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IDENTIFICATION OF TECHNOLOGY TREND ON INDONESIAN PATENT DOCUMENTS AND RESEARCH REPORTS ON CHEMISTRY AND METALLURGY FIELDS

by

Endang Sri Rusmiyati Rahayu

Zainal A. Hasibuan

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INTRODUCTION

Problems

Technology development
•Penetration of foreign technology to Indonesia
•Capability of domestic: technology is relatively low (2005:3,56%)

Purposes

•To assess the overlap: R&D and patents on chemistry, metallurgy

•Identify core, prominent, emerging topics

Benefit:
•Research policy
• Direction of R&D

Impacts
To save
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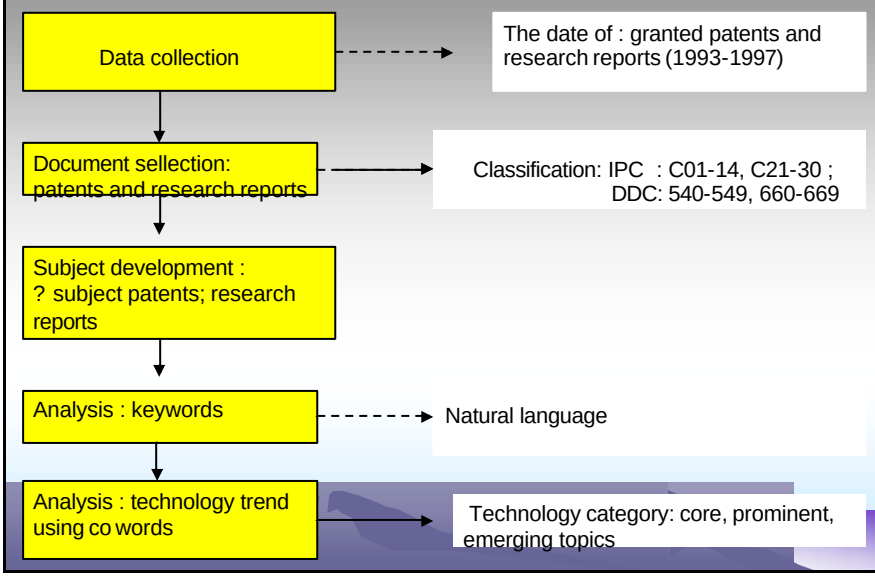
METHODOLOGY



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RESEARCH METHODS

- Data collection:
  - Indonesian Patent documents section C
  - Research reports on chemistry and metallurgy field (DDC: 540 - 549 and 660 - 669).

Population coverage : granted patents, from 1993-1997;
CD ROM of research report, published from 1993-1997.

The numbers of documents:

Year	? population	
	Patent	Research report
1993	1	108
1994	8	84
1995	98	82
1996	182	61
1997	200	117

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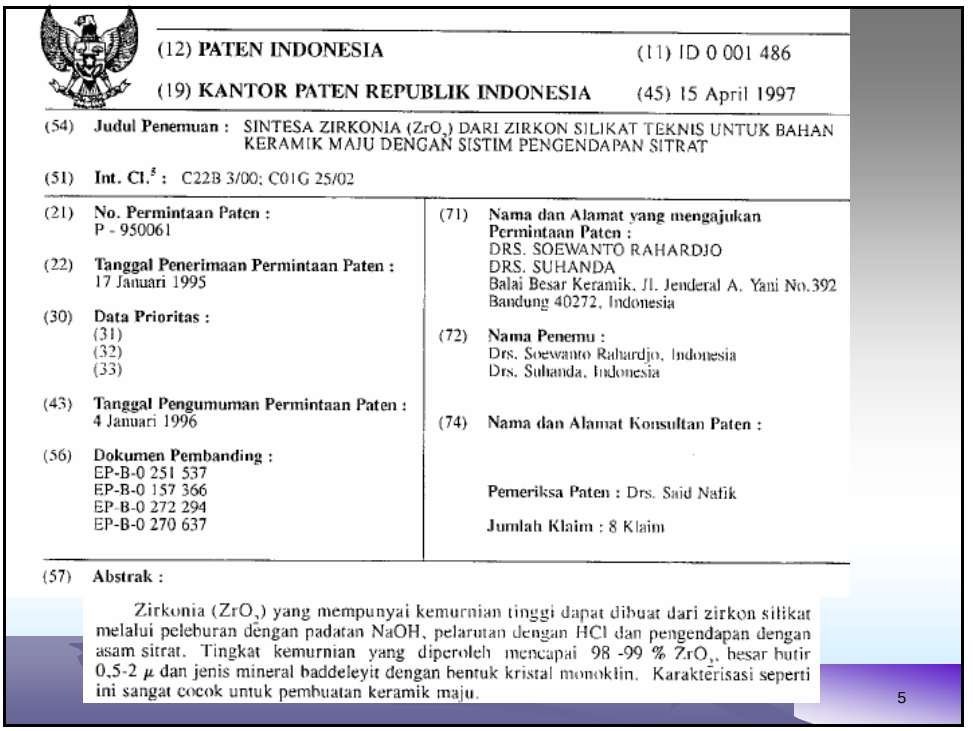

