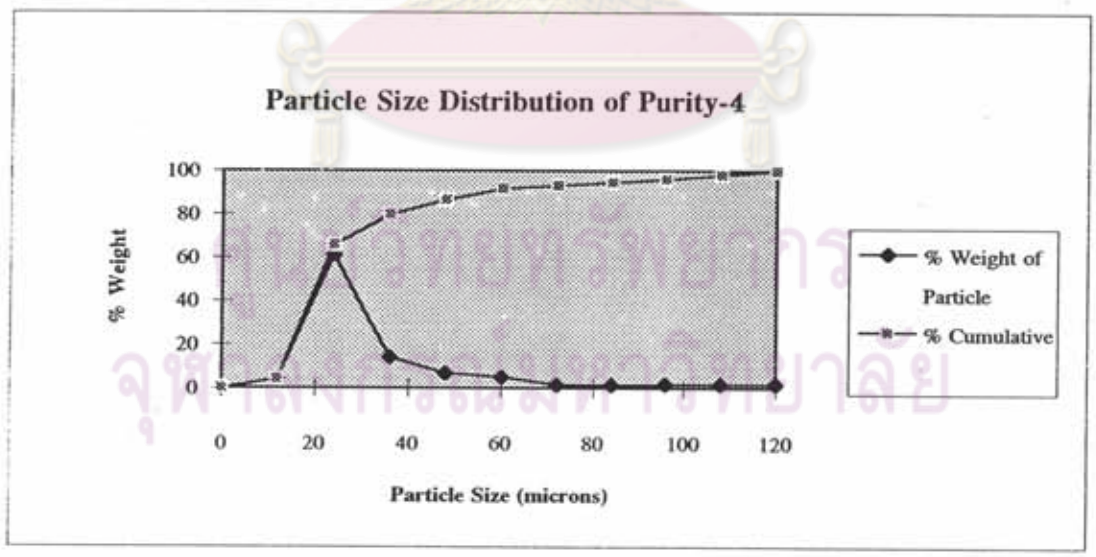


Table ana-modi-4 Particle size distribution of Corn modified starch

Sample	Absorb HP
Sample Density, g/cc.	1.38
Dispersion Medium	Iso Butanol
Medium Density, g/cc.	0.805
Medium Viscosity, cp	3.38
Room Temperature, C	25
Medium Temperature, C	25
Dispersion Method	S-K Disperser
Date	27/04/1995
Maximum Size, microns	60

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<3	0.064	0.064	0.57
3<7	0.399	0.463	4.12
7<14	0.549	1.012	9.01
14<16	1.953	2.965	26.4
16<20	2.095	5.060	45.0
20<25	0.740	5.800	51.6
25<35	3.546	9.346	83.2
35<45	0.627	9.973	88.8
45<60	1.259	11.23	100

