

print

ISSN 0250-6807

Ann Nutr Metab

55(suppl 1) 1-758 (2009)

55 S1 09

online

ISSN 1421-9697

www.karger.com/anm

ISBN 978-3-8055-9204-8

DSN-75 78

Annals of Nutrition & Metabolism

An Official Journal of



International Union of
Nutritional Sciences (IUNS)



Federation of European
Nutrition Societies (FENS)

ABSTRACTS 19th International Congress of Nutrition

October 4-9, 2009, Bangkok, Thailand



4-9 October 2009
BITEC, Bangkok, Thailand

Editors

K. Tontisirin, Bangkok

E. Wasantwisut, Bangkok

KARGER

S. Karger
Medical and Scientific Publishers
Basel · Freiburg · Paris ·
London · New York ·
Bangalore · Bangkok · Shanghai ·
Singapore · Tokyo · Sydney

Contents

Scientific Program

Plenary Lectures

PL1-1	Global Efforts Towards Achieving the Millennium Development Goals (MDGs) and Nutrition Well-being	1
	A. Alwan	
PL1-2	Contribution of Agriculture and Food Security on Nutrition: the Global Harmonization Efforts	1
	A. A. Muller	
PL2-1	Genetics of Human Hypertension: Dietary Influence of Genetic Expression	1
	G. H. Williams	
PL3-1	Global Partnerships for Combating Obesity and Chronic Diseases	1
	K. Srinath Reddy	
PL3-2	Global Partnerships for Combating Obesity and Chronic Diseases	1
	W. P. T. James	
PL4-1	Nutrition, Lifestyle and Cancer	1
	J. Milner	
PL5-1	Nutrition as a Sound Investment for Human Capital	2
	J. Rivera	
PL5-2	Nutrition as a Sound Investment for Human Capital	2
	S. Horton	

Cascade Lectures

CL1:	Role of Bioactive Food Components in Chemoprevention	3
	J.H.Y. Park	
CL2:	Food Policy and Systems in Time of Global Crisis	3
	H. Herren	
CL3:	Fetus to Adults: What have We Learned?	3
	D. Barker	
CL4:	Advances in Nutrigenomics	3
	B. van Ommen, M. Muller	
CL5:	Long-chain Polyunsaturated Fatty Acids in Pregnancy, Lactation and Infancy	3
	B. Koletzko	
CL7:	Paradigms in Applied Nutrition	4
	U. Jonsson	
CL8:	Global Action Plan for Scaling-up Nutrition	4
	M. Shekar	

EV McCollum Lecture

5

Dialogues

D1:	Control of Iron Deficiency: Rewards And Risks	6
	G. Brittenham, B. Lonnerdal	
D2:	Dietary Diversity to Enhance Nutrition among Deprived Populations	6
	S. de Pee, R. Gibson	

Symposia

S01:	Polyunsaturated Fatty Acids and Human Health: Getting the Balance Right	7
S02:	Bridging Agriculture and Health through Nutrition	8
S03:	Innovative Tools and indicators for Program Planning and Advocacy: Mathematical Modelling Tools and New Indicators for Infants, Young Children and Women of Reproductive Age	9
S04:	Various Food Practices for Nutrition and Health	10
S05:	Meeting the Nutritional Needs of Adults and Children Living with HIV/AIDS in Resource-Poor Settings: From Science to Practice	10
S06:	Correction of iodine deficiency in populations: strategies for control and the changing epidemiology of thyroid disorders with changes in iodine intake	11

S07:	Epigenetics: Linking Nutritional, Hereditary and Environmental Aspects of Human Health	12
S08:	Recent Advances in Methods to Determine Amino Acid Requirements and Availability in Humans and Animals	14
S09:	Ensuring Safe Food supply - A continuing Challenge	15
S10:	Iron and Malaria Interactions: Where are we now and where do we go from here?	15
S11:	Novel Lipids in Clinical Nutrition in Health and Disease	16
S12:	Ensuring Appropriate Nutrition from the Start: Infant and Young Child Nutrition	17
S13:	Childhood Obesity: Global Perspectives and Prevention Approaches	18
S14:	Building Better Programs through Delivery Science: Experiences, Challenges and the Way Forward	19
S15:	Antioxidant Defense/Oxidative Damage and Nutrition	20
S16:	Biofortified Crops as an Emerging Nutrition Intervention for Two Continents: State of the Art Update on Rice and Maize	22
S17:	Nutrition and Infection, Inflammation and the Immune System - Update on Impact & Mechanism	23
S18:	The Metabolic Syndrome: New insights into Mechanisms and Treatment	25
S19:	Africa Highlights	26
S20:	Global Alliance/WHO: Prevention and Control of Obesity and Related Chronic Diseases	28
S21:	Infant and Young Child Nutrition: Public Private Partnerships: Experience from the Field	28
S22:	Understanding Policy Processes in Nutrition	30
S23:	Body Composition from Conception through Infancy	32
S24:	The Human Right to Adequate Food as a Basis for Good Governance for Nutritional Wellbeing	32
S25:	Gut Dynamics: the Impact of Prebiotics on Gut Health and Well-being	33
S26:	Challenge to Nutrition Security among Diverse and Vulnerable Populations in U.S. and Canada: Access and Availability to Healthier Foods in a Changing Food Environment	34
S27:	Impact of Interventions to Enhance Zinc Status	35
S28:	Food, Nutrition, Physical Activity and the Prevention of Cancer: Relevance & Implications for Global Health	36
S29:	Effects of Micronutrient Interventions during Pregnancy on Health, Development and Survival Later in Life: Findings from Randomized Controlled Field Trials (2 hours)	37
S30:	Nuclear Techniques to Move the Nutrition Agenda Forward	38
S31:	Glutamate Function in Human Nutrition, Taste and Satiety	39
S32:	Nutrition, LifeStyle, Brain Aging and Neurodegenerative Diseases: Quenching the Fires of Aging	40
S33:	From Biological Efficacy to Program Effectiveness (The case of Food Fortification)	41
S34:	The Long term Significance of Nutrition in Early Childhood	42
S35:	Obesity Prevention -- Effective Interventions Using Public-Private Partnerships	44
S36:	Asia Highlights	46
S37:	Nutritional Genomics in Health and Disease	47
S38:	Optimal Calcium and Vitamin D Nutrition	48
S39:	Nutritional Benefit-Risk Assessments of Foods and Food Consumption Patterns	49
S40:	Micronutrients Requirements	49
S41:	Fight against malnutrition in hospitals	50
S42:	Econutrition: Integrating Food Based Human Nutrition with Ecology and Agrodiversity	50
S43:	Communication and Partnership Building to Improve Child Nutrition	51
S44:	Nutrition and Cognition in Children: Possible Mechanisms of Action	52
S45:	Latin America Highlights	53
S46:	Nutrition Profiling and labeling: current research, controversies and impact	54
S47:	Europe Highlights	56
S48:	Indigenous Peoples' Food Systems and Nutrition: Finding Solutions in Local Cultures and Environments	58
S49:	Amino Acids and related Metabolites: Nutritional and Physiological Significances in Regulation of Normal Appetite, Digestion and Homeostasis for Healthier Life	59
S50:	Household Food Security Measurement in Developing Countries: Can we Inform Better Policy Makers?	60
S51:	Preventing Micronutrient Deficiencies in Women and Young Children: Emerging Issues and Latest Findings (*)	62
S52:	Carbohydrates: Continuing Controversies	63
S53:	Asian Food Culture: Dietary Factors for Obesity and Diabetes	65
S54:	Protecting Nutrition in times of Food Price Crisis: Programs and Policy Responses	66
S55:	Interactions within the 'Double Burden' of Malnutrition:	