(12) **PATEN INDONESIA** (11) ID 0 001 486

(19) **KANTOR PATEN REPUBLIK INDONESIA** (45) 15 April 1997

(54) **Judul Penemuan :** SINTESA ZIRKONIA (ZrO_2) DARI ZIRKON SILIKAT TEKNIS UNTUK BAHAN KERAMIK MAJU DENGAN SISTIM PENGENDAPAN SITRAT

(51) **Int. Cl.[5] :** C22B 3/00; C01G 25/02

(21) **No. Permintaan Paten :**
P - 950061

(22) **Tanggal Penerimaan Permintaan Paten :**
17 Januari 1995

(30) **Data Prioritas :**
(31)
(32)
(33)

(43) **Tanggal Pengumuman Permintaan Paten :**
4 Januari 1996

(56) **Dokumen Pembanding :**
EP-B-0 251 537
EP-B-0 157 366
EP-B-0 272 294
EP-B-0 270 637

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Drs. Suhanda, Indonesia

(74) **Nama dan Alamat Konsultan Paten :**

Pemeriksa Paten : Drs. Said Nafik

Jumlah Klaim : 8 Klaim

(57) **Abstrak :**

Zirkonia (ZrO_2) yang mempunyai kemurnian tinggi dapat dibuat dari zirkon silikat melalui peleburan dengan padatan NaOH, pelarutan dengan HCl dan pengendapan dengan asam sitrat. Tingkat kemurnian yang diperoleh mencapai 98 -99 % ZrO_2, besar butir 0,5-2 μ dan jenis mineral baddeleyit dengan bentuk kristal monoklin. Karakterisasi seperti ini sangat cocok untuk pembuatan keramik maju.

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IPC AND DDC CLASSIFICATION

Code	IPC SUBJECT
C01	Inorganic chemistry.
C02	Treatment of water, waste water, sewage, or sludge
C03	Glass, mineral or slag wool.
C04	Cements, concrete,artificial stone, ceramics, refractories
C05	Fertilisers; manufacture thereof
C07	Organic chemistry
C08	Organic macromolecular compounds, their preparation or chemical working-up, compositions thereon
C09	Dyes, paints, polishes, natural resins, adhesives, miscellaneous compositions, miscellaneous applications of materials
C10	petroleum, gas or coke industries, technical gases containing carbon monoxide, fuels, lubricants, peat.

Code	DDC SUBJECT
540	chemistry and allied sciences
541	Physical andtheretical chemistry
542	Techniques, equipment, materials
543	Analytical chemistry
544	Qualitative analysis
545	Quantitative analysis
546	Inorganic hemistry
547	Organis chemistry
548	Crystallography
549	Mineralogy
660	Chemical engineering
661	Industrial chemicals technology
662	Explosives, fuels, related products
663	Beverages
664	Food technology
665	Industrial oils, fats, waxes, gases

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IPC AND DDC (continue)