Weight 50% Average 26.5 microns

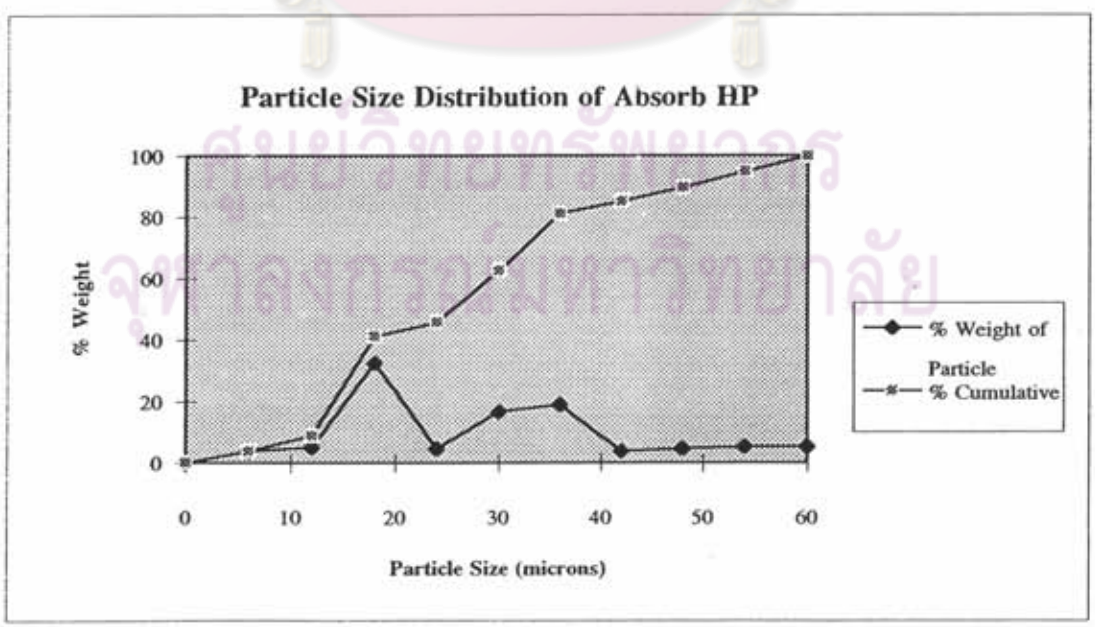


Table ana-Toner(V) Particle size distribution of Virgin Toner

Sample	Virgin Toner
Sample Density, g/cc.	0.903
Dispersion Medium	Ethanol
Medium Density, g/cc.	0.789
Medium Viscosity, cp	1.035
Room Temperature, C	28
Medium Temperature, C	28
Dispersion Method	S-K Disperser
Date	25/04/1995
Maximum Size, microns	75

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<5	0.091	0.091	1.15
5<10	1.041	1.132	14.3
10<20	3.016	4.148	52.3
20<25	2.018	6.166	77.7
25<30	0.553	6.719	84.7
30<40	0.433	7.152	90.1
40<50	0.449	7.601	95.8
50<75	0.333	7.934	100

Weight 50% Average 19.4 microns

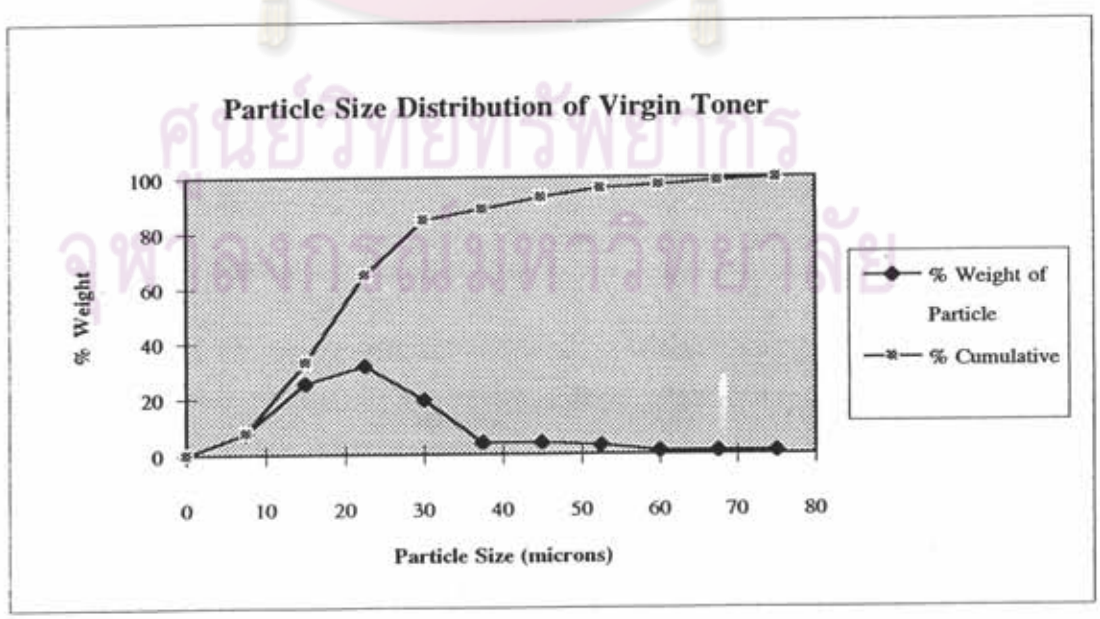
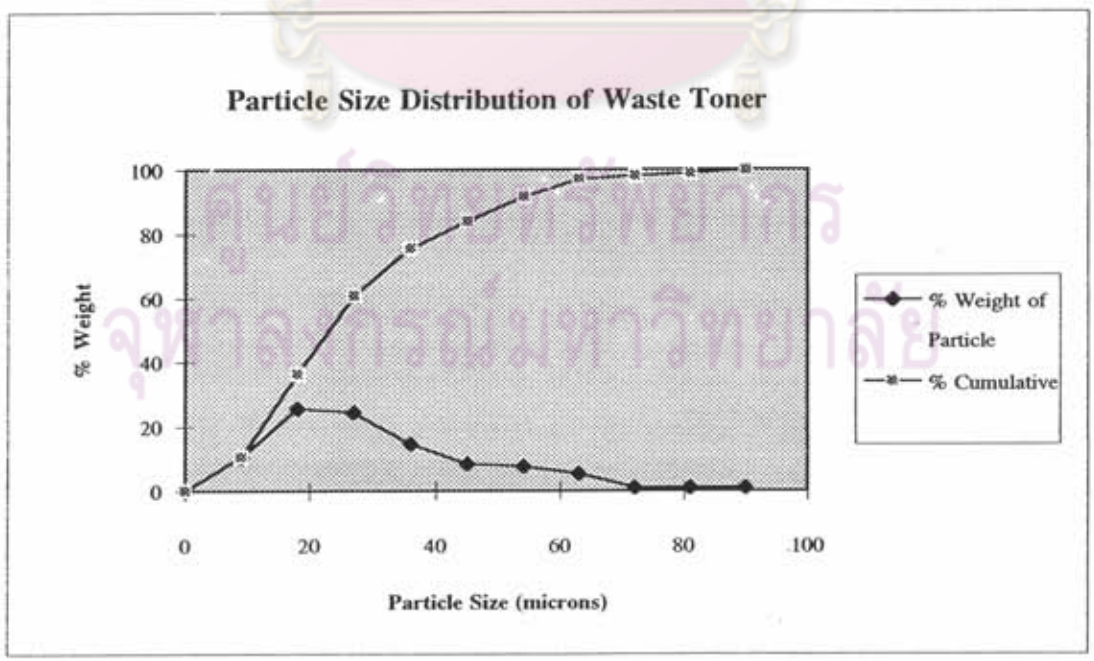


