

フィリピン国食品医薬品検定  
センタープロジェクト  
実験動物用飼料調査報告書

昭和63年6月

国際協力事業団 医療協力部  
JAPAN INTERNATIONAL COOPERATION AGENCY  
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フィリピン国食品医薬品検定センタープロジェクト

実験動物用飼料調査報告書

目 次

1. 実験動物用飼料の調査の必要性	1
1.1 現地飼料メーカーの調査	1
1.2 フィリピン国における実験動物飼育の現状	1
1.3 実験動物用飼料としての原料事情	2
1.4 飼料および飼料原料の分析と配合設計	2
2. 飼料専門家チームによるフィリピン国の現状調査	3
2.1 飼料専門家チームの調査手順	3
2.1.1 事前調査	3
(1) RITMで製造された飼料の入手と栄養分析	3
(2) フィリピンにおける視察場所の調査	3
2.1.2 メンバーと日程	3
2.1.3 視察場所	4
2.2 調査結果	6
(1) University of the Philippines, College of Veterinary Medicine(UP)	6
(2) Research Institute for Tropical Medicine(RITM)	7
(3) Food and Nutrition Research Institute(FNRI)	11
(4) Bureau of Animal Industry(BAI)	12
(5) Philippine Association of Feed Millers, Inc.(PAFMI)	18
(6) Vitarich Corporation	18
(7) Honphil Agri-Development Corporation(HADG)	18
(8) Republic Flour Mills Corporation(RFM)	20
(9) San Miguel Corporation, B-Meg Feed Plant(SMC, B-Meg)	21
(10) Abbott Laboratories/Philippines	22
2.3 実験動物用飼料および飼料原料のサンプリング場所	24
2.4 現状調査結論	24
3. 飼料および飼料原料の分析	26
3.1 栄養成分分析	26
3.2 汚染物質分析	26
3.3 微生物検査	27

3.4	分析結果と考察ならびに結論	28
4.	フィリピン国プロジェクト用配合設計	29
4.1	配合設計の基本的な考え方	29
4.2	マウス、ラット、ウサギおよびモルモット用配合設計案	29
4.3	配合設計における問題点	31
5.	ま と め	32
6.	参考資料 1～8	35

## 1. 実験動物用飼料の調査の必要性

フィリピン食品・医薬品局（Bureau of Food and Drugs, BFAD）においては、動物飼育施設を所有していないため、実験動物を用いる毒性試験および品質管理試験などすべて外部機関委託に頼っているのが現状であり、また外部機関といってもこれといった動物飼育施設も安全性研究機関も存在しないことが、国際協力事業団（JICA）によるBFAD機能強化のためのプロジェクト調査報告で明らかにされている。

フィリピン国食品医薬品検定センタープロジェクトにおいて、動物実験に関しては、急性毒性試験のほか発熱性試験、局所刺激性試験、ヒスタミン試験などの品質管理的試験を可能にすることを目的としている。従って、BFADにおいて、毒性試験および品質管理試験などの動物実験を行うためには、まず良質の実験動物の生産が必要となる。

良質な実験動物を生産する場合には環境条件を良好な状態に維持することが必要であると同時に、実験動物が摂取する飼料において、栄養の過不足、あるいは原料中に混入する環境汚染物質が動物の成長および繁殖さらに毒性試験成績に種々の影響を及ぼすことが知られているので、飼料も十分な統御が必要となる。

本プロジェクトを進めるに際して、フィリピン国における実験動物の現状と実験動物用飼料に関する情報がなんら資料として得られていなかった。本プロジェクトの実験動物施設の設計においては、現在の日本における実験動物飼育施設の水準をもとにして、SPF動物の生産とその動物を使用しての動物実験が行えるようにし、多少現地の社会状況などを考慮して運営しやすいように計画された。

このような観点から、本プロジェクトにおける毒性試験あるいは品質管理的な動物試験を成功させ、本プロジェクトを円滑に進めるためには、その主要な実験動物の生産および飼育に使用する飼料原料の調査および現地で入手できる飼料原料を用いた飼料製造を可能にすることが必要とされた。従って、以下のような内容の調査をすることが必要であると判断した。

### 1.1 現地飼料メーカーの調査

フィリピン国における実験動物用の飼料製造メーカーおよび飼料原料の有無あるいは原料供給の可能性について調査

### 1.2 フィリピン国における実験動物飼育の現状

実験動物の飼育の現状、その品質および飼育施設の調査

### 1.3 実験動物用飼料としての原料事情

実験動物用飼料の条件については、日本実験動物飼料協会案<sup>1)</sup>、EPA (Environmental Protection Agency)<sup>2)</sup>、NCTR (The National Center for Toxicological Research)<sup>3)</sup>、LAC Diets Advisory Committee<sup>4)</sup>、National Cancer Institute のガイドライン<sup>5)</sup>、実験動物飼料中の毒性物質と栄養<sup>6)</sup>、実験動物の栄養必要条件<sup>7)</sup>などで実験動物の栄養条件および実験あるいは繁殖に支障をきたす可能性のある汚染物質の規制および毒性について報告がなされている。原料の純度によりその製品の純度が決まる。このようなことから、実験動物用飼料に使用できる原料が現地において入手できるか、また原料の品質特に栄養成分、重金属・農薬・カビおよび細菌などの混入の有無を調査する必要があり、各種の原料のサンプリングを行い、各種の分析を実施し判断する。

#### 文 献

- 1) 日本実験動物飼料協会案 (仲川憲一, Exp. Anim. 32. 163-65-1983)
- 2) Environmental Protection Agency (EPA) 飼料および媒体の汚染物質限度: GLP 基準解説 薬時日報社
- 3) The National Center for Toxicological Research (NCTR) 配合飼料における汚染物質の最大許容濃度: GLP 基準解説, 薬時日報社
- 4) Dietary Standards for Laboratory Animals: Report of Laboratory Animal Center Diets Advisory Committee; Clarke H.E. Coates M.E. Eva J.K., Ford D.J., Milner C.K., O'Donoghue P.N., Scott p.p. and word R.J. Laboratory Animal 11. 1-28(1979)
- 5) Guide Lines for Carcinogen Bioassay in Small Rodents: National Cancer Institute, NIH, Bethesda, Maryland (1973)
- 6) Commercial Laboratory Animal Diets: Toxicant and Nutrient Variability: Greenman D.L., Oller W.L., Little Field N.C., Nelson C.J.: J. Joxi. Envi. Her. 6 235-246(1980)
- 7) Nutrient Requirements of Laboratory Animals 3rd. Ed. National Academy of Sciences (1978)

### 1.4 飼料および飼料原料の分析と配合設計

フィリピン国において入手した原料の栄養成分分析、汚染物質などの分析および微生物検査を行い、それらの成績を基にして、実験動物飼料製造上における問題点の指摘およびマウス、ラット用飼料あるいはウサギ、モルモット用飼料の配合設計を行う。



## 2. 飼料専門家チームによるフィリピン国の現状調査

### 2.1 飼料専門家チームの調査手順

#### 2.1.1 事前調査

JICA国内委員会メンバー水谷正寛氏（財団法人食品薬品安全センター・秦野研究所参事）の招集により，大滝恒夫（食品薬品安全センター・動物管理室長），田口芳樹（日本クレア株式会社・部長），吉田米男（日本配合飼料株式会社・副参事），伏谷寿（日本配合飼料株式会社・主管）が集まり，調査目的などについて打ち合わせを行った。（昭和61年9月8日）。その後出発まで約2ヶ月間に行った事前調査としては以下のものであった。

##### (1) RITMで製造された飼料の入手と栄養分析

フィリピン熱帯医学研究所（RITM）で製造された4種の実験動物用飼料を入手し，（参考資料1），その飼料の栄養分析（日本配合飼料株式会社で実施）を実施した。（参考資料2）

その成績によればNo. 848～No. 850の3種類はマウス，ラット，ハムスター，スナネズミ用の飼料である。No. 848とNo. 849は一般成分分析値および使用原料からみる限り同一飼料と思われる，No. 848はオープンで滅菌処理されたもの，No. 849はオートクレーブで滅菌処理されたものと推察される。成分的には粗灰分が若干低い傾向があり，従ってカルシウムおよびリンもやや低い値を示した。No. 850は前記飼料とは一般成分も使用原料も異なり粗蛋白質が低い値であった。日本においても長期飼育用飼料として，この程度の粗タンパク組成のものもあるが，特に粗繊維含量が低かった。No. 851はモルモット，ウサギ，ガチョウ用飼料として製造されているが，粗繊維質含量がかなり低く，使用原料の種類からみて繊維質原料の調達が問題点として考えられた。

以上の飼料サンプル全体についていえることは，使用している原料，特にタンパク原料は比較的種類が多く用いられて量，質的に工夫の一端がうかがえる。しかし，粗繊維質原料に問題があった。

##### (2) フィリピンにおける視察場所の調査

フィリピンBFADから視察場所および実験動物に関する情報が得られなかったため，日本クレア株式会社において，実験動物および実験動物用器材について問合せがあった研究所あるいは製薬企業と飼料会社をリストアップし（参考資料3），JICAを通じてBFADのDirector Mrs. Sanchezに訪問依頼の手配をお願いした。

#### 2.1.2 メンバーと日程

メンバーは，財団法人食品薬品安全センター・秦野研究所・動物管理室長・大滝恒夫，日本クレア株式会社・営業本部部长・田口芳樹，日本配合飼料株式会社・実験動物・主管・伏谷