Obesity, Hyperlipidemia, Insulin Resistance and Micronutrient Deficiencies	66
S56: A Global Perspective on Consumer Understanding and Use of Nutrition Information on Food Labels	67

Oral Presentations

OR01: Obesity and Chronic Diseases	68
OR02: Nutrition and Cognition	69
OR03: Nutrition and Cancer I	70
OR04: Nutritional Supplementation	71
OR05: Nutrition in the Elderly	73
OR06: Nutrition, Immunity and Morbidity	74
OR07: Nutrition Assessment	76
OR08: Capacity Building and Empowerment	78
OR09: Bioactive Compounds & NCD	79
OR10: Food Security and Indigenous Diets	81
OR11: Nutrition and Chronic Diseases	83
OR12: Food, Nutrition and Health Claims	84
OR13: Health Promotion and Poverty Alleviation	86
OR14: Developmental Nutrition I	87
OR15: Body Composition and Determinants	89
OR16: Obesity and Chronic Diseases	91
OR17: Metabolism and Chronic Diseases	93
OR18: Protein & Amino-Acids	94
OR19: Fatty Acid Metabolism	96
OR20: Micronutrient Intervention	98
OR21: Developmental Nutrition II	100
OR22: Food Fortification & Biofortification	101
OR23: Food-based Strategies & Dietary Diversity	103
OR24: Nutrition and Cancer II	105
OR25: Micronutrient Metabolism	106

Poster Presentations Part I

DP1: Macronutrients (Protein/Carbohydrates/Lipids) I	109
DP2: Micronutrients I	110
DP3: Bioactive Ingredients in Foods	112
DP4: Nutrition Assessment I	113
DP5: Infant and Young Child Nutrition (breastfeeding, complementary foods, etc.) I	115
DP6: Food Fortification for Optimal Nutrition I	117
DP7: Food-based Strategies/Interventions I	118
DP8: Agriculture and Food Systems I	119
DP9: Food Cultures, Cuisines & Indigenous Diets I	121
DP10: Right to Adequate Food & Nutrition	122
DP11: Nutrition & Infection I	123
DP12: Obesity	124
DP13: Nutrition-related Chronic Diseases	126
DP14: Nutrition Throughout Life Course I	129
DP15: Nutrition / Food Policy & Program I	131
DP16: Food & Nutrition Interventions for Health I	133
DP17: Frontiers in Nutrition Research I	135
DP18: Macronutrients (Protein/Carbohydrates/Lipids) II	136
DP19: Micronutrients II	137
DP20: Bioactive Ingredients in Foods & Others	138
DP21: Nutrition Assessment II	140
DP22: Clinical Nutrition	142
DP23: Infant and Young Child Nutrition (breastfeeding, complementary foods, etc.) II	143
DP24: Food Fortification for Optimal Nutrition II	145
DP25: Food-based Strategies/Interventions II	146
DP26: Agriculture and Food Systems II	148
DP27: Food Cultures, Cuisines & Indigenous Diets II	150

DP28: Nutrition & Infection II	151
DP29: Obesity II	153
DP30: Nutrition-Related Chronic Diseases II	155
DP31: Nutrition Throughout Life Course II	158
DP32: Nutrition / Food Policy & Program II	160
DP33: Food & Nutrition Interventions for Health II	161
DP34: Frontiers in Nutrition Research II	164

Poster Presentations Part II

P1: Lipids & Fatty Acids I	166
P2: Protein & Amino-acids I	168
P3: Energy	170
P4: Micronutrients I	170
P5: Bioactive Ingredients in Foods I	173
P6: Nutrient Requirements & Metabolism: Others I	179
P7: Isotopic Techniques	181
P8: Novel Techniques for Field Use	182
P9: Nutrition Monitoring & Evaluation I	184
P10: Nutritional Assessment: Others I	190
P11: Nutrition Assessment of Hospitalized Patients I	193
P12: Nutrition Management of Diabetes I	195
P13: Enteral & Parenteral Nutrition	196
P14: Clinical Nutrition: Others I	199
P15: Infant and Young Child Nutrition I	200
P16: Food Fortification for Optimal Nutrition I	207
P17: Dietary Diversification/Modification I	209
P18: School Nutrition I	211
P19: Food-based Strategies/Interventions for Optimal Nutrition (Others)	214
P20: Food Processing for Improved Nutrition I	217
P21: Asian Diet (including spices, condiments and herbs in Asian Diet)	219
P22: Food Cultures, Cuisines, & Traditional Diets	221
P23: Nutrition & HIV/AIDS I	224
P24: Nutrition & Infection	226
P25: Nutrition & Respiratory Infection	227
P26: Nutrition & Allergy	229
P27: Obesity I	233
P28: Metabolic Syndrome I	238
P29: Diabetes I	240
P30: Cardiovascular Diseases I	243
P31: Hypertension I	246
P32: Nutrition & Cancer I	249
P33: Obesity & Nutrition-related Chronic Diseases I	251
P34: Double Burden of Malnutrition I	253
P35: Micronutrient Deficiencies and their Prevention I	255
P36: Growth & Development I	258
P37: Nutritional and Human Capital Development	260
P38: Country Efforts Towards Achieving the MDGs	261
P39: Capacity Building in Food and Nutrition Revisited (Institution, Program, Policy) I	262
P40: Community-based Interventions I	264
P41: Nutrition and Physical Activity I	265
P42: Nutrition Education/Communication and Behavioral Changes I	267
P43: Food Based Dietary Guidelines	272
P44: Nutrient Supplementation (single, multiple combinations) I	274
P45: Food & Nutrition Intervention for Health (Others) I	276
P46: The Human Microbiome and its Relevance to Human Health	277
P47: Lipids & Fatty Acids II	278
P48: Protein & Amino-acids II	281
P49: Micronutrients II	282
P50: Bioactive Ingredients in Foods II	285