Table ana-Toner(W) Particle size distribution of Waste Toner

Sample	Waste Toner
Sample Density, g/cc.	0.903
Dispersion Medium	Ethanol
Medium Density, g/cc.	0.789
Medium Viscosity, cp	0.997
Room Temperature, C	30
Medium Temperature, C	30
Dispersion Method	S-K Disperser
Date	25/04/1995
Maximum Size, microns	90

Range (microns)	Weight of dust (g)	Accumulate Weight (g)	% by weight (Accumulation)
0<5	0.012	0.012	0.14
5<11	1.406	1.418	16.0
11<22	2.823	4.241	48.0
22<25	0.639	4.88	55.2
25<30	1.254	6.134	69.4
30<40	0.918	7.052	79.8
40<60	1.511	8.563	96.9
60<90	0.273	8.836	100

Weight 50% Average 22.8 microns



Appendix 3

Information of chemical composition of Flour and Starch

Table inform-1 Lipids in various cereal starches

	Wheat	Corn[a] (maize)	Amyylo-maize[a]	Waxy maize[a]
	(% or mg/100g)[b]			
Nonpolar lipids	6%	60%	73%	88%
Sterol esters	2	3	9	7
Triacylglycerils	15	5	16	12
Diacylglycerals	7	3	16	6
Monoacylglycerols	8	12	13	5
Free fatty acids	27	380	650	105
Glycolipids	5%	1%	5%	6%
Sterol glycosides	3	7	13	3
Monogalactosyldiacryl-glycerols	4			1
Monogalactosylmono-acylglycerols	10		18	
Digalactosyldiacyl-glycerols	11			2
Digalactosylmono-glucerols	24		17	3
Phospholipids	89%	39%	22%	6%
Lyso-phosphatidyl ethanolamines	104	17	16	1
Lyso-phosohatidyl glycerols	23	6	7	trace
Lyso-phosohatidyl cholines	783	226	183	8
Lyso-phosohatidyl serines,inositols	26	8	6	trace
Total lipids	1047	667	964	153

[a] Amylose content in starch amounts to 23% (corn),70% (amylomaize) and5% (waxy maize cultivars)

[b] Results for lipid classes are expressed as % of total lipids present in starch, and for individual lipid Compounds as mg/100g starch dry matter.