寿の計3名であった。

調査日程は、1986年11月4日(火)～11月17日(月)の14日間で視察場所は以下に示す10ヶ所であった。(なお一部の視察場所はBFADの紹介により行ったが、それ以外は調査団独自により行った。)

### 2.1.3 視 察 場 所

以下に訪問先を示す。

1. U.P. Vet. Medicine: University of the Philippines, College of Veterinary Medicine,  
Quezon Campus: Diliman, Quezon City 3004 (Phone: 99-54-36)  
Los Banos Campus: Los Banos, Laguna, 3720  
\* Dr. Joseph S. Morsangkay, DVM./Lab. Animal Facilities
2. RITM: Research Institute for Tropical Medicine  
Albang, Muntenlupa, Metro Manila (Phone: 842-2828)  
\* Dr. Yoshinori Kaneko  
\* Mr. Jun Ichinose  
\* Mr. Faustino C. Icatlo, Jr. DVM
3. FNRI: Food and Nutrition Research Institute,  
National Science and Technology Authority (NSTA)  
Pedro Gil Street, Manila 2801 (Phone: 59-51-13, 50-30-41)  
P.O. Box EA-467 Manila  
\* Miss Alice Alma C. Bungay, DVM  
\* Miss Rosario H. Arim, DVM
4. BAI: Bureau of Animal Industry, Ministry of Agriculture & Food  
Visayas Ave., Diliman, Quezon City (Phone: 95-21-84)  
\* Miss Rubina O. Cresencio, DVM/Lab. Services Div.  
\* Dr. Jaime Abella Sison, DVM/Food Control Div.  
\* Miss Teodora N. Alcantara
5. PAFMI: Phillipine Association of Feed Millers, Inc.  
Rm. 302 Premiere Financing Bldg., 430 E. Rodriguez Sr. Boulevard,  
Cubao, Quezen City (Phone: 722-2912)  
\* Mr. Aproniano C. Jacobe, Executive Secretary

6. Vitarich Corporation  
Sarmieato Bldg. II, Makati (Phone: 87-20-81)  
\* Mrs. Zeny
  
7. HADC: Honphil Agri-Development Corporation  
Stall No. 519-522, Bldg., FTI Complex, Jaguig (Phone: 818-8498)  
\* Mr. Adel H. Ambrosio, DVM/Area Manager
  
8. RFM: Republic Flour Mills Corporation  
Cor. Pioneer & Sheridan Sts., Mandaluyong  
P.O. Box 713, Makati, MM (Phone: 77-37-11)  
\* Mr. Jerry Dean O. Concepcion, Animal Nutritionist
  
9. SMC. B-Meg: San Miguel Corporation, B-Meg Jeed Plant  
# 638 A Bonifacio Ave., Quezon City (Phone: 35-30-71)  
\* Mr. Philip Habel, Planning Div.
  
10. Abbot Laboratories/Philippines  
# 102, Epifanio De Los Santos Ave., Makati  
P.O. Box 29, Makati, MM (Phone: 78-00-41)  
\* Mr. Reynoldo H. Umali, Director QA

## 2.2 調査結果

国立大学、公立研究機関、飼料製造会社および製薬会社における調査・見学の概要を次に述べる。

### (1) University of Philippines (UP) College of Veterinary Medicine

実験動物学および家畜育種学の Dr. Masmgkry とフィリピンにおける実験動物の現状と今後について打ち合わせをした。

Dr. Masmgkry は名古屋大学で実験動物学を修了し、実験動物の重要性を認識しており、いずれフィリピンにおける実験動物の中心的人物になると思われる。

彼によれば、国内では実験動物の必要性を認めてはいるものの実験動物として確立された動物が生産されておらず、また実験動物用飼料もなく一部の研究者が外国からこれらを輸入して研究をしているのが現状である。

既に稼動している熱帯医学研究所 (RITM) と今回の食品・医薬品検定センターの開設によって研究成果があがり実験動物の重要性が認識されることがフィリピンの実験動物学の発展につながるものと期待しているとのことであった。

(a) 熱帯医学研究所より出発前に入手していた飼料配合表をもとにフィリピンにおける原料事情についてコメントを頂いた。

100% 輸入のもの : Fish Meal, Wheat Pollard, Synthetic Amino Acid, Limestone,  
Sodium Chloride, Vitamin Mix, Mineral Mix.

50% 輸入のもの : Ground Corn

100% 国産のもの : Vegetable oil 他

※ 原料のほとんどを輸入に頼っているが、常に統一された品質のものが入手できるとは限らない。

※ Vegetable oil は Coconuts Oil を使用しており品質に問題があるが代替のオイルの入手が困難であり止むを得ない。

※ 繊維源として Ipil-ipil を使用するが、有毒成分のミモンシが含まれており、大量に使用すると繁殖障害や脱毛症状をおこすため7%から10%の使用が限度である。

※ 農薬はマラチオンが国内で使用されているが、原料中への残留については分析されていない。

(b) 大学で飼育している実験動物はICRマウスとSDラットで日本よりSPF (Specific Pathogen Free) で入手したものをコンベンショナル (Conventional) 条件で繁殖しており、生産した動物は各研究機関に分与している。系統の由来ははっきりしているがコロニーが小さいため近交化が進んでいると思われる。環境条件は自然条件に近かったが、現状でできる最大限の努力がなされていた。

飼料は市販のBLUE RIBBON (資料-1) のハトの飼料と全粒のトウモロコシをそ

れぞれ50%ずつ混合して与えている。繁殖成績には問題はないが成長曲線が標準より相当に悪いようである。(分析のためのサンプル入手: サンプルNo. 22; 栄養分析の結果では粗タンパクが12.8%と低かった。)

床敷は家具メーカーの木屑を天日乾燥して使用していた。SPF動物の飼育には検討の必要があると思われる。

## (2) Research Institute for Tropical Medicine (RITM)

1981年に日本の援助によってオープンした研究所で金子博士および一ノ瀬氏より現状についてコメントを受けた。

(a) 動物飼育施設は約4m×5mの飼育室が3室あり、マウス・モルモット・ウサギを飼育し、それらの動物は近在の農家またはペットショップから購入され系統は一定していなかった。最近マウスについてSPF動物を米国より入れ、繁殖を開始していた。特にモルモットは死亡率が高く非常に効率が悪いので、動物室の一部をバリアー化し、クリーンラックを入れて温湿度条件を統御しようと思いたが思うようにいっていなかった。繁殖のうまくいっていない理由としては、飼料中のビタミンの欠乏にあるように思われた。

(b) 動物数が少ないので飼料原料を単品で購入し独自の配合表に従って配合し、ペレットを製造していた。

※ モルモット・ウサギ用の繊維源としてIpil-ipilを使用しているが7%以上の配合をすると繁殖障害をおこすため成分配合に苦慮しているとのことであった。

※ 使用量が少量のため、安定した品質の原料を購入することは在庫量と価格の面で困難であり、大切なことはわかっているが対応策は皆無である。

※ 飼料製造設備として次の機器があった。

リボンミキサー (宮坂)

ペレットミル (CPM)

ヒートシーラー (富士)

乾熱滅菌機 (トキワ)

(c) 後日、一ノ瀬氏と面談の結果、マウス・ラット用飼料はHADCOより混合した粉末飼料を購入して、ペレット化しているとのことであった。サンプル(サンプルNo. 24)および成分配合表(資料-2)を入手した。一般家畜用飼料原料のため抗性物質が添加されているとのことであった。

これまでは原料を単品で購入していたが、一部の原料に品切れがおこりやすいため配合した飼料を購入することに変更した。

また、モルモット・ウサギ用はURC(Universal Robina Corporation)より家畜用ペレットを購入しており、サンプル(サンプルNo. 25)および成分配合表(資料-3)を入手した。更に後日、主要原料についての価格表を一ノ瀬氏より入手した。(資料-4)

COMPOSITION OF "BLUE RIBBON FEEDS"

PIGEON PELLETS

BAI Registration No. 1586

GUARANTEED ANALYSIS

Crude Protein	-----	not less than 18%
Crude Fat	-----	not less than 4%
Crude Fiber	-----	not more than 8%
Moisture	-----	not more than 13%
Ash	-----	not more than 10%

INGREDIENTS

- |                           |                          |
|---------------------------|--------------------------|
| 1. Yellow Corn            | 19. Pyridoxine Hcl       |
| 2. White Corn             | 20. Riboflavin           |
| 3. Soybean Oil Meal       | 21. Niacin               |
| 4. Pollard                | 22. Choline Chloride     |
| 5. Fish Meal              | 23. Calcium Pantothenate |
| 6. Meat & Bone Meal       | 24. Biotin               |
| 7. Copra Meal             | 25. Folic Acid           |
| 8. Ipil-Ipil Leaf Meal    | 26. Vitamin B12          |
| 9. Molasses               | 27. Copper Sulfate       |
| 10. Limestone Salt        | 28. Manganese Oxide      |
| 11. Tri-calcium Phosphate | 29. Ferrous Sulfate      |
| 12. Vegetable Oil         | 30. Potassium Iodide     |
| 13. DL-Methionine         | 31. Cobalt Carbonate     |
| 14. Vitamin A             | 32. Zinc Oxide           |
| 15. Vitamin D3            | 33. Sodium Selenite      |
| 16. Vitamin E             | 34. Antioxidant          |
| 17. Vitamin K             | 35. Antimold             |
| 18. Thiamine Hcl          |                          |