P51:	Nutrient Requirements & Metabolism (Others) II	291
P52:	Novel Approaches in Dietary Assessment I	295
P53:	Bio-markers: Individual vs Population	297
P54:	Nutrition Monitoring & Evaluation II	299
P55:	Nutritional Assessment: Others II	305
P56:	Nutrition Assessment of Hospitalized Patients II	308
P57:	Nutrition Management of Diabetes II	310
P58:	Clinical Nutrition: Others II	311
P59:	Infant and Young Child Nutrition II	312
P60:	Food Fortification for Optimal Nutrition II	319
P61:	School Nutrition II	321
P62:	Biofortification for Better Foods	325
P63:	Integrated Farming for Food and Nutrition Security	327
P64:	Food Safety / Food Borne Diseases I	328
P65:	Food Processing for Improved Nutrition II	330
P66:	Food Composition and Biodiversity I	332
P67:	Nutrition & HIV/AIDS II	336
P68:	Nutrition & Infection , Immunity, Inflammation I	337
P69:	Obesity II	340
P70:	Metabolic Syndrome II	346
P71:	Diabetes II	349
P72:	Cardiovascular Diseases II	352
P73:	Nutrition & Cancer II	354
P74:	Obesity & Nutrition-related Chronic Diseases II	357
P75:	Double Burden of Malnutrition II	359
P76:	Micronutrient Deficiencies and their Prevention II	360
P77:	Growth & Development II	364
P78:	Country Experiences to Resolve Food Insecurity	365
P79:	Capacity Building in Food and Nutrition Revisited (Institution, Program, Policy) II	367
P80:	Community-based Interventions II	368
P81:	Nutrition and Physical Activity II	370
P82:	Nutrition Education/Communication and Behavioral Changes II	372
P83:	Food Regulation (Labeling & Claim)	377
P84:	Nutrient Supplementation (single, multiple combinations) II	378
P85:	Food & Nutrition Intervention for Health (Others) II	381
P86:	Nutritional Advances in Omics (i.e. nutrigenomics, epigenetics, proteomics, etc.)	382
P87:	Macronutrients (Protein/Carbohydrates/Lipids)	387
P88:	Food Cultures, Cuisines, & Traditional Diets II	388
P89:	Nutrition Assessment	389
P90:	Nutrient Supplementation	389
P91:	Lipids & Fatty Acids III	390
P92:	Protein & Amino-acids III	392
P93:	Carbohydrates I	393
P94:	Micronutrients III	395
P95:	Bioactive Ingredients in Foods III	398
P96:	Novel Approaches in Dietary Assessment II	403
P97:	Recent Innovations in Body Composition Assessment	405
P98:	Nutrition Monitoring & Evaluation III	407
P99:	Nutritional Assessment: Others III	413
P100:	Nutrition Assessment of Hospitalized Patients III	416
P101:	Novel Lipids	418
P102:	Nutrition Management of Diabetes III	419
P103:	Clinical Nutrition: Others III	421
P104:	Infant and Young Child Nutrition III	422
P105:	Food Fortification for Optimal Nutrition III	429
P106:	School Nutrition III	431
P107:	Elderly Nutrition I	434
P108:	Nutrition in Emergencies	437
P109:	Food Processing for Improved Nutrition III	439

P110:	Food Composition and Biodiversity II	441
P111:	Agriculture & Food Systems: Others	445
P112:	Right to Food and Adequate Nutrition I	445
P113:	Nutritional Benefit-Risk Assessment of Foods and Food Consumption Patterns I	448
P114:	Nutrition & HIV/AIDS III	450
P115:	Nutrition & Infection , Immunity, Inflammation II	452
P116:	Obesity III	455
P117:	Metabolic Syndrome III	461
P118:	Diabetes III	464
P119:	Cardiovascular Diseases III	466
P120:	Nutrition & Cancer III	469
P121:	Nutrition & Osteoporosis	472
P122:	Micronutrient Deficiencies and their Prevention III	474
P123:	Growth & Development III	477
P124:	Nutrition and Neural/Brain Function I	479
P125:	Developmental Nutritional Exposures that May Affect Health Across the Life Cycle	481
P126:	Regional Highlights - Food and Nutrition for Better Health	484
P127:	Capacity Building in Food and Nutrition Revisited (Institution, Program, Policy) III	486
P128:	Community-based Interventions III	487
P129:	Nutrition and Physical Activity III	489
P130:	Nutrition Education/Communication and Behavioral Changes III	492
P131:	Nutrient Supplementation (single, multiple combinations) III	498
P132:	Food & Nutrition Intervention for Health (Others) III	499
P133:	Gene Polymorphisms in Determining the Response to Foods and Components	500
P134:	Lipids & Fatty Acids IV	502
P135:	Protein & Amino-acids IV	504
P136:	Carbohydrates II	506
P137:	Micronutrients IV	508
P138:	Bioactive Ingredients in Foods IV	511
P139:	Novel Approaches in Dietary Assessment III	516
P140:	Fetal and Child Growth References/Standards	519
P141:	Nutrition Monitoring & Evaluation IV	520
P142:	Nutritional Assessment: Others IV	525
P143:	Nutrition Assessment of Hospitalized Patients IV	529
P144:	Nutrition Management of Diabetes IV	530
P145:	Clinical Nutrition: Others IV	532
P146:	Infant and Young Child Nutrition IV	534
P147:	Food Fortification for Optimal Nutrition IV	541
P148:	Dietary Diversification/Modification II	543
P149:	School Nutrition IV	546
P150:	Elderly Nutrition II	548
P151:	Biotechnology	551
P152:	Food Safety / Food Borne Diseases II	553
P153:	Food Processing for Improved Nutrition IV	555
P154:	Food Composition and Biodiversity III	557
P155:	Agriculture & Food Systems: Others	560
P156:	Indigenous Diets in Transition	562
P157:	Right to Food and Adequate Nutrition II	564
P158:	Nutritional Benefit-Risk Assessment of Foods and Food Consumption Patterns II	568
P159:	Increasing Food Costs, Food Aid and Malnutrition	570
P160:	Nutrition & HIV/AIDS IV	571
P161:	Obesity IV	573
P162:	Metabolic Syndrome IV	579
P163:	Diabetes IV	581
P164:	Cardiovascular Diseases IV	584
P165:	Nutrition & Cancer	587
P166:	Micronutrient Deficiencies and their Prevention	589
P167:	Growth & Development IV	593
P168:	Nutrition and Neural/Brain Function II	594