Code	IPC SUBJECT
C11	Animal or vegetable oils, fats, fatty substances or waxes, fatty acids therefrom , detergents, candles
C12	Biochemistry, beer, spirits, wine, vinegar, microbiology, enzymology, mutation or genetic engineering.
C13	Sugar industry
C14	Skins, hides, pelts, leather
C21	Metallurgy of iron
C22	Metallurgy, ferrous or non-ferrous alloys, treatment of alloy or non-ferrous metals
C23	Coating metallic material, coating material with metallic material, chemical surface treatment, diffusion treatment of metallic material, coating by vacuum evaporation, by sputtering, by ion implantation or by chemical vapour deposition, in general, inhibiting corrosion of metalli material or incrustation in general
C25	Electrolytic or electrophoretic processes, apparatus therefor
C30	Crystal growth

Code	DDC SUBJECT
666	Ceramic and allied technology
667	Cleaning, color, coating technology
668	Technology of other organic products
669	Metallurgy

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Analysis of technology category :co-words

Matrix of keywords co-occurence

	K_1	K_2	K_3	.....	K_n
K_1	-	$C_{1,2}$	$C_{1,3}$	$C_{1,...}$	$C_{1,n}$
K_2	$C_{2,1}$	-	$C_{2,3}$	$C_{2,...}$	$C_{2,n}$
K_3	$C_{3,1}$	$C_{3,2}$	-	$C_{3,...}$	$C_{3,n}$
.....	.....	.....	.....	-	C.,.
K_n	$C_{n,1}$	$C_{n,2}$	$C_{n,3}$	$C_{n,...}$	-

Keyword co-occurence:
>5% : core topics
>3%-5% : prominent topics
1-3% : emerging topics

8

Matrix of keyword co-occurence

Theme : PATEN-95	(R)-	2-(N	2-1(	2-O	3-A:	7-O	AEF	AIR	ALA	ALU	AMI	AMI	ANA	ANC	ANH	ANI	ANC	ANT	ANT	ANT	ANT	ANT	ANT
(R)-ALFA-ETIL-2-OKSO-1-PI		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-(N-GUANIDINO TERS	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-1(p-B-DIMETILAMINC	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
2-OKSINDOL-1-KARBC	0	0	0		0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	3
3-ASIL-2-OKSINDOL-1	0	0	0	0		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
7-OKSABISIKLOHEPTI	0	0	0	0	0		0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
AERATOR;	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AIR MINUM;	0	0	0	0	0	0	0		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ALAT;	0	0	0	0	0	0	0	1		0	0	0	0	0	0	0	0	0	0	0	0	0	0
ALUMINA PEPTISASI;	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0
AMIDA;	0	0	0	0	0	1	0	0	0	0		0	0	0	0	0	0	1	0	0	0	0	0
AMLODIPIN;	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
ANALGESIK;	0	0	0	3	1	0	0	0	0	0	0	0		0	1	0	0	0	0	0	0	0	5
ANGIOTENSIN II;	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
ANHIDRAT;	0	0	0	1	0	0	0	0	0	0	0	0	1	0		0	0	0	0	0	0	0	1
ANIONIK;	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
ANORGANIK;	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0
ANTAGONIS;	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0		0	0	0	0	0

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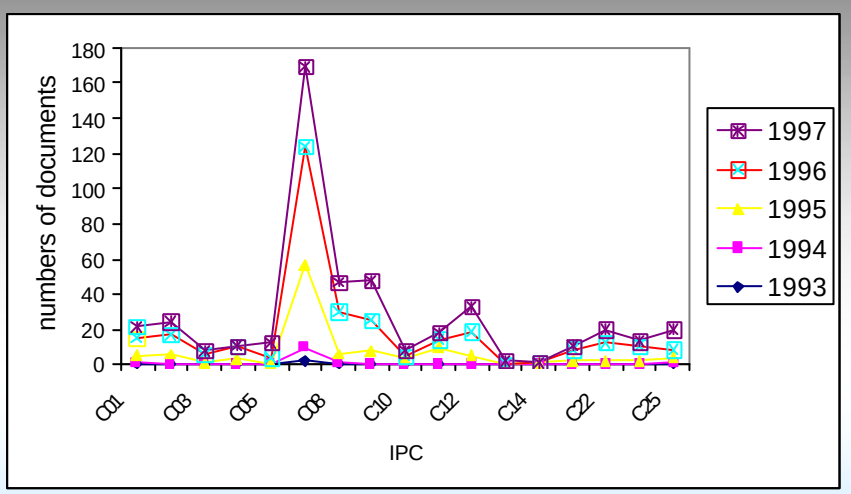
w5