A QUALITY PRODUCT OF

RFM Corporation, Feeds Division  
Pioneer St., Mandaluyong, Metro Manila  
Tel. 77-37-11

Feed mixture used for laboratory animal  
(Mouse & Rat) in RITM

INGREDIENTS

1. Soybean Oil Meal
2. Processed Fish Meal
3. Meat & Bone Meal
4. Corn Germ Meal
5. Corn Gluten Meal
6. Yellow Corn Grits
7. Synthetic Amino Acids
8. Unidentified Growth Factors
9. Anticoccidiostat
10. Limestone
11. Sodium Chloride
12. Essential Vitamins & Minerals

GUARANTEED CALCULATED ANALYSIS

- |                       |                   |
|-----------------------|-------------------|
| 1. Crude Protein----- | Not less than 22% |
| 2. Crude Fat -----    | Not less than 4%  |
| 3. Crude Fiber -----  | Not more than 6%  |
| 4. Moisture -----     | Not more than 13% |

PRICE PER KILOGRAM OF THE PRE-MIXTURE

Pesos 8.00 / kg

PRE-MIX FEED BY

HONPHIL AGRI-DEVELOPMENT CORPORATION  
Stall No.519-522, Bldg., FTI Complex, Taguig  
Tel. No. 87-20-81

Composition of pellet being used for  
Guinea pig & Rabbit in RITM

INGREDIENTS

1. Blood Meal
2. Bran and Pollard
3. Corn
4. Corn Germ Meal
5. Corn Gluten Feed
6. Copra Meal
7. Fish Meal
8. Ipil-ipil Leaf Meal
9. Limestone Powder
10. Meat and Bone Meal
11. Molasses
12. Rapeseed Meal
13. Salt
14. Soybean Meal
15. Tricaphos
16. Vegetable Oil
17. Calcium Panthothenate
18. Choline
19. Di-Methionine
20. Folic Acid
21. Niacin
22. Riboflavin
23. Vitamin A
24. Vitamin D3
25. Vitamin E
26. Vitamin K
27. 3-Nitro
28. Copper Sulfate
29. Ferrous Sulfate
30. Manganese Oxide
31. Zinc Oxide
32. Potassium Iodide
33. Fortified with Vitamin B12 & Antibiotics
34. Stabilized with Antioxidant

PRICE PER KILOGRAM OF THE PELLETT

Pesos 5.40 / kg

MANUFACTURED BY

UNIVERSAL ROBINA CORPORATION

Pasig, Metro Manila

Trade Mark : STAR feeds 555



<資料-4>

MAJOR PRICE OF RAW MATERIALS

1. Corn Gluten Feed	Pesos 2.40 / kg
2. Copra Meal	2.50 / kg
3. Corn Grit ( No.22 )	3.50 / kg
4. Soybean Oil Meal	6.50 / kg
5. Fish Meal ( Peruvian )	11.00 / kg
6. Skimmed Milk Powder	24.00 / kg
7. Rice Bran D1	1.90 / kg
8. Vegitable Oil	32.45 / 0.5 gal.
9. Brown Suger	5.25 / kg
10. Wheat Flour	9.50 / kg
11. Oyster Shell Powder	1.20 / kg
12. Vionate ( Vitamin-Mineral Mixture )	65.00 / 200 g
13. Salt	1.40 / kg

\* November 20, 1986

\* Mr. J. Ichinose / RITM

(3) Food and Nutrition Research Institute (FNRI)

栄養実験を行っているとのことで訪問したが、動物はSDラットを少数飼育しているだけであった。飼料は原料で購入し独自の配合設計(資料-5)によって混合し粉末で給餌していた。原料についての品質チェックはされていなかった。

1回の購入量が少なく購入が定期的に行われなため品質にむらがあると思われた。ここで飼育されたSDラットの体重曲線や臓器重量などのデータが標準のデータと異なることを問題にしていた。

ここでも原料(サンプルNo.1, 2, 3, 4)と配合飼料(サンプルNo.23)を入手した。

<資料-5>

COMPOSITION POWDER DIET FOR RATS

(Food & Nutrition Research Institute)

INGREDIENTS

Rice Flour	36 %
Ground Dils (Fish Meal)	24
Dapak (Rice Bran)	20
Malungay (Horseradish)	8
Coco/Corn Oil	6
Vitamin & Cornstarch*	2
Cod-Liver Oil	2
Coco/Corn/Toco	2

( Crude Protein 24%)

\* Vitamin Mix

Ca-Pantothenete	4.00 gram
Niacin	4.00
Thiamine (Vitamin B1)	0.40
Riboflavin (Vitamin B2)	0.40
Phyridoxine (Vitamin B6)	0.40
Folic Acid	0.04
Biotin	0.04
Menadione	0.40
Choline	100.00
P-Amino Benzoic Acid	8.00
Inositol	8.00
Cornstarch	3,874.32

Total : 4.000.00 gram

(4) Bureau of Animal Industry (BAI)

農業食糧省の研究機関であり民間から持ち込まれた飼料原料や食品材料の栄養と成分分析を実施する部門である。

従って栄養成分分析室は大きく一般成分の分析を行っていた。原料サンプルも豊富にあったが、これらは必ずしも安定供給されているものではないとのことで調査は行わなかった。

動物実験は少数のマウス・ハムスター・ウサギ・ニワトリを木製のケージを使って飼育し

ていた。飼料はUPと同じBLUE RIBBONのハト用の飼料を与えていた。

また、PAFMIの紹介でFood Control DivisionのDr. Sisonを訪問し、彼の著書になる“フィリピンにおける飼料関係の統計および啓蒙書”(The Philippines Feedmilling and Technology Resource Handbook)を頂いた。

その内容の目次は以下に示すごとくである。

The Philippines Feedmilling and Technology Resource Handbook

Table of Contents

	Page
Why This Book Was Written	vi
Foreword	vii
A Look at RP's Growing Feed Milling Industry	8
How to Start Your Own Feed Mill	13
Basic Nutrition to Animal Raisers and Feed Millers	15
Common Feedstuffs for Poultry and Livestock	28
Feed Formulation Made Simple	40
How Feed is Manufactured	48
Quality Control in Feed Processing	51
Recent Developments in Government Control of Poultry and Livestock Feeds	55
All You Nced to Know About Feed Control Law	59
Don't Overlook Storage Management in Feed Milling	66
Primer on Feed Processing Equipment and Machineries	69
Cost and Returns in Feed Production	76
Keeping Good Plant Records is Essential	81
What It Takes to Be A Successful Feed Manufacturer and Dealer	83

by Jaime Abella Sison, D.V.M.

内容の一部について述べるとフィリピンにおける飼料メーカーおよび商社数は(表-1)のごとくであり、各飼料メーカー名および飼料の規制と標準的飼料組成あるいは飼料の栄養分析は別紙資料(参考資料4~6)のごとくである。1980年度における生産高は(表-2~3)に示されるようにPAFMIのメンバーで全フィリピンの46.5%の飼料を生産している。また、そのPAFMIメンバーによる各年度の家畜別の生産高は(表-4)のごとく示される。

<表-1> Total Number of Feed Millers  
and Dealers in the Philippines

Total Number of:

Feed Mills	368
Mixed-Feed Manufacturers	285
Commercial	136
Non-Commercial	149
Feed Ingredient Producers	83
Importers/Indentors	90
Suppliers	119
Distributors	211
Retailers.	1,368

Source: Animal Feed Control Division,  
BAI (1983).

<表-2>

TOTAL FEED MILL CAPACITY OF THE PHILIPPINES

BY REGIONAL LOCATION OF FEED MILL

(1980-METRICTONS)<sup>1/</sup>

	Total Production Capacity		
	All Mills	PAFMI	Non-PAFMI
Total Philippines	<u>1,034,205.0</u>	<u>481,250.0</u>	<u>552,905.0</u>
Total Luzon	<u>811,390.0</u>	<u>404,950.0</u>	<u>406,440.0</u>
Region I - Ilocos	8,735.0	-	-
Region II - Capayan Valley	-	-	-
Region III - Central Luzon	219,180.0	93,600.0	125,580.0
Region IV - National Capital	575,365.0	311,350.0	264,015.0
Region V - Bicol	8,110.0	-	8,110.0
Total Visayas	<u>147,435.0</u>	<u>74,895.0</u>	<u>72,540.0</u>
Region VI - Western Visayas	16,225.0	-	16,225.0
Region VII - Central Visayas	127,935.0	74,895.0	53,040.0
Region VIII - Eastern Visayas	3,257.0	-	3,257.0
Total Mindanao	<u>75,380.0</u>	<u>1,405.0</u>	<u>73,975.0</u>
Region IX - Western Mindanao	4,055.0	-	4,055.0
Region X - Northern Mindanao	500.0	-	500.0
Region XI - Southern Mindanao	32,605.0	1,405.0	31,200.0
Region XII - Central Mindanao	38,220.0	-	38,220.0

I/Based on an 8 hour/26-day month labor year.