P169: Global Strategy on Diet Physical Activity and Health	597
P170: Marketing of Foods and Drinks to Children	597
P171: Nutrition and Physical Activity IV	598
P172: Nutrition Education/Communication and Behavioral Changes IV	601
P173: Rational Use of Dietary Supplements	606
P174: Nutrient Supplementation (single, multiple combinations) IV	608
P175: Food & Nutrition Intervention for Health (Others) IV	611
P176: Frontiers in Nutrition Research (Others)	612
P177: Nutrient Requirements & Metabolism: Others III	613
P178: Nutritional Assessment: Others IV	618
P179: Obesity V	620
P180: Nutrition Throughout the Life Course: Others	622
P181: Evidence-Based Policies & Programs to Address the Global Health and Nutrition Goal	623
P182: Food & Nutrition Intervention for Health (Others) V	625

Special Sessions

SS2: World Public Health Nutrition Association: Building Capacity To Address Challenges in Nutrition. A Panel Discussion.	626
SS4: Evidence-Based Nutrition: Different From Or The Same As Evidence-Based Medicine?	626
SS7: Health and Wellbeing Through Food and Nutrition Security- A Journey Of Macro With Micro	626
SS8: Applied Metrology For Strengthening Food And Nutritional Measurements: Ways, Means and Outcomes	626
SS12: Food Composition Data Linking Agriculture, Health, Trade and the Environment	626
SS13: Management Of Obesity And Metabolic Syndrome: Can Soy Protein Help?	627

Addendum

627

Author Index

628

...susceptible to losses during cooking (~15 %) and storage for 4 ...C and 80% RH (~ 60% in transparent plastic bags and ~ 45% in light ... bags). Mean total losses of storage and cooked rice approached ... changes were observed.

...storage losses may be considerable and must be taken into account ... fortification level.

LIFE CHARACTERISTICS AND TOTAL MIGRATION OF TORBANGUN SOUP (Coleus amboinicus Lour) IN CANNED BATHYLATED BUTHYLATED HIDROXY TOLUEN

...^{1,2}, Devi Marlina³ & Endang Warsiki³

...ment of Community Nutrition, Faculty of Human Ecology, IPB ... Bogor, IDN

...Health & Nutrition Centre, Monash Asia Institute, Monash ... Melbourne, AUS

...ment of Agroindustrial Technology, IPB University, Bogor, IDN

...soup is a traditional cuisine consumed by Batakese lactating women ... Sumatera Indonesia in order to stimulate their breast milk production. ... the soup is prepared using fresh leaves and once cooked it should ... immediately. Efforts to prolong shelf life of the soup should be ... attempt soup preparation more efficiently. The present study aimed to ... shelf life characteristic of soup in canned which was added buthylated ... in its preparations. Total plate account and thiobarbituric acid ... technology and rancidity assessments were analyzed. Results of the ... showed that the soup shelf life in cool temperature (5-8°C and 10-12°C) ... than in room temperature (22 vs. 14 days). Total residual migration ... packaging material into the soup is lower than 10 mg/dm² allowing by ... 90/128/EEC for aqueous food simulant. In conclusion, addition of ... preparation can prolong the shelf life of Torbangun soup.

EFFECTS OF ADDITION OF KATUK (Sauropus androgynus Merr) IN FEED ON MICE REPRODUCTION AND MILK PRODUCTION

...¹ & Arindhini²

...ment of Community Nutrition, IPB University, Bogor, IDN

...ment of Animal Production, IPB University, Bogor, IDN

... (Sauropus androgynus Merr) are commonly consumed as diet for ... women in Indonesia. This study aimed to study the effect of addition ... leaves in feed on mice reproduction and milk production. The study ... completely random factorial (2x3) with factors: percentage of Katuk ... in feed (0, 5 and 10%) and given time of feed (Day-14 during ... and day of giving birth). The study results showed that addition of ... had significant effects (P<0.01) on feed consumption of mice. ... of Katuk did not affect litter size and birth weight, and daily body ... Interaction between the addition level of Katuk and given-time of ... significant effect (P<0.01) on feed consumption and milk production ... gain weight of mice (P<0.05). Addition of 10% Katuk on feed and ... on day 14th during pregnancy had greatest effects on breast milk ... and daily weight gain of the newborn.

EFFECTS OF ADDITION OF TORBANGUN LEAVES (Coleus amboinicus Lour) IN FEED ON MICE REPRODUCTION AND MILK PRODUCTION

...^{1,2}, Frans Silitonga³ & P.H. Siagian³

...ment of Community Nutrition, Faculty of Human Ecology, IPB ... Bogor, IDN

...Health & Nutrition Centre, Monash Asia Institute, Monash ... Melbourne, AUS

...ment of Animal Production, IPB University, Bogor, IDN

... plant (Coleus amboinicus Lour) is used as herb among Batakese ... North Sumatera, Indonesia. In Batakese tradition, Torbangun leaves ... with the beliefs it can stimulate breast milk production of lactating ... The aim of this study was to compare effects of addition of Torbangun

(either in fresh or cooked form) in feed on mice reproduction performance and milk production. The study design was complete random with two factors: percentage of addition of Torbangun cooked (0 vs. 2.5% vs. 5%) and Torbangun leaves (5%). The effects of these factors on feed consumption, milk production, birth litter size, birth and weaning weight, and daily weight gain of mice were studied. The results showed that addition of Torbangun (fresh or cooked) in feed had significant effects (P< 0.05) on feed consumption and weaning weight of mice. Levels of addition of Torbangun did not have significant effect on birth litter size and daily weight gain.