The development of chemistry and metallurgy fields on patent documents



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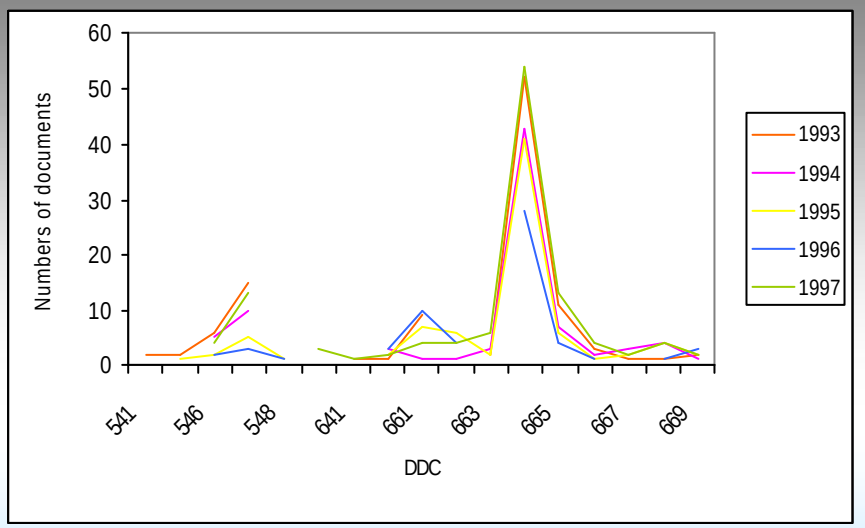
Slide 10

w3 terdiri 670 subyek, perkembangan pesat pada kelas kimia organik C07 (170/670), komponen organik C08 (47), pewarna, cat, komposisi sejenis C09(48). Terkait juga dengan ilmu pengobatan dan ilmu tentang peny hewan kelas A61(92). Subkelas: metoda kimia organik dan alatnya, senyawa asoklik/karbosiklik, heterosiklik, gula dan turunannya, peptida, polisakarida dan turunannya, seny makromolekuler dll.
Subkelas A61: pembuatan utk kesehatan gigi, toilet, metoda/alat steril.
winme, 5/22/2005

w5 Institusi utk alat/seny kesehatan: Ciba Geigy (CH) UCB (Belgia), ER Squibb (AS), Pfeizer (AS), Pharmacia (IT), Sandoz (CH), Unileve (NE), Hoffmann La Roche (CH).
Pewarna: Ciba specialty chemicals (CH), And Haas (AS), Rhone Poulene Chimie (Perancis)
winme, 5/22/2005

w6

The development of chemistry and metallurgy fields on research reports



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The development of chemistry and metallurgy fields on research reports

DDC	Subjects	Year					Numbers
		1993	1994	1995	1996	1997	
541	chemistry and allied sciences	2	-	-	1	1	4
543	Analytical chemistry	2	-	1	-	-	3
546	Inorganic chemistry	6	5	2	2	4	19
547	**Organic chemistry**	**15**	**10**	**5**	**3**	**13**	**46**
548	Crystallography	-	-	1	1	-	2
549	Mineralogy	-	1	-	-	3	4
641	Food and drink	1	-	-	-	1	2
660	Chemical engineering	1	3	2	3	2	11
661	Industrial chemicals technology	9	1	7	10	4	31
662	Explosives, fuels, related products	-	1	6	4	4	15
663	Beverage technology	2	3	2	-	6	13
664	**Food technology**	**52**	**43**	**41**	**28**	**54**	**218**
665	Industrial oils, fats, waxes, gases	11	7	6	4	13	41
666	Ceramic and allied technology	3	2	1	1	4	11
667	Cleaning, color, coating technology	1	3	2	-	2	8
668	Technology of other organic products	1	4	4	1	4	14
669	Metallurgy	2	1	2	3	2	10
		108	84	82	61	117	12

w6 terdiri dari 452 subyek. Kecenderungan ada pada subbidang teknologi pangan 218 (48,23%) dan kimia organik 46(10,18%).