TOTAL PRODUCTION CAPACITY AND UTILIZATION RATES

OF PAFMI-MEMBER COMPANIES, 1980

(in thousands of 50-kg. bags)

COMPANY	Production Output	Total Production Capacity 1/	Utilized Capacity 2/	Unused Amount	Capacity %
Champion Feed Mills, Inc	105.9	374.4	28.3%	268.5	71.7%
Far East Agricultural Supply Co., Inc.	173.3	312.0	55.6	138.7	44.4
General Milling Corporation	2,275.0	624.0	364.6	-	-
Liberty Flour Mills, Inc.	164.8	249.6	66.0	84.8	34.0
Philippine Feeds Milling Company	91.2	499.0	18.3	407.8	81.7
R F M Corporation	1,414.1	698.9	202.3	-	-
San Miguel Poultry & Livestock Feed Plant	5,802.0	3,993.6	145.3	-	-
Universal Robina Corporation	2,466.4	1,248.0	197.6	-	-
Virginia, Incorporated	35.0	99.8	35.1	64.8	64.9
Vitarich Corporation	2,934.3	1,525.7	192.3	-	-
Total PAFMI-Member Companies	15,462.0	9,625.0	160.6	964.6	10.0%

NOTES

- Total production capacity figures of the individual PAFMI members are based on a single 8-hr/26-day/ month labor shift.
- % utilized capacity exceeds 100% in the following companies since multiple shifts were normal during 1980.
  - General Milling Corporation ..... 3 shifts
  - RFM Corporation ..... 3 shifts
  - San Miguel Poultry & Livestock Feed Plant ..... 3 shifts
  - Universal Robina Corporation ..... 3 shifts
  - Vitarich Corporation ..... 3 shifts

SOURCE: PAFMI SECRETARIAT; information provided by individual PAFMI-member companies.

COMPARATIVE PRODUCTION OUTPUT OF PAFMI-MEMBER

COMPANIES, 1979 AND 1980

(in thousands of 50-kg. bags)

	1980	% to Total	1979	% to Total	Difference	% Change
TOTAL PRODUCTION	<u>15,282.4</u>	<u>100.0%</u>	<u>14,646.1</u>	<u>100.0%</u>	<u>636.3</u>	<u>4.3%</u>
Poultry Total	<u>11,933.9</u>	<u>78.1%</u>	<u>11,487.4</u>	<u>78.4%</u>	<u>446.5</u>	<u>3.9%</u>
Starter	<u>1,003.9</u>	<u>6.6</u>	<u>979.2</u>	<u>6.7</u>	<u>24.7</u>	<u>2.5</u>
Grower	<u>1,098.4</u>	<u>7.2</u>	<u>1,050.5</u>	<u>7.2</u>	<u>27.9</u>	<u>4.6</u>
Layer	<u>4,323.3</u>	<u>28.3</u>	<u>4,295.3</u>	<u>29.3</u>	<u>28.0</u>	<u>0.7</u>
Broiler	<u>5,196.0</u>	<u>34.0</u>	<u>4,928.8</u>	<u>33.6</u>	<u>267.2</u>	<u>5.4</u>
Others	<u>312.3</u>	<u>2.0</u>	<u>231.4</u>	<u>1.6</u>	<u>80.9</u>	<u>35.0</u>
Hog Total	<u>3,348.5</u>	<u>21.9%</u>	<u>3,158.7</u>	<u>21.6%</u>	<u>189.8</u>	<u>6.0%</u>
Creep	<u>227.7</u>	<u>1.5</u>	<u>198.2</u>	<u>1.4</u>	<u>29.5</u>	<u>14.9</u>
Grower	<u>985.3</u>	<u>6.5</u>	<u>818.8</u>	<u>5.6</u>	<u>166.5</u>	<u>20.3</u>
Fattener	<u>586.8</u>	<u>3.8</u>	<u>702.8</u>	<u>4.8</u>	<u>(116.0)</u>	<u>-16.5</u>
Brood Sow	<u>825.1</u>	<u>5.4</u>	<u>852.6</u>	<u>5.8</u>	<u>( 27.5)</u>	<u>-3.2</u>
Others	<u>723.6</u>	<u>4.7</u>	<u>586.3</u>	<u>4.0</u>	<u>137.3</u>	<u>23.4</u>

生産の問題点としては、raw material の 1) Yellow Corn, 2) Soybean Meal, 3) Fish Meal, 4) Meat and Bone Meal あるいは Vitamin Supplements などはほとんどが輸入されており、Yellow Corn は国内産で供給が一部可能であるが、供給が不安定で PAFMI のメンバーは国内産 24%、輸入物 76% の割合で使用している。また、Soybean Meal : 100%、Fish Meal : 37%、Meat and Bone Meal : 93%、Vitamin Supplements : 95.3% を輸入している。

また、飼料の原料、各種家畜の飼料組成およびそれらの品質管理についても述べられている。

(5) Philippine Association of Feed Millers, Inc. (PAFMI)

フィリピン国内の大手飼料メーカー 5 社と中堅 6 社が共同出資して設立した会社(1951年設立)(資料-6)で、情報の収集や政府に対する折衝等を行っている。コマーシャル業務はしていないが、将来は原料の共同購入や配合設計の基準設定等を実施する計画を持っている。

国内における飼料および飼料原料の動向調査について統計資料(参考資料-7)(Dr. Sison の著書と同様)を入手した。

原料中 100% 輸入に依存しているものは、Soya, Wheat Bran, Pollard であり、Fish Meal は国産品が 20~30% を占めるが品質が悪く安定供給の保証がないため大手飼料会社は 100% 輸入に頼っている。

Corn も国産品があるが洪水や台風などによる不作・流通不能などで在庫切れが往々にしてあり、主として輸入品を使用している。国産・輸入ともに品切れの時はキャッサバを代用している。

(6) Vitarich Corporation

Abbott が抗生物質や抗酸化剤フリーの飼料を製造依頼しているとのことで訪問したが詳細についてははっきりしなかった。家畜飼料の大量生産工場(プラントは郊外にある)のため実験動物用としての少量生産は行っていないとのことであった。

(7) Honphil Agri-Development Corporation (HADCO)

熱帯医学研究所(RITM)がマウス・ラット用としてプレミックスしたものを購入しているとのことで、国際協力事業団のノ瀬氏の案内で訪問したがそのような事実はなく、間に入った業者が一般家畜の飼料を納入している模様であった。

RITM で入手した配合表は CHICK BOOSTER STARTER と同じものであった。

ここではペレットは作ってなく原料かプレミックスで販売しており、特別注文によるプレミックスは 500kg 単位で受注できるとのことであった。主要原料のサンプル(サンプル No.





## PHILIPPINE ASSOCIATION OF FEED MILLERS INC.

Rm. 302, Maligaya Building III  
430 E. Rodriguez Sr. Blvd., Cubao, Q.C.  
Tel. Nos. 722-2912 & 721-0906

### DIRECTORY OF MEMBER-FIRMS

<u>F I R M S</u>	<u>REPRESENTATIVES IN THE ASSOCIATION</u>	<u>MAILING ADDRESS/TEL. NOS.</u>
1. San Miguel Corporation	Liwanag R. Tolentino	6766 Ayala Avenue Makati, Metro Manila Tel. 8194000
2. Vitarich Corporation	Warmelo G. Ching	Sarmiento Building II 2316 Pasong Tamo Extension Makati, Metro Manila Tel. No. 872061/89
3. Universal Robina Corporation	Henry L. Co	E. Rodriguez Avenue Bagong Ilog, Pasig, M.M. Tel. No. 6737541
4. General Milling Corporation	Ramon M. Lachica	6th Floor, Corinthian Plaza 121 Paseo de Roxas, Makati Metro Manila Tel. No. 884701
5. RFM Corporation	Augusto L. de Leon	Pioneer St., Pasig, M.M. Tel. No. 773711
6. Far East Agricultural Supply, Inc.	Carlos C. Chan	ACA Compound, Valenzuela Metro Manila
7. Philippine Feeds Milling Co., Inc.	Lorenzo Sy	917 Tetuan Street Sta. Cruz, Manila Tel. Nos. 477627; 405490; 405372
8. Champion Feed Mills, Inc.	Danilo R. Sandiko	74 M. H. del Pilar Street San Francisco del Monte Quezon City, Metro Manila Tel. Nos. 993824; 995126
9. Liberty Flour Mills, Inc.	Enrico D. Obias	Liberty Bldg., Pasay Road Makati, Metro Manila Tel. No. 865011/29
10. Virginia, Inc.	Nicolas S. Sevilla	Roman Santos Building Plaza Lacson, Sta. Cruz, Mla. Tel. Nos. 474198; 497158
11. Mabuhay Feeds, Inc.	Gregorio B. Abreu	Hizon Building 29 Quezon Blvd. Extn., Q.C., M.M., Tel. No. 712-22-49

/lcs

MEMBERS: CHAMPION FEED MILLS, INC. • FAR EAST AGRICULTURAL SUPPLY, INC. • GENERAL MILLING CORPORATION  
LIBERTY FLOUR MILLS, INC. • MABUHAY FEEDS, INC. • PHILIPPINE FEEDS MILLING CO., INC.  
RFM CORPORATION • SAN MIGUEL POULTRY & LIVESTOCK FEED PLANT • VIRGINIA, INC.  
UNIVERSAL ROBINA CORPORATION • VITARICH CORPORATION

12~21) を入手したので分析の結果を待たねばならないが、使用量が少量のあいだは原料購入先の候補として考えられる。

(8) Republic Flour Mills Corporation (RFM)