P110: Food Composition and Biodiversity II

P110-01

SELENIUM, ZINC AND COPPER CONTENTS IN NORTHEAST THAI VEGETABLES Boonsiri, Patcharee¹; Hongsprabhas, Pranithi²; Daduang, Jureerut³; Yongvanit, Puangrat¹

¹Department of Biochemistry, Khon Kaen, THA; ²Department of Medicine, Khon Kaen, THA; ³Department of Medical Technology, Khon Kaen, THA

RATIONALE & OBJECTIVES: Selenium, zinc and copper are trace elements which act as cofactors of antioxidant enzymes in human. Northeast Thais usually consume vegetables accompanied with their meal. Therefore, we aim to determine selenium, zinc and copper contents in 23 edible vegetables in northeast.

MATERIALS & METHODS: The fresh vegetables were purchased from local markets in Khon Kaen during April – September 2008. The concentrations of selenium, zinc and copper were determined by inductive coupled plasma-optical emission spectroscopy (ICP-OES).

RESULTS & FINDINGS: The studied vegetables exhibited varied selenium, zinc and copper contents. Selenium was found in very low amounts (98.00-0.00 microgram/100g wet wt), whereas zinc and copper concentrations were in the range 2.69-0.01 milligram/100g wet wt. *Careya Sphaerica* Roxb.C., *Barringtonia acutangula* Gaertn., *Leucaena leucocephala* (Lam).

CONCLUSION: A number of northeast vegetables could be a rich source of essential minerals.

P110-02

IRON, ZINC AND PHYTIC ACID LEVELS OF GRAIN AMARANTH COMMONLY USED IN KENYA

Macharia-Mutie, Catherine W.¹; Brouwer, Inge D.²; Mwangi, Alice M.³; Kok, Frans J.

¹Wageningen University, Nairobi Kenya, KEN; ²Wageningen University, Wageningen, NLD; ³University of Nairobi, Nairobi, KEN

RATIONALE AND OBJECTIVE: Grain amaranth is a widely accepted pseudo-cereal. Nutrient composition of the grain amaranth flour in the Kenyan market is lacking. The objective of this study was to evaluate the proximate and inorganic composition of grain amaranth commonly used in making porridge flours in Kenya.

MATERIALS AND METHODS: Ten samples collected either as grain or flour were analyzed. Proximate, iron, zinc and phytate analysis was done in duplicate.

RESULTS: Protein content of the samples ranged between 10.8 and 13.8g/100g DM. The grain samples had higher content of dietary fiber compared to flour samples. The iron and zinc values of the grain ranged between 12.5-72mg/100g and 3-8mg/100gDM respectively. Fermented grain amaranth flour had the highest amount of iron among all the samples. The molar ratios of phytate to minerals were above the critical values except the phytate/iron molar ratio of fermented amaranth flour.

CONCLUSION: Whereas the number of samples analyzed in the present study were relatively few, it is evident that grain amaranth has high iron content and its bioavailability can be explored further. Though the phytate/iron ratios of amaranth are relatively low, this was mainly due to high iron values rather than low phytate level.

EFFECTS OF ADDITION OF TORBANGUN LEAVES (*Coleus amboinicus* Lour) IN FEED ON MICE REPRODUCTION AND MILK PRODUCTION

Rizal Damanik^{1,2)}, Frans Silitonga³⁾ and P.H. Siagian³⁾

- 1) Department of Community Nutrition, Faculty of Human Ecology, IPB University, Bogor, Indonesia.
- 2) Asia Pacific Health & Nutrition Centre, Monash Asia Institute, Monash University, Melbourne, Australia.
- 3) Department of Animal Production, IPB University, Bogor, Indonesia.

ABSTRACT

Torbangun plant (*Coleus amboinicus* Lour) is used as herb among Bataknese people in North Sumatera, Indonesia. In Bataknese tradition, Torbangun leaves are consumed with the beliefs it can stimulate breast milk production of lactating mothers. The aim of this study was to compare effects of addition of Torbangun (either in fresh or cooked form) in feed on mice reproduction performance and milk production. The study design was complete random with two factors: percentage of addition of Torbangun cooked (0 vs. 2.5% vs. 5%) and Torbangun leaves (5%). The effects of these factors on feed consumption, milk production, birth litter size, birth and weaning weight, and daily weight gain of mice were studied. The results showed that addition of Torbangun (fresh or cooked) in feed had significant effects ($P < 0.05$) on feed consumption and weaning weight of mice. Levels of addition of Torbangun did not have significant effect on birth litter size and daily weight gain.

Key words: Torbangun, coleus amboinicus Lour, Bataknese, milk production

Introduction

Traditional Ingredient use in Indonesia have old recognized since hundreds of year ago. Data have shown that traditional ingredient use expanded progressively. This matter proven with more company majoring elementary ingredient substance plants exist in Indonesia. Expanding of it traditional ingredient usage go together some advantage for example plant to be made a easy ingredient got by breeder, cheap price relative, and seldom generate side effects.

Torbangun Leaves (*Coleus Amboinicus Lour*) representing one of substance which used as a traditional ingredient in Indonesia. The plants grow wild on calm place and lowland. woman of Bataknese which suckling, Torbangun leaves (*Coleus amboinicus* Lour) trusted able to increase product milk water (having the character of as lactagogum). Effect Lactagogum of Torbangun leaves on woman which suckling that has been proved scientifically (Damanik, 2001). This research aim to study the influence of addition and time of gift of Torbangun leaves (*Coleus amboinicus* Lour) on feed to production irrigate milk of mice and growth of mice child.

Materials and methods

Location and Time

The research executed at month of July till September 2006, in Spacious Laboratory (cage C), Shares of Non-Ruminansia and Expectation Animal (NRSH), Departmental of Science of Production and Livestock Technology (DIPTP), Faculty of Livestock, Bogor Agriculture Institute (IPB), Bogor. Feed analysis was conducted at Laboratory of Inter University Center (PAU-IPB) in Bogor.