winme, 5/22/2005

The comparison between numbers of documents and keywords

		Year					Amount
		1993	1994	1995	1996	1997	
Number of document	Patent	1	8	98	182	200	489
	Research report	108	84	82	61	117	452
Number of keyword	Patent	5	42 (5,25)	421 (4,3)	632 (3,47)	484 (2,42)	1584
	Research report	436	311	270	101	412	1415

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The changes of keywords on patent documents

Year				
1993	1994	1995	1996	1997
heterosiklik	komposisi	analgesik	antimikroba	antimikroba
komposisi	pembuatan	antiinflamasi	besi	Besi ekstraksi
pembuatan	proses	antimikroba	deterjen	herbisida
	ekstraksi Obat pestisida			
herbisida		ekstraksi	ekstraksi	insektisida
zat pengatur pertumbuhan		Katalis obat	elastomer	Katalis obat
		pelapisan	gas	pelapisan
		pestisida	herbisida	peleburan
			insektisida	pestisida
			kaca	pewarna
			Limbah obat	polimer
			pelapisan	polimerisasi
			peleburan	sintesa

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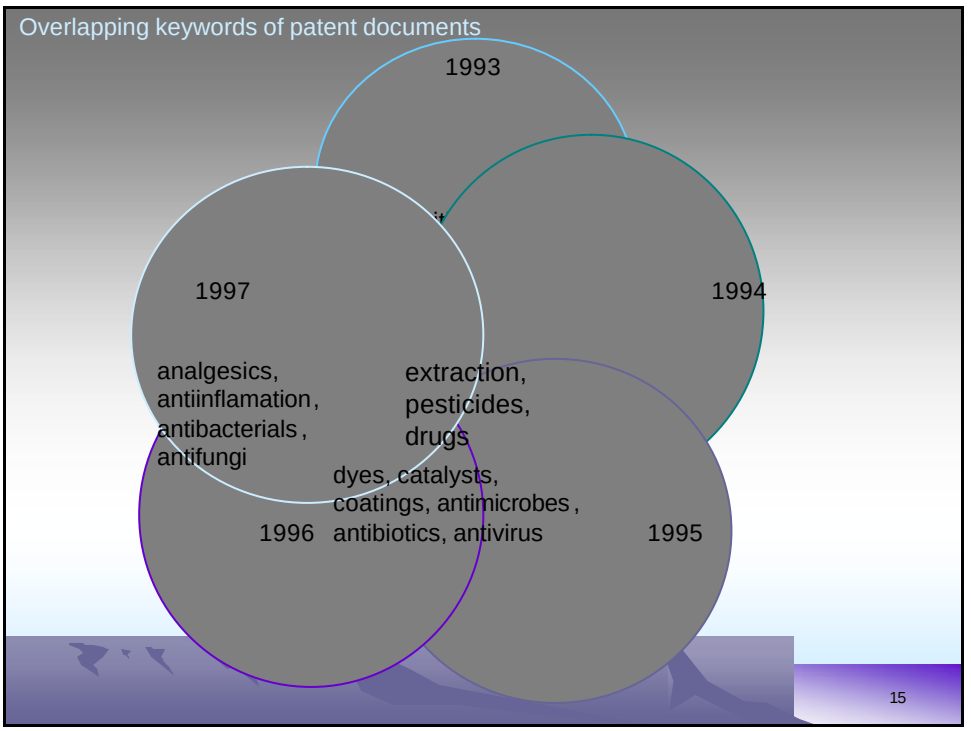
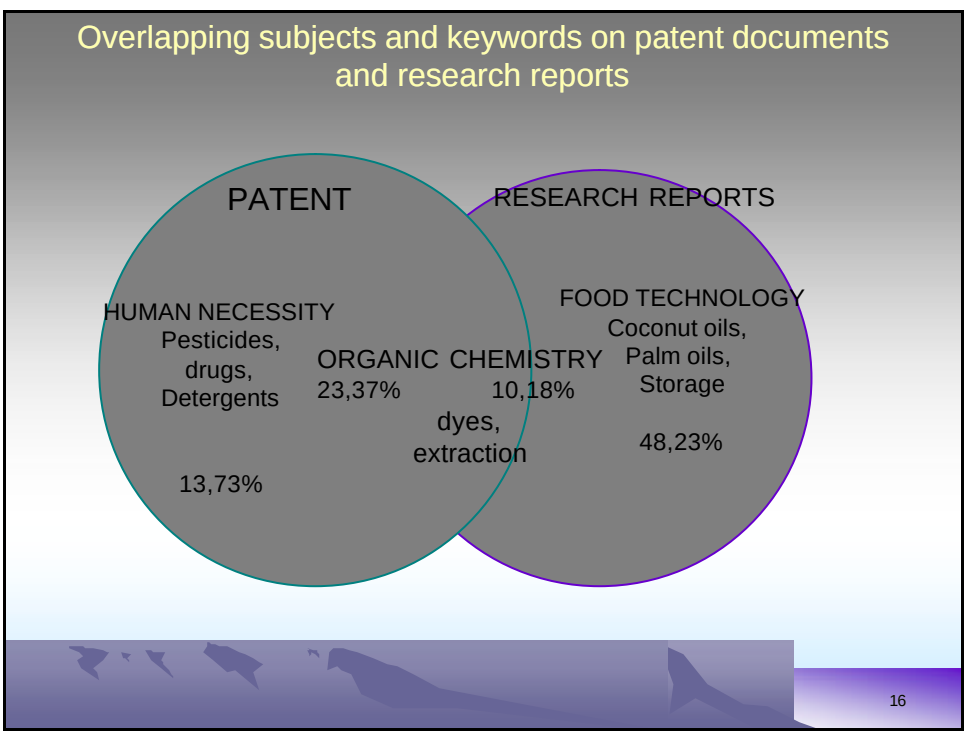