食品の製造も行っている会社であり訪問した所のうちでは一番整備されている様子であり、品質管理もしっかりしていた。

実験動物用飼料としてのサル用ペレットを製造しており、実験用カニクイザルのブリーダーへの供給およびヨーロッパへの輸出をしているとのことであった。その他ペット用イヌのビスケット、ハト、ニワトリ・ブタ・ウシなどの家畜用飼料をBLUE RIBBONのブランドで製造していた。

工場は飼料関係で従業員100名、月産10,000トンの規模を有し、実験動物用飼料はサル用以外は製造したことはないが、2,000 kgのオーダーがあれば受注生産に応じられるとのことであった。

(a) 飼料原料はほとんど自社で輸入したものを使用しており、ビタミンとミネラル類は日本から単品で購入し飼料別に自社配合している。

Skim milkは以前はヨーロッパ産であったが最近ニュージーランド産を使用している。

(b) 原料は入荷時に次の品質検査を実施している。

A) PHYSICAL

- ① Color    ② Odor    ③ Texture    ④ Flavor & Taste

B) MICROSCOPICAL

- ① Adulterants    ② Mold

C) CHEMICALS

- ① Moisture    ② Protein    ③ Fat    ④ Fiber    ⑤ Ash  
⑥ Salt    ⑦ Calcium    ⑧ Phosphorus  
⑨ FFA (Free Fatty Acid) ... AV    ⑩ PV (Peroxide Value) ... POV

D) TOXICITY

- ① Urease    ② Salmonella    ③ Sulfide    ④ Aflatoxin  
⑤ Mold Count    ⑥ Coliform Count    ⑦ Cyanide

※ FFA は Coconuts のみ実施

※ Urease は Soybean Meal のみ実施

※ Salmonella および Sulfide は国産の Fish Meal, Meat & Bone Meal について実施

※ Cyanide は Ipil-ipil のみ実施

※ 農薬と重金属については分析していない

(c) これらの原料検査で不良品と判定されたものとしては Fish Meal と Meat & Bone Meal

でOdor, Salmonellaが検出され、10%程度不良品であった。輸入品については返品交換をしたが国産品は輸入不足時の補充のみで少量のためオートクレーブ殺菌して使用した。

またYellow CornについてはColorのチェックで返品したこともある。

※ 配合はPAFMI Standard Formulationに基づいて配合している。

※ ビタミンとミネラルは製品単価への影響が大きいため、自社配合によって重量で1%、価格で5%以内の添加量にしているとのことであった。

※ Ipil-ipil は他社で言われているように成長を阻害するので添加量は少量である。

(d) 原料はほとんど輸入品を使用しており1985年から1986年の原産国と平均単価について概略の説明を得た。(資料-8)

※ 工場内には原料入荷時の品質検査室があり、見学は出来なかったが検査項目は①水分、②タンパク、③脂肪、④カロリー、⑤アミノ酸、⑥ビタミン、⑦ミネラル、⑧カルシウム、⑨混入物の9項目について実施している。

(9) San Miguel Corporation, B-Meg Feed Plant (SMC. B-Meg)

San Miguel ビール会社の子会社で家畜用飼料生産ではフィリピンにおけるトップのメーカーであり、実験動物用飼料としてはあまり参考にはならなかったが輸入原料のサンプル(サンプルNo.5~11)が入手出来た。

(a) 当工場で生産している飼料はニワトリ、ブタおよびエビ用で形状はMash, Crumble, Pelletsの3種類であり、Pelletとしてはニワトリ、ブタ用は4mm径、エビ用は2.5mm径を製造していた。

ニワトリ(Layer)用: Starter, Grower, Layer

” (Broiler)用: Starter, Finisher

ブタ(Hog) 用: Starter Creep, Hog Grower, Fattener Finisher, Brood Sow, Hog Pre-Starter, Hog Concentrate

アフラトキシンが検出されるため、アフラトキシン・フリーの保証付のものを輸入しているとのことであった。

<u>MAJOR SOURCE OF RAW MATERIALS</u>		
SMC. B-Meg Feed Plant		
<u>MATERIALS</u>	<u>Average UNIT PRICE</u> (Peso/kg)	<u>SOURCE ( COUNTRIES )</u>
Corn	3.35	P.R. of China U.S.A. Thailand Domestic Products ( 60 % )
Soya	6.60	P.R.O.C. ( 44 % ) U.S.A. ( 56 % )
Fish Meal	9.00	Peru
Meat & Bone Meal	?	U.S.A. New Zealand Australia
Mollasis	1.40	U.S.A. Australia
Rice Bran	1.60	Domestic Products
Copra Meal	1.80	Domestic Products
Ipil-ipil	2.20	Domestic Products
Vitamin & Mineral Mix	?	Australia U.S.A.

(10) Abbott Laboratories / Philipines

製薬企業の動物実験の実施状況について調査を行った。外資系企業で本社のデータを利用できるためか動物実験は一応U.S.P.の発熱性物質試験に準拠して行う程度で、その他の毒性試験は形式的に実施しているだけであった。

(a) 動物はAlabangの近郊の動物供給業者から購入しており、ウサギはNew Zealand White系と称しているが系統維持されておらず雑種と思われた。入荷後2週間の検疫で95%合格することによって日本に比べ非常に効率が良い。しかし、検疫基準がはっきりせずこの違いによるものと思われる。数量は常時100羽を飼育しており、6ヶ月毎に新しい動物と交換することであった。

動物舎は温度21℃に空調され換気もよく臭気はほとんどなかった。

サンプルリスト

No.	Description	Place
1	Rice Flour	FNRI
2	Ground Dils ( Fish Meal )	"
3	Dapak (Rice Bran )	"
4	Malungay	"
5	Corn Grain	SMC, B-Meg
6	Soya ( Soybean Meal )	"
7	Copra Cake	"
8	Rice Bran (Local made)	"
9	Pollard	"
10	Fish Meal	"
11	Ipil-ipil pellet	"
12	Yellow Corn Grain (Local made)	HADC
13	Soybean Meal	"
14	Copra Meal	"
15	Rice Bran	"
16	Pollard-Soft	"
17	Pollard-Hard	"
18	Fish Meal	"
19	Meat Born Meal	"
20	Limestone	"
21	Coco Oil	"
22	Corn & Poultry pellet(RFM) mix	U.P.
23	Rats Diet (Mash)	FNRI
24	Mice Diet (Mash)	RITM(HADC)
25	Rabbit Diet (Pellet)	" (URC)
26	Wheat Flour-Hard	RFM
27	Wheat Flour-Soft	"

マウスはFreidheimsを購入して実験に使用していた。(実施場所は見学できなかった。)

(b) 飼料は抗生物質を含まない物を特別注文しているが、試験期間が短いので特に成分については分析はしていない。

後日、特注先のVitarich Corpで質問したところ、この様な特注に応じたことはなく少量生産の施設を持っていないので対応は出来ないとのことであった。

### 2.3 実験動物用飼料および飼料原料のサンプリング場所

飼料および飼料原料のサンプリング場所とサンプルNo.を以下に示した(資料-9)。ここにおけるサンプルNo.は分析結果および配合設計においても共通して使用される。

### 2.4 現状調査結論

出発前に調査した時と同様フィリピンにおいては実験動物に対する認識がまだなく、実験動物用飼料を製造しているメーカーは無かった。飼料メーカーはPAFMIに参加している大手5社、中堅6社を含め数多く存在するが製造はレイヤー、ブロイラー、ブタ等の畜産用が主体で他にエビ用とペット用を製造するいわゆる畜産飼料製造会社であった。

一方、実験動物を使用している公立の研究機関でも大半はペット用のハトの飼料を与えて間に合わせているのが多く、FNRIのように原料を購入して独自の配合に従って給餌している所は他にはなかった。

この様な状況の下での調査結果について問題点等を述べる。

- (1) フィリピンで生産され、実験に使用している実験動物はほとんどコンベンショナルであり、実験動物としてのコントロールはまだ行われていない。
- (2) 家畜用の飼料は製造されているが、実験動物用の飼料を製造している会社はなく、原料の品質管理・製品管理の点から考えても製造を委託するとすれば大手のRFMくらいである。
- (3) 原料は輸入品が多く、国産はCorn, Rice Bran, Vegetable Oil, Ipil-ipilくらいでこれも100%でない。サンプルを入手したので分析の結果を待たねばならないがほぼ栄養成分的には使用できる原料と思われる。
- (4) 原料の分析は一部のメーカーで実施されていたが重金属・農薬等の環境汚染物質については行われておらず、実際に製造を行う時は定期的にこれらの分析や細菌・真菌の検査を実施して原料の品質を安定させなければならない。
- (5) 高温多湿という気象条件下で原料が保存されているため、原料の購入・保管による変質には十分な注意を払う必要がある。
- (6) 飼料中の繊維源として多くは牧草が使用されているが、フィリピンには原料となる牧草がなくIpil-ipilを使用している。

この Ipil- ipil にはミモシンが含まれており、多量に使用すると繁殖障害や脱毛症状をおこすため配合量が制限される。従ってウサギ、モルモット用飼料の必要繊維源の代替を考えなければならない。