Equipments and items

Sixty mice, 21 days old, were used in this research was 60 mice consisted of 30 male and 30 female with body weight early $22,03 \pm 2,15$ g/mice. Equipments used are cage, digital weighing-machine, plastic bottle 600 ml, paddy chaff, comb bottle, gauntlet, masker, strand of metal constrictor, cutter. Cage of mice used fairish $36 \times 28 \times 12$ cm³.

Procedure

Research Phase

Cage Preparation. Cage and all equipments used washed out by using soap clean and sterilized by using alcohol 70% later, then the cage pallet arranged in layers with paddy chaff as much 50 gram per cage.

Identify and Balance of Wight Early Mice. Mice were identified by gender later, then each one of female and masculine mice united in one cage to be married. Balance of weight early after process identification.

Feed Treatment. Flour of Torbangun obtained from aerated the Torbangun leaves during two-day and put to the sun under sunshine run dry later, then milled by refinement before mingled in feed. Feed of treatment consisted by feed of commercial chicken and Torbangun leaves with the following level:

R1 : Feed 100 + Torbangun (0%)

R2 : Feed 95 + Torbangun (5%)

R3 : Feed 90 + Torbangun (10%)

Research Execution

Mice of married female mice with a male placed in one cage. Vaginal plug was used to ascertain the mated of mice, if there are vagina plug is hence expressed as pregnant first day (Sunarti, 1992). Male mice released from cage if estimated female mice have pregnant 14 day in order to do not bother female mice during pregnant till bear. Gift of feed treatment started on 14 day after pregnant and day of moment bear, where before given by treatment of mice consume feed of commercial chicken or without addition of Torbangun leaves. Feed given always made available every day at 07.00 o'clock, every four day once lock up changed with newly before balance of weight body mice. Drinking water also given always made available every day, through bottle with capacities 265 ml gave by aluminum pipe (so that not eaten by mice), and mice suck water of through the pipe.

The Design

The design of the study was completely random design factorial (2x3) with two factors; dosage or Torbangun leaves added on feed (0, 5 and 10%) and time give the feed-containing Torbangun (on the 14th day of pregnant period and on day of giving birth) The significant results were analyzed by Tukey tests. Model mathematics (Steel and Torrie, 1993) used in this research is following:

$$Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \varepsilon_{ijk}$$

Note:

Y_{ijk} : Assess perception at factor A pregnant level to-i, factor B level to-j and restating to-k

μ : avarage

α_i : Influence of addition of Torbangun Level to-i;
 $i = 0, 5, \text{ and } 10\%$

β_j : Gift time influence to-j; $j = \text{pregnant age } 14 \text{ day and day bear}$

$(\alpha\beta)_{ij}$: interaction of dosage Torbangun and gift time

ε_{ijn} : Attempt error of treatment to-i and to-j and also restating to-n; $n = 1, 2, 3, 4, 5$

Result

Feed Consumption

Result of perception indicate that rate feed consumption is $9,13 \pm 1,05$ g/mice/day (Table 1). This result indicate that rate feed consumption research supported by opinion Smith and Mangkoewidjojo (1988), expressing that adult mice need feed 3-5 gram every days, and for pregnant mice and lactation can consume more amount.

Result of analysis show that the Torbangun leaves gift time and level influence in feed and also interaction of gift time and level have an effect on very significant ($P < 0,01$) to feed consumption. Level Torbangun in feed R1, R2 and R3 differ very real one another, where downhill consumption very real at the height of level Torbangun in feed each 10,29; 9,01 and 8,10 g/mice/day. Degradation feed consumption with Torbangun leaves level mounting reduced the leaves palatability (Sutardi, 1981; Parakkasi,1999). Gift

Torbangun time in feed have an effect on very significant ($P < 0,01$) to feed consumption, where 14th day of pregnant period (H1) real compared to day of giving birth (H2) each 9,44 and 8,82 g/mice/day.

Table 1. Rate of Feed Consumption Mice

Time Give (day)	Level Torbangun (%)			Rate
	0 (R1)	5 (R2)	10 (R3)	
	-----g/ekor/hari-----			
H1	10,26±0,55 ^A	9,34±0,22 ^B	8,71±0,12 ^C	9,44±0,74 ^A
H2	10,32±0,46 ^A	8,67±0,19 ^C	7,48±0,14 ^D	8,82±1,24 ^B
Rate	10,29±0,51 ^A	9,01±0,40 ^B	8,10±0,66 ^C	9,13±1,05

Superskrip of different block letters at same line or column show result very significant ($P < 0,01$)

H1 = 14th day of pregnant period; H2 = day of giving birth

Milk Production

Result of analysis show, that level of gift have an significant ($P < 0,05$) and time and also the interaction usher level and time of gift of Torbangun in feed very significant ($P < 0,01$) to milk production of mice. Torbangun 5% in feed which passed to] a pregnant moment 14th day of pregnant period (R2H1) proven to increase milk product (Table 2). This result is supported by Silitonga study (1993), expressing that production irrigate milk mount mains of rat gave by Torbangun extract was possibly cause by existence of improvement of growth and activity of gland of mammae and also metabolism of rat body. Difference of result of this also happened because improvement of rate of DNA and RNA of gland of mammae and also degradation of concentration of T4 and serum glucose. According to Nurendah (1982), Torbangun leaves have the nature of like hormone oxytocin (nature of oksitosik). Hormone of Oxytocin that is hormone released together with prolactin as suckle response (Ghosh and Slandek, 1995). Torbangun contain calium which was also important in milk secretion. According to Mephan (1987), ox experiencing of stress will require additional addition sodium as much 1% to prevent degradation of milk secretion irrigate. Deficiencies of sodium cause degradation of weight of body and degradation of milk production.

Tables 2. Rate of Milk Production

Time Give (day)	Level Torbangun (%)			Rate
	0 (R1)	5 (R2)	10 (R3)	
	-----g/mice/hour-----			
H1	0,09±0,02 ^C	0,18±0,04 ^A	0,14±0,06 ^B	0,14±0,06 ^A
H2	0,09±0,01 ^C	0,08±0,08 ^C	0,05±0,01 ^D	0,07±0,02 ^B
Rate	0,09±0,01 ^b	0,13±0,06 ^a	0,09±0,07 ^b	0,10±0,05

Superskrip with different lower case and an block letters at same line or column show significant ($P < 0,05$) and very significant ($P < 0,01$)

H1 = 14th day of pregnant period; H2 = day of giving birth

Litter Size Born

Litter size born is full scale of child borne by mice mains of good live and also the death. Result of analysis were presented at Table 3 indicating that rate litter size is 8,57±2,16 mice. According to Malole and Pramono (1989), slimmer first litter size generally than next litter size, and became optimal production of litter to 2-8 which can reach 10-12 mice/ birth. Influence of level and time of gift Torbangun leaves in feed and also interaction of both do not significant to litter size born.