Overlapping keywords of patent documents
1993
1997
1994
analgesics, antiinflamation, antibacterials, antifungi
extraction, pesticides, drugs
dyes, catalysts, coatings, antimicrobes, antibiotics, antivirus
1996
1995
15


Overlapping subjects and keywords on patent documents and research reports
PATENT
RESEARCH REPORTS
HUMAN NECESSITY
Pesticides, drugs, Detergents
13,73%
ORGANIC CHEMISTRY
23,37%
10,18%
dyes, extraction
FOOD TECHNOLOGY
Coconut oils, Palm oils, Storage
48,23%
16

Development of technologies categories since five years (1993 to 1997)

Technology categories	Year			
	1994	1995	1996	1997
Core topics	composition-drugs preparation-drugs process-composition	anti-inflammatory agents-analgesics	composition-preparation methode-preparation process-preparation	process-preparation preparation-drugs
Prominence topics	insecticides-pesticides insecticides-nitromethylene Imidazole acid-drugs Imidazole acid - composition Imidazole acid-preparation	drugs-analgesics drugs –antiinflammatory agents drugs-antimicrobes equipment-extraction process- vegetable oils extraction-vegetable oils composition-antimicrobes	equipment- methode composition-drugs process-composition waste-treatment preparation-dyes	process-drugs composition-preparation methode-preparation
Emerging topics		detergents-bleaching agents extraction-silver enzymes-drugs composition-pesticides dyes-pesticides process-detergents textiles-dyes synthetic dyes	composition-detergents composition-pesticides process-dyes preparation-drugs preparation-detergents preparation-pesticides extraction-precious metals drugs-antimicrobes	composition-drugs preparation-dyes coating methods process-catalists pesticides-insecticides preparation-pesticides bleaching agents-textiles

Technologies categories of research reports

Categories	Year				
	1993	1994	1995	1996	1997
Core topics	none	none	none	none	none
Prominence topics	Fermentation-processes Storage-processes	none	none	Drying-equipments	none
Emerging topics	Prototype-equipment Biotechnology-coconut oils Proteins-hypocholesterolemia fat-hypocholesterolemia	Flour-preparation	Crackers-preparation Processes-alcohols Drying-equipments extraction-coconut oils	Aspergillus oryzae-aflatoxin Preparation-coal Aspergillus oryzae-detoksification Preparation-activated carbon	Alcohols-wastes Preparation-wastes