### 3. 飼料および飼料原料の分析

フィリピン国食品医薬品検定センターにおいて実験動物の飼育・繁殖のために使用する飼料に関する予備調査の一環として現地より持ち帰った飼料（4品目）および飼料原料（23品目）について、5大栄養成分を主とした栄養成分分析、環境汚染物質を中心とした汚染物質分析および細菌、真菌等の微生物検査を行った。試験に供された材料およびその入手先は資料-9にすでに示した。また、試験項目および試験結果については、参考資料-8に示したとおりである。なお、試験方法については、日本の各飼料メーカーおよび各試験研究機関が採用している標準的方法によった。詳細については、“衛生試験法注解・日本薬学会編”等の専門の図書を参考にされたい。

試験は、栄養成分分析については、日本配合飼料(株)中央研究所において実施し、他の項目については、(財)食品薬品安全センター秦野研究所において試験を実施した。

#### 3.1 栄養成分分析

水分、粗タンパク、粗脂肪、粗繊維および粗灰分の5成分、並びにカルシウム、リンの定量分析を行った。

全体的に水分含量がやや高かったが、これは、試料の保管および輸送中などに吸湿したものと考えられた。

サンプルNo.2のGround Dilsは、通常の魚粉に比べると粗タンパクの測定値がかなり高く、これは、高タンパクの異物が混入している可能性が考えられた。

サンプルNo.3のDapakは、粗繊維の測定値がかなり高かった。実体顕微鏡を用いて鏡検したところ、多量の籾殻が確認された。

したがって、測定結果の数値のみを考慮して、この飼料原料を繊維質の供給源として使用することは、決して好ましくないと思われる。

他の飼料および飼料原料の栄養成分分析において、いずれの測定結果にも異常はみられなかった。

#### 3.2 汚染物質分析

飼料および飼料原料中へ混入している可能性が考えられるカドミウム、鉛、総クロム、ヒ素、有機塩素剤（10種）、有機リン剤（3種）、およびアフラトキシン（4種）の環境汚染物質について分析を実施した。同時に、昆虫を中心とした異物についても試験を実施した。

カドミウムは、Coco-oil（サンプルNo.21）を除いた他のサンプルで0.02~0.26 ppm 検出した。中でも飼料原料のFish Meal（サンプルNo.18）の0.26 ppm、Ground Dils（サンプルNo.2）の0.24 ppmおよびFish Meal（サンプルNo.10）の0.18 ppmのように魚粉類は、EPAの規



格限度である0.16 ppmを超えるものであった。

日本実験動物飼料協会（飼料協会）案の規準値である0.5 ppmを超えた飼料および飼料原料はなかった。

鉛は、小麦粉、ココナツ油など一部の飼料原料を除いて0.2～2.1 ppmを検出した。飼料原料の Meat Bone Meal（サンプルNo.19）の2.1 ppm、Copra Meal（サンプルNo.14）の1.6 ppmおよび飼料の U.P-Pellet（サンプルNo.22）の1.6 ppmは、EPAならびに飼料協会案の規準値である1.5 ppmを超えるものであった。

ヒ素は、魚粉、Ipil-ipil など6種の飼料原料と1種の飼料から0.10 ppm以上を検出した。中でもGround Dils（サンプルNo.2）からは、5.40 ppmと高い値が検出された。しかし、他には飼料のFNR I-Mash（サンプルNo.23）の0.84 ppmのように比較的高い濃度を検出したものもあったが、EPAならびに飼料協会案の規準値1.0 ppmを超えたものはなかった。

クロムは、試験に供したすべての飼料および飼料原料から0.05～1.00 ppmの範囲で検出された。今回の試験では、総クロムとして測定を行ったために、毒性的に問題とされている6価クロムの含量については明らかではない。

有機塩素剤および有機リン剤を検出した飼料および飼料原料はなかった。

アフラトキシンは、一部の飼料や飼料原料から検出された。飼料のRITM-Mash（サンプルNo.24）ではアフラトキシンB<sub>1</sub>を13.1 ppb、飼料原料のCorn Grain（サンプルNo.5）からアフラトキシンB<sub>1</sub>を21.6 ppbとアフラトキシンG<sub>1</sub>を4.5 ppbおよびRice Bran（サンプルNo.15）、Copra Meal（サンプルNo.14）、Copra Cake（サンプルNo.7）、Rice Bran（サンプルNo.8）からは、アフラトキシンB<sub>1</sub>をそれぞれ11.9 ppb、8.3 ppb、5.6 ppb、5.6 ppbを検出した。因みにEPAの規格限度は、総アフラトキシンとして5 ppbであり、飼料協会案の規準値は10 ppbである。

Dapak（サンプルNo.3）およびRice Bran（サンプルNo.8）では、穀物害虫であるコクヌストの成虫および幼虫が検出された。

### 3.3 微生物検査

一般生菌数の検査では、Coco-Oil（サンプルNo.21）を除いたすべての飼料および飼料原料から $10^2 \sim 10^5$  個/gを検出した。

カビ数では、飼料のRITM-Mash（サンプルNo.24）をはじめとして穀類を中心とした9種の飼料原料から $10^3$  個/g以上を検出した。検出したカビの種類は、Aspergillus, A. flavus, Penicillium, Mucorales, Geotrichum, A. fumigatus およびFusariumなどであった。

酵母数では、2種の飼料から $10^2$  個/g以上、穀類を中心とした10種の飼料原料から $10^2 \sim 10^4$  個/gを検出した。

大腸菌群が陽性であった飼料はなかったが、飼料原料のGround Dils（サンプルNo.2）、

Rice Bran ( サンプル No.8 ) および Soya ( サンプル No.13 ) では大腸菌群が陽性であった。

サルモネラは、2種の飼料で、また、飼料原料についても10種が陽性であった。

### 3.4 考察ならびに結論

栄養成分分析結果において、Ground Dils ( サンプル No.2 ) の粗タンパク含量が正常な魚粉に比べ3～4割高く、高タンパクの異物の混入が示唆された。また、Dapak ( サンプル No.3 ) の粗繊維含量が、一般的な米糠の粗繊維含量に比べ異常に高かった。鏡検の結果、多量の籾殻の存在が確認され、その精製工程に問題があるのではないかと推測された。

従って、この2種の飼料原料は、原料の由来や製造工程等を十分に調査し検討を行う必要があると判断された。

他に栄養成分的に問題となりそうな飼料および飼料原料はなかったが、今回持ち帰った飼料原料の中で、繊維質の安定供給源として何を使用することが望ましいのか十分に検討する必要性が示唆された。

カドミウム、クロム、鉛およびヒ素については、各原料の生育過程での環境から汚染された可能性が高く、今後もその測定値に大きな変動はないと思われる。飼料のUP-Pellet ( サンプル No.22 ) の鉛がEPAおよび飼料協会案を上廻っていたのは多少問題を残したが、飼料原料については、飼料製造の際の配合比率によりその値も変化するものであるから、最終的な配合設計に基づいて製造された飼料についてその実態を調べる必要がある。ただし、Ground Dils ( サンプル No.2 ) については、カドミウム、鉛、クロムおよびヒ素のすべてにおいて含有量が比較的高く、特にヒ素の含有量はEPAや飼料協会案の規格規準値を大幅に上廻っているため、飼料原料として使用するには再考を要する。

アフラトキシンやカビをはじめとした微生物および昆虫類の汚染については、飼料や飼料原料そのものに由来することも考えられるが、それ以外に精製や保存・流通過程などに要因しているものと考えられる。

特にカビの分布をみると、マイコトキシンで重視される *A. flavus* や *Penicillium* などの乾性カビと、*Mucorales* や *Fusarium* などの好湿性カビが混在している。また、コクヌスト ( 鞘翅目、コクヌスト科 ) の存在が確認された。本種は他の食品害虫を捕食する性質を有するので、本種の存在は、コクゾウ等他の食品害虫が発生していた可能性を示唆している。さらに一般生菌数も多く、大腸菌群やサルモネラも検出されている。従って、実際に使用する飼料原料については、定期的に栄養分析、微生物検査およびマイコトキシン等の分析により飼料原料の品質を確認し続けていくことが必要であろう。

#### 4. フィリピン国プロジェクト用配合設計

##### 4.1 配合設計の基本的な考え方

各種実験動物に適した栄養組成を満足させ、入手可能な飼料原料を長期間にわたって安定確保出来る原料を選び、組成は出来るだけ単純化し、動物実験結果におよぼす影響を極力少なくすることを心掛け、配合設計を行った。

##### 4.2 マウス、ラット、ウサギ、モルモット用配合設計案

配合設計に使用した原料は平均組成のものを選び特異的な組成の原料は除外した。

(配合割合)

原料名	動物種	マウス・ラット	ウサギ・モルモット
トウモロコシ		23.5	18.5
米	糠	9.0	15.0
フスマ		10.0	20.0
イピル	イピル	3.0	3.0
小麦	粉	20.0	15.0
大豆	粕	15.0	10.0
コブラミール		5.0	10.0
魚	粉	12.0	5.9
ココナツ	油	0.5	—
炭酸カルシウム		0.8	1.3
食塩		0.5	0.5
*ビタミン・ミネラル混合		0.7	0.7
ビタミンC		—	0.1
合計		100.0 (%)	100.0 (%)

※ ビタミンおよびミネラル混合は飼料100gに対し下記含量になるよう調製する。

原料名	含量	原料名	含量	原料名	含量
ビタミンA	1,000 IU	ビタミンB <sub>12</sub>	7 $\mu$ g	コバルト	0.1 mg
ビタミンD <sub>3</sub>	200 IU	ナイアシン	3 mg	鉄	5.0 mg
ビタミンE	10 mg	パントテン酸	3 mg	銅	0.6 mg
ビタミンB <sub>1</sub>	1.5 mg	コリン	150 mg	亜鉛	2.0 mg
ビタミンB <sub>2</sub>	1.5 mg	ビオチン	40 $\mu$	マンガン	5.0 mg
ビタミンB <sub>6</sub>	1.5 mg	葉酸	0.5 mg		