Table 3. Rate of Litter Size Born

Time Give (day)	Level Torbangun (%)			Rate
	0 (R1)	5 (R2)	10 (R3)	
	-----mice-----			
H1	9,00±1,41	9,00±1,00	8,40±2,70	8,80±1,74
H2	6,60±3,05	8,80±2,59	9,60±0,89	8,33±2,55
Rate	7,80±2,57	8,90±1,85	9,00±2,00	8,57±2,16

H1 = 14th day of pregnant period; H2 = day of giving birth

Weight Newborn Mice

Weight newborn mice to represent weight obtained by considering all child of birth of each mains then divided with amount all of deliberated child. Weight newborn mice child during research is $1,45 \pm 0,17$ g/mice. Wight born obtained high enough because Malole and Pramono (1989), expressing that weight newborn mice range from 0,5-1,5 g/mice. Excelsior weight newborn mice, meaning progressively the child ability goodness mentioned in using feed given its mains during in uterus. Influence of time Torbangun in feed with level and interaction of both do not have an effect on reality to weight newborn. Rate of weight newborn during research take place at Table 4.

Table 4. Rate of Weight Newborn Mice

Time Give (day)	Level Torbangun (%)			Rate
	0 (R1)	5 (R2)	10 (R3)	
	-----g/mice-----			
H1	1,48±0,18	1,45±0,14	1,43±0,14	1,45±0,14
H2	1,49±0,20	1,53±0,18	1,34±0,20	1,45±0,20
Rate	1,49±0,18	1,49±0,16	1,38±0,17	1,45±0,17

H1 = 14th day of pregnant period; H2 = day of giving birth

Weaning-Weight

Weaning to represent growth phase shall no longer base on milk production of mains and start to consume solid feed and the drinking water. Weight weaning obtained conducted balance at the time of child old age 21 day. Weaning shall be conducted by a age moment wean, because if more early hence the child growth will be lost time. Mice weaned at age 14-16 day will not grow as good as which remain to with mains old age 20-21 day. Rate weaning-weight during research is $8,30 \pm 1,73$ g/mice (Table 5). Result of analysis show, that leaf Torbangun gift time and interaction of gift time and level have an effect on very significant ($P < 0,01$) to weaning-weight but level influence in feed do not significant. Torbangun contain sodium, calcium give positive respond to growth of mice child. Calcium is one of very important additional mineral at child for the normal growth and also the nerve growth of during in content.

Table 5. Rate of Weaning-Weight

Time Give (day)	Level Torbangun (%)			Rate
	0 (R1)	5 (R2)	10 (R3)	
	-----g/mice-----			
H1	8,65±0,65 ^C	10,93±0,67 ^A	8,99±0,47 ^B	9,52±1,18 ^A
H2	8,57±0,57 ^C	6,93±0,44 ^D	5,75±0,37 ^D	7,08±1,27 ^B
Rate	8,61±0,58	8,93±2,18	7,37±1,75	8,30±1,73

Superskrip of different block letters at same line or column show result very significant ($P < 0,01$)

H1 = 14th day of pregnant period; H2 = day of giving birth

Body Weight Gain of the Newborn

Child body weight gain of the newborn is indication from itself child growth. Growth from delivering birth wean most influenced by milk amount yielded by individual health and mains itself. Rate of body weight gain of the newborn during research is $0,35 \pm 0,11$ g/mice/day. Result of analysis show, that leaf Torbangun gift time and interaction of gift time and level have an effect on very significant ($P < 0,01$) to weaning-weight but level influence in feed do not significant (Table 6).

Table 6. Rate of Body Weight Gain of the Newborn

Time Give (day)	Level Torbangun (%)			Rate
	0 (R1)	5 (R2)	10 (R3)	
	-----g/mice/day-----			
H1	0,37±0,18 ^C	0,50±0,01 ^A	0,40±0,04 ^B	0,42±0,11 ^A
H2	0,33±0,02 ^C	0,30±0,00 ^C	0,23±0,02 ^D	0,29±0,05 ^B
Rate	0,35±0,19	0,40±0,12	0,31±0,09	0,35±0,11

Superskrip of different block letters at same line or column show result very significant ($P < 0,01$)

H1 = 14th day of pregnant period; H2 = day of giving birth

Mortality

Rate of mortality obtained during research was 22,11%. Influence of time Torbangun in feed with level and interaction of both do not have an effect to mortality. Mortality of this research do not because of treatment however the nature of cannibalism mice mains, this matter is proven from carcass inexistence which left behind in cage whereas child amount decrease. Cannibalism of mains can be caused annoying of mains after bearing because often conducted balance of child and mains that is four day once.

Conclusion

Results collected from the present study showed that addition of Torbangun leaves in feed had significant effects ($P < 0,01$) on feed consumption, and milk production ($P < 0,05$) of the mice. The addition of leaves did not affect the litter size and weight of the newborn mice, and the mortality rate. The interaction between the addition level of Torbangun leaves and the given-time of feed, had significant effect ($P < 0,01$) on feed consumption, milk production, weaning-weight and body weight gain of the newborn mice. The interaction, however, did not affect the weight born, litter size of newborn and the mortality rate. In conclusion, the addition of 5% of Torbangun leaves in feed and be given on the 14th day of the pregnancy period had shown the greatest effect on milk production and body weight gain of the newborn.