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CONCLUSION

- Development of chemistry and metallurgy field in Indonesia during five years was on the organic chemistry (dyes, extraction). Other important subject in patent documents was human necessity (pesticides, drugs, detergents). The largest subject on research activities on the same area and period was on food technology (coconut oils, palm oils, and storage)
- Technology categories using co-word analysis on patent documents (1994-1997):
  - core topics: drugs composition, drugs preparation, and drugs processes for antiinflammation and anti-inflammatory agents.
  - Prominent topics: preparation and composition of alkena imidazolel acid as raw materials for drugs to overcome several diseases like glaucoma, hipertension, and heart disease; the using of nitromethylenes for insecticides; processes and equipments for preparation of vegetable oils, composition of 2-oksindol-1-carboxamide for antiinflammation and anti-inflammatory agents; preparation of dyes; waste treatment.
  - The emerging topics: preparation and composition of detergents, pesticides, herbicides, and drugs for HIV, cancer, antimicrobes; textile dyes.
- Technology categories on research report documents:
  - no core topics of research activities in Indonesia during five years from 1993 to 1997.
  - The prominent topics: fermentation process, storage processes, and drying apparatus.
  - The emerging topics in 1993: equipment prototypes, microorganisms for coconut oils preparation, product preservation for storage, and flour preparation.
  - The emerging topics in 1995: preparation of crackers, extraction of coconut oils, and drying apparatus.
- This study is also confirmed that the direction of research and development in Indonesia is not conform with the trend of technology

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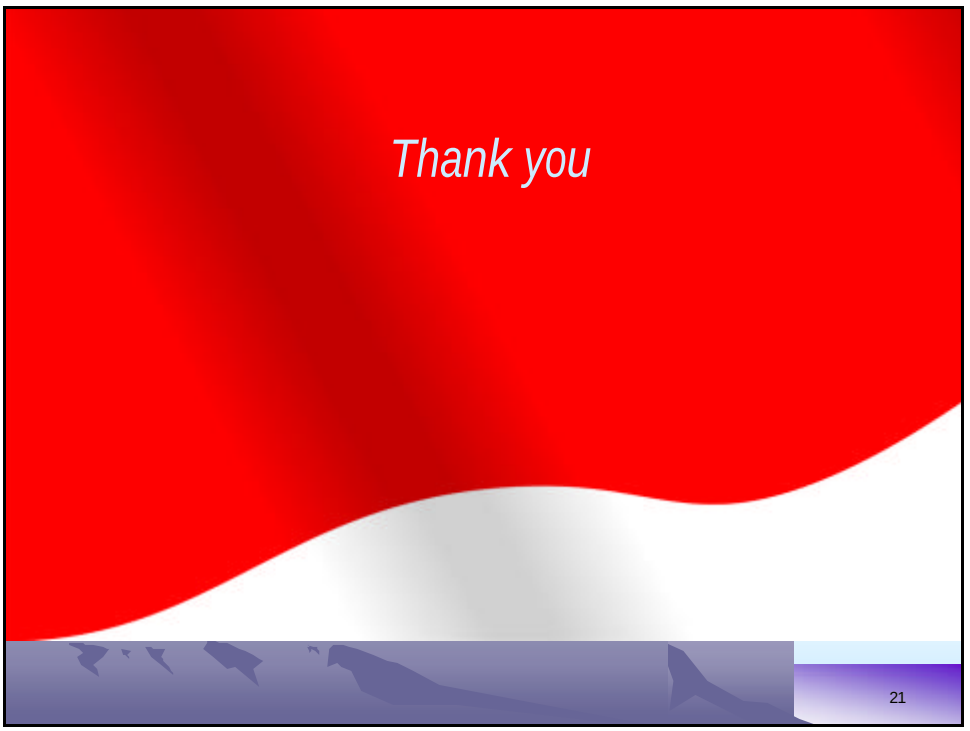
Thank you
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