基剤は小麦粉で調整する。

上記配合率で計算した栄養成分含有量は、下記の通りとなる。

(計算値)

成分	動物種	
	マウス・ラット	ウサギ・モルモット
水分	11.8 %	11.5 %
粗タンパク	23.3 %	19.7 %
粗脂肪	4.4 %	4.4 %
粗繊維	3.6 %	5.2 %
粗灰分	6.9 %	7.5 %
可溶性無窒素物	50.0 %	51.7 %
カルシウム	1.12 %	1.08 %
リン	0.78 %	0.76 %

(1) 入手したサンプルの栄養分析と汚染物質の含有量から使用する飼料原料として考えると以下のことが問題となった。

入手した2点のトウモロコシ(サンプルNo.5とサンプルNo.12)は栄養成分的には大差ないが、アフラトキシンB<sub>1</sub>の汚染度からみるとHADCの方が好ましい。

(2) 米糠は(サンプルNo.3)のごとく粗タンパクが低く、粗繊維含有量が異常に高すぎる特異的な組成原料は除外した。サンプルNo.8, およびNo.15の米糠は微生物汚染からみてサンプルNo.15が好ましい。

(3) フスマはサンプルNo.9, 16, およびNo.17共に、いずれも成分的には大差ないが、No.16が若干デンプン質が多く、重金属および微生物検査からみて、No.9のフスマが比較的良好である。

(4) Ipil-ipilは貴重な繊維質源の1つであるが、ミモシン含有の関係で3%とした。

Ipil-ipilに代る繊維源として恒常的に入手出来る自家生産可能な繊維源料を考える必要がある。

- (5) 小麦粉はサンプルNo.26およびNo.27のいずれでも良い。
- (6) 大豆粕No.6はいわゆる脱皮大豆粕(粗タンパク50%もの)の組成に近くNo.13は一般的な組成(粗蛋白質45%もの)に近く、微生物検査結果からみてもNo.13が好ましい。
- (7) コブラミールはサンプルNo.7およびNo.14共に粗蛋白質含量は大差ないが、No.7の方が残油分が多く、粗繊維含量も多い。特に粗繊維質源の絶対的不足からもNo.7の方が好ましい。
- (8) 魚粉は、サンプルNo.2, 10, およびNo.18の3種を入手したがNo.2の粗タンパク含量は高く、粗脂肪並びに粗灰分含量は低い。特に粗脂肪は溶剤抽出並みに少い。No.18の魚粉は成分的には粗灰分含量がやや低くサルモネラ陽性の難点がある。No.10の魚粉は成分含量も適性であり、クロムが若干多い難点があるが3点の中では一番良いと考える。
- (9) ミートボーンミールは動物性タンパクとして貴重であるが今回は大豆粕と魚粉で必要タンパク量を一応まかなえるのであえて使用原料から除外した。
- (10) ウサギ・モルモット用飼料の添加ビタミンCは飼料のオートクレーブ処理時の破壊を想定して添加量を設定した。

#### 4.3 配合設計における問題点

- (1) 現地にて入手した原料の分析結果に基づき配合設計を行ったが、今回入手した程度の原料が常に安定供給が可能か否かが問題である。
- (2) 配合設計(案)を行った2種類の飼料については、固型化を前提に設計してあるが、実際に固型化製造を試作していないので、この実施を試みる必要がある。
- (3) 配合設計に基づいて2種類の飼料の価格を試算してみた。原料価格は現地にて入手した、1982年度のStatistical Data (Philippine Association of Feed Millers, Inc.) (参考資料-7)と、RITMの一ノ瀬氏(November 20, 1986)の資料(資料-4)を参考として算出した。いずれもビタミン・ミネラル混合物の価格は含まれていない。算出価格は下記のとおりで、前記1982年度のStatistical DataとRITMの価格とは大きな差があり、RITMの方が略倍の価格になる。

	1982: Statistical Data	1986: RITM
ラット・マウス用飼料	2.7 peso/kg	5.8 peso/kg
ウサギ・モルモット用飼料	2.1	4.5

RITMの資料によると同所で使用しているウサギ・モルモット用ペレット飼料価格は、5.4 peso/kgとなっている。

## 5. ま と め

今回、フィリピン国食品医薬品検定センタープロジェクトを進めるに際して、実験動物の生産および毒性試験の実施を可能ならしめるに必要な資料を得る目的で、フィリピンにおける実験動物施設および飼育の現状と実験動物用飼料についての調査を行った。

実験動物は、研究・試験・検定・診断等を行う上で重要な因子の一つとして、含目的に繁殖・育成・生産された動物であり、さらに遺伝的コントロールおよび微生物学的コントロールがなされ、かなり一定した条件のもとでの実験が可能な動物でなければならない。従って、動物個体の統御（維持方式、生産方式）・環境統御・栄養統御（飼料、水）・微生物統御・遺伝統御の各面からコントロールされる必要がある。本プロジェクトでは、これらの統御を行うように計画されており、本調査団は実験動物用の飼料についての調査を主目的としたものである。

以下に調査結果とそれに関する今後の検討事項についてまとめた。

- 1) フィリピンにおいては、実験動物に対する認識がまだ浅く、使用されている動物はコンベンショナルで、環境統御および遺伝的コントロールもほとんどされていなかった。また、実験動物用飼料を製造しているメーカーは無かった。飼料メーカーとしては、PAFMIに参加している大手5社、中堅6社を含め数多く存在したが、飼料製造はレイヤー、ブロイラー、ブタ等の家畜用が主体で他にエビ用とペット用を製造するいわゆる畜産飼料製造会社であった。その中で原料の品質管理、製品管理の点から考えて原料の購入あるいは配合などを依頼するとすればRFMおよびHADC位であろう。
- 2) 実験動物を使用している公立の研究機関でも大半はペット用のハトの飼料を与えて間に合わせているものが多かった。しかし、FNR Iでは原料を購入して独自の配合に従って、またRITMでは配合したものを購入して、ペレットに成型したものを給餌していた。
- 3) 原料は輸入品が多く、国産としてはCorn, Rice Bran, Vegetable Oil, Ipil-ipilくらいでこれらも100%ではなかった。原料の分析は一部のメーカーで実施されていたが重金属・農薬等の環境汚染物質については行われていなかった。

各種の原料（23品目）および飼料（4品目）のサンプルを入手して持ち帰り、栄養成分分析・重金属・農薬・細菌・真菌およびアフラトキシンなどの検査を行った。その結果、栄養成分分析では、魚粉の粗タンパクおよび米糠の粗繊維含量が高かったほか特に問題はなかった。重金属特にカドミウム、クロム、鉛およびヒ素では、多少高い濃度で検出されたが、実際の飼料における配合比率を考慮すれば問題はないと考えられた。しかし、微生物（細菌・真菌）および昆虫類による汚染、さらに真菌の産生によるカビ毒（アフラトキシン）が多数のサンプルから検出されている。これらの原因としては、フィリピンの高温多湿の気象条件下で原料が保存

されている環境条件の不備な点にあると推察される。従って、原料の品質の良否、保管による変質などの両面を考慮する必要がある。実際に製造を行う場合には、原料の安定供給の可能性および定期的に栄養分析・細菌・真菌・主要な環境汚染物質などの検査により原料の品質を確認する必要がある。

- 4) 飼料中の繊維源として多くは牧草が使用されているが、フィリピンには原料となる牧草がなく、Ipil-ipilの葉を使用している。このIpil-ipilにはミモシンが含まれており、多量に使用すると繁殖障害や脱毛を起すため配合量が制限される。従って、ウサギ・モルモット用飼料の必要繊維質の代替を考えなければならない。
- 5) 配合設計を行った2種類の飼料は、固型化を前提に設計したが、本調査団が入手した原料サンプルは少量であったことから、実際に固型化製造を実施できなかった。従って、今後現地において試作する必要がある。また、製造した飼料は、動物飼育室へ搬入する場合にオートクレーブで滅菌される。ビタミン類の破壊を想定して添加量を設定したが、添加量が適量であるかの検討も必要であろう。さらに製造された飼料の嗜好性および成長・繁殖試験などを実施することが必要である。