Table inform-2 Average composition of wheat-and rye flours[a]

A. Wheat flour	Type				
	405	550	812	1,050	1,700[b]
	Flour extraction rate[c]				
	40-56%	64-71%	76-79%	82-85%	100%
Starch	84.2	81.8	78.4	78.2	66
Protein (N*6.25)	11.7	12.3	13	13.3	14.8
Lipids	1	1.2	1.5	1.9	2.3
Dietary fiber[d]	3.7	3.7		4.9	10.9
Minerals (ash)	0.41	0.55	0.81	1.05	1.7
B. Rye flour	Type				
	815	997	1,150	1,370	1,740
	Flour extraction rate[c]				
	62-72%	75-78%	79-83%	84-87%	90-95%
Starch	77.5	74.6	72.2	69.3	62.8
Protein (N*6.25)	9.6	10.1	10.6	11.2	12.4
Lipids	1.1	1.1	1.3	1.5	1.5
Insoluble pentosans	3.8	4.3	4.8	5.2	6.5
Soluble pentosans	1.4	1.5	1.6	1.7	1.9
Minerals (ash)	0.82	1	1.15	1.37	1.74

[a] Weight-% per dry matter of wheat and rye flours. Flour average moisture content is 13 weight-%

[b] Whole wheat flour.

[c] Approximate data.

[d] Indigestible carbohydrates (water soluble and insoluble), lignin.

Table inform-3 Protein content of wheat flours as affected by flour particle size

Particle size (microns)	As portion of flour (weight %)	Protein content (weight %)
0.-13	4	19
13-17	8	14
17-22	18	7
22-28	18	5
28-35	9	7
>35	43	11.5

Table inform-4 Average composition of vegetables (as % of fresh edible portion)

Vegetable	Dry matter	N-Com-pounds	Carbo-hydrates	Lipids	Crude fiber	Ash
Mushrooms						
Champignon (cultivated *Agaricus arvensis, campestirs*	10	4.8	3.5	0.2	0.8	0.8
Chanterelle	8.5	2.6	3.5	0.8	1	0.7
Edible boletus *(Boletus edulis)*	13	5.4	5.2	0.4	1	1
Rooty vegetables						
Carrots	11.8	1.1	8.7	0.2	1	0.8
Radish (Raphanus sativus, elongated white freshy root)	5.5	1	2.9	0.2	0.7	0.8
Viper's grass, *scorzonera*	21.4	1.4	16.3	0.4	2.3	1
Parsley	12	2.9	2.3	0.6	0.8	1.6
Turerous vegetables (sprouting tubers)						
White (Irish) potato	22.2	2	18.9[a]	0.2	1.3	1.1
Celery (root)	11.6	1.8	7.2	0.3	1	1
Knhlrabi	9.7	2	5.6	0.1	1.1	1
Rutabaga	13	1.1	9.9	0.2	0.8	0.8
Radish *(Raphanus sativus,* reddish fleshy root)	5.6	1.1	3.5	0.1	0.9	0.9
Red beet, beetroot	12.7	1.6	9.1	0.1	0.8	1.1
Turerous root vegetable						
Sweet potato	30.8	1.6	26.6[b]	0.6	0.7	1.1
Cassava (manioc)	35	0.9	32	0.4	0.6	0.4
Yam	28	1.8	23.8	0.2	1.3	1
Bulbous root vegetables						
Onion	10.9	1.5	8.1	0.3	0.5	0.6
Leek	14.6	2.2	9.9	0.3	0.7	0.9
Vegetable fennel	14	2.4	9.1	0.3	0.7	1.7
Flowerhead (calix) vegetables						
Artichoke	14.5	2.9	8.2	0.1	2.4	0.8
Cauliflower	9	2.7	4.2	0.3	1	0.9
Broccoli	10.9	3.6	4.4		1.5	1.1

[a] Starch content 14.1%.

[b] Starch and saccharose contents 19.6 and 2.8 %, respectively.

VITA

Mr. Songchai Wiriyaumpaiwong was born on August 28, 1970, in Bangkok, Thailand. He graduated from King Mongkut's Institute of Technology Tornburi, with a bachelor degree of Engineering in Chemical Engineer in 1993. He continued his Master's Study at Chulalongkorn University in 1993. He was granted the degree in October, 1995.