REFERENCES

1. Damanik, R, Damanik, N, Daulay Z, Saragih S, R. Premier, N. Wattanapenpaiboon, Wahlqvist ML. 2001. Consumption of bangun-bangun leaves (*Coleus amboinicus* Lour) to increase breast milk production among Bataknesse women in North Sumatra Island, Indonesia. *APJCN*;10(4):S67.
2. Ghosh, R. and C. D. Slandek. 1995. Role of prolactin and gonadal steroids in regulation of oxytocin mRNA during lactation. *Am. J. Physiol.* 269 (Endocrinol Metab. 32): E76-E84.
3. Malole, M. B. dan C. S. Pramono. 1989. Penggunaan Hewan Percobaan di Laboratorium. Departemen Pendidikan dan Kebudayaan. Direktorat Jenderal Pendidikan Tinggi. Pusat Antar Universitas Bioteknologi. Institut Pertanian Bogor, Bogor.
4. Mepham, T. B. 1987. *Physiology of Lactation*. Open University Press. Melton Keynes, Philadelphia.
5. Nurendah. 1982. Sifat ekbolik komponen jamu yang digunakan terhadap kehamilan. Laporan Penelitian. Pusat Penelitian dan Pengembangan Farmasi, Badan Penelitian dan Pengembangan Kesehatan. Departemen Kesehatan, Jakarta.
6. Parakkasi, A. 1999. *Ilmu Nutrisi dan Makanan Ternak Ruminan*. Universitas Indonesia, Indonesia.
7. Sari, D. A. P. 2004. Pengaruh pemberian minuman ekstrak daun katuk kering dan katuk hijau (*Sauropus androgynus* (L) Merr) terhadap produksi susu mencit (*Mus musculus*). Skripsi. Fakultas Kedokteran Hewan, Institut Pertanian Bogor. Bogor.
8. Silitonga, M. 1993. Efek laktakogum daun jinten (*Coleus amboinicus* L.) pada tikus laktasi. Tesis. Program Paskasarjana. Institut Pertanian Bogor, Bogor.
9. Smith, B. J. dan S. Mangkoewidjojo. 1988. *Pemeliharaan, Pembiakan dan Penggunaan Hewan Percobaan di Daerah Tropis*. Universitas Indonesia Press, Jakarta.
10. Steel, R. G. D. and J. H. Torrie. 1993. *Prinsip dan Prosedur Statistika Suatu Pendekatan Biometrik*. Gramedia Pustaka Utama, Jakarta.
11. Sunarti. 1992. Pengaruh umur induk terhadap awal perkembangan embrio mencit (*Mus musculus albinus*) hasil superovulasi. Tesis. Program Pascasarjana, Institut Pertanian Bogor, Bogor.
12. Sutardi, T. 1981. Sapi Perah dan Pemberian Makanannya. Departemen Ilmu Makanan Ternak, Fakultas Peternakan, Institut Pertanian Bogor. Bogor.

Karger Publications in

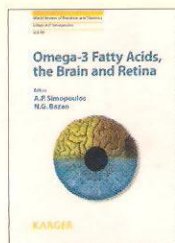
Nutrition

World Review of Nutrition and Dietetics

► www.karger.com/wrund

Editor: Simopoulos, A.P. (Washington, D.C.)

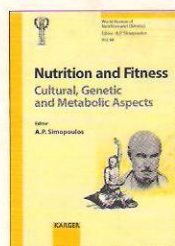
Vol. 99



Omega-3 Fatty Acids, the Brain and Retina

Editors: Simopoulos, A.P. (Washington, D.C.); Bazan, N.G. (New Orleans, La.)
XII + 164 p., 20 fig., 19 tab.,
hard cover, 2009
CHF 219.–/EUR 156.50/USD 219.00
ISBN 978-3-8055-9019-8
e-ISBN 978-3-8055-9020-4

Vol. 98



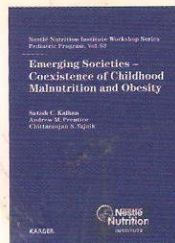
Nutrition and Fitness: Cultural, Genetic and Metabolic Aspects

Editor: Simopoulos, A.P. (Washington, D.C.)
XVI + 260 p., 48 fig., 12 in color, 34 tab.,
hard cover, 2008
CHF 228.–/EUR 163.–/USD 228.00
ISBN 978-3-8055-8530-9
e-ISBN 978-3-8055-8531-6

Nestlé Nutrition Institute Workshop Series:
Pediatric Program

► www.karger.com/nepep

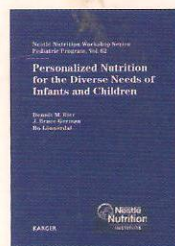
Vol. 63



Emerging Societies – Coexistence of Childhood Malnutrition and Obesity

Editors: Kalhan, S.C. (Cleveland, Ohio); Prentice, A.M. (London); Yajnik, C.S. (Pune)
XIV + 274 p., 39 fig.,
1 in color, 28 tab., hard cover, 2009
CHF 228.–/EUR 163.–/USD 228.00
ISBN 978-3-8055-9009-9
e-ISBN 978-3-8055-9010-5

Vol. 62



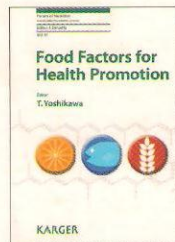
Personalized Nutrition for the Diverse Needs of Infants and Children

Editors: Bier, D.M. (Houston, Tx.); German, J.B. (Davis, Calif.); Lönnerdal, B. (Davis, Calif.)
XX + 262 p., 28 fig., 3 in color, 23 tab.,
hard cover, 2008
CHF 228.–/EUR 163.–/USD 228.00
ISBN 978-3-8055-8553-8
e-ISBN 978-3-8055-8554-5

Forum of Nutrition

► www.karger.com/fonut

Vol. 61



Food Factors for Health Promotion

Editor: Yoshikawa, T. (Kyoto)
XII + 240 p., 53 fig., 1 in color,
12 tab., hard cover, 2009
approx. CHF 250.–/EUR 178.50/USD 250.00
ISBN 978-3-8055-9097-6
e-ISBN 978-3-8055-9098-3

Nestlé Nutrition Institute Workshop Series:
Clinical and Performance Program

► www.karger.com/nnwos

Vol. 12



The Economic, Medical/Scientific and Regulatory Aspects of Clinical Nutrition Practice: What Impacts What?

Editors: Elia, M. (Southampton); Bistran, B.R. (Boston, Mass.)
approx. XIV + 180 p., 9 fig., 26 tab.,
hard cover, 2009
approx. CHF 198.–/EUR 141.50/USD 198.00
ISBN 978-3-8055-8977-2
e-ISBN 978-3-8055-8978-9

Prices subject to change. EUR price for Germany, USD price for USA only.

KARGER

► www.karger.com/Nutrition

Place orders at: orders@karger.com