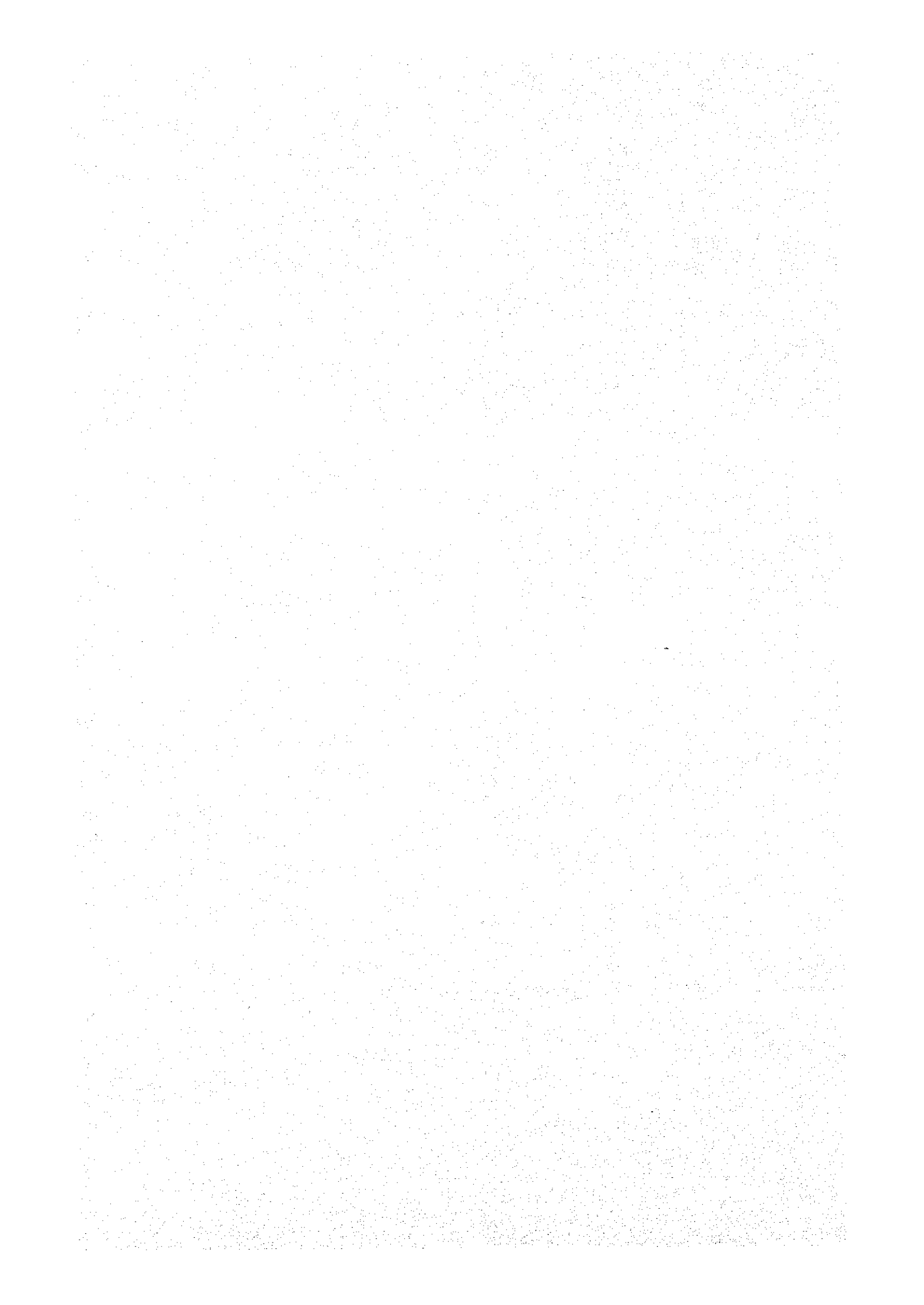
最後に、報告書作成において、財団法人食品薬品安全センター秦野研究所食品環境部岩原部長、高鳥，井上，勝村，宮崎，日本配合飼料株式会社中央研究所中島所長武藤の各氏，その他の関係者に多大な御援助をいただきましたことに深く感謝いたします。

また、フィリピン国において、本調査および飼料サンプルを提供していただいた研究所，飼料会社に厚く御礼申し上げます。





## 参 考 资 料



RITMから入手した飼料 ( Sept. 22, 1986 )

DIET No.1-A  
(Ovensterilized)

No.848

For: Mice, Rats, Hamster, Gerbil

Ingredients:

1. Soybean Oil Meal
2. Processed Fish Meal
3. Meat and Bone Meal
4. Corn Germ Meal
5. Corn Gluten Meal
6. Yellow Corn Grits
7. Synthetic Amino Acids
8. Limestone
9. Sodium Chloride
10. Vitamins and Minerals

DIET No.1  
( Autoclaved )

No.849

For: Mice, Rats , Hamster, Gerbil

Ingredients:

1. Soybean Oil Meal
2. Processed Fish Meal
3. Meat and Bone Meal
4. Corn Germ Meal
5. Corn Gluten Meal
6. Yellow Corn Grits
7. Synthetic Amino Acids
8. Limestone
9. Sodium Chloride
10. Vitamins and Minerals

DIET No.2  
(Oven Sterilized )

No.850

For: Mice , Rats, Hamster, Gerbil

Ingredients:

1. Ground Corn
2. Soybean Oil Meal
3. Fish Meal
4. Meat and Bone Meal
5. Copra Meal
6. Rice Bran d-1
7. Wheat Pollard
8. Ipil Ipil Leaf Meal
9. Molasses
10. Vegetable Oil
11. Limestone
12. Tricaphos
13. Salt (Sodium Chloride)
14. dl-Methionine
15. l-Lysine

DIET No.3  
(Oven Sterilized)

No.851

For: Guinea Pig, Rabbit, Goose

Ingredients:

1. Blood Meal
2. Bran and Pollard
3. Corn
4. Corn Bran
5. Corn Germ Meal
6. Corn Gluten Feed
7. Copra Meal
8. Fish Meal
9. Ipil Ipil Leaf Meal
10. Limestone
11. Meat and Bone Meal
12. Molasses
13. Rapeseed Meal
14. Sodium Chloride
15. Soybean Meal
16. Tricaphos
17. Vegetable Oil

Calculated Analysis :

Crude Protein-----	Not less than 18%
Crude Fiber-----	Not more than 10%
Crude Fat-----	Not less than 4%
Ash-----	Not more than 8%

<資料-2>

RITM飼料の分析結果

(単位%)

No	品名	C.Pro	C.Fat	C.Fib	C.Ash	Mois	Ca	P	Nacl
848	DIET No.1-A	23.0	4.1	3.2	5.6	11.2	0.65	0.70	0.41
849	DIET No. 1	22.5	3.9	3.7	5.7	13.4	0.79	0.74	0.41
850	DIET No. 2	19.2	6.1	2.1	7.3	10.6	1.26	0.82	0.50
851	DIET No. 3	20.4	5.6	4.0	6.1	11.9	0.90	0.72	0.33

備考:

以上

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

P. O. BOX 216 MITSUI BLDG  
2-1, NISHI-SHINJUKU, SHINJUKU-KU TOKYO  
160 JAPAN

October 6, 1986

PLACES TO VISIT FOR THE EXPERTS ON FEED MATERIALS

They want to visit the organizations or institutes listed below for the survey about feed materials for the experimental animals to be bred by BFAD.

1. Official institutes or organizations

- Dr. Joseph S. Masangkay  
College of Veterinary Medicine, University of the Philippines
- Research Institute for Tropical Medicine (RITM) - JICA
- Food and Nutrition Research Institute
- Vaccine Quality Control, Laboratory Services Div.,  
Bureau of Animal Industry
- Other laboratories or institutes handling experimental animals

2. Companies producing animal food

- Republic Flour Mills
- The maker that produces the food for pigeons named "STAR FEEDS 555" (Universal Robina Corporation?)

3. Pharmaceutical companies

- Pharmaceutical companies handling experimental animals in their laboratories

## Appendix 1. Regional Distribution of Commercial Mixed-Feed Manufacturers in the Philippines\*

Region 1	Ilocos (Center - San Fernando, La Union)	Rated Capacity**		
	KAISA-PANGASINAN FEEDMILL ENTERPRISES (BISA FEEDS) *** Barangay Longos, Calasiao, Pangasinan Manager: JACINTO V. CARMEL	5	ANGELES B. E. COMMERCIAL (HAPPY ACRES) Bagong Bayan, Barangay St., Angeles City Manager: BENEDICTA CHU Consultant: DR. FABIAN ROSACIA Tel. No. 4567	16
	NORTHERN ANIMAL RAISERS CORPORATION (UNION) Taboc, San Juan, La Union Manager: DANIEL BOLONG, SR. Consultant: DR. ERNESTO BOLONG	12	ANTONIO'S AGRONOMICS, INC. (DOUBLE "A") Km. 131 Romulo Highway, Tarlac, Tarlac Manager: COSMO P. ANTONIO Consultant : DR. AMADO E. BALADAD Tel. No. 2554	40
	PANGLALAWIGANG KALIPUNAN NG MGA ISA NG ILOCOS NORTE Brgy. Catagtaguen, Espiritu Ilocos Norte Manager: JOSEFINA M. VILLANUEVA Consultant: DR. TEODULO M. TOPACIO, JR.	11	ARH AGRICULTURAL PRODUCTS (HI-Q FEEDS) Liciada, Bustos, Bulacan Manager: HILARIO ANASTACIO Consultant: DR. AMADO E. BALADAD	10
	STANDARD FEED COMPANY (STANDARD) Barangay No. 35, Batac, Ilocos Norte Manager: JOSE SARE, JR.	3	ASSOCIATED AGRO-PRODUCTS DEALERS CORP. (FORMIX) Bo. Bagbaguin, Sta. Maria, Bulacan Manager: FRANCISCO P. BONTON Consultant: DR. PERFECTO MONTANCES	30
	VILLANUEVA INTEGRATED FEED MILL San Jose, Narvacan Ilocos Sur Manager: ROSALIA B. VILLANUEVA Consultant: Dr. RENATO CABALO	14	BULACAN POULTRY & LIVESTOCK RAISERS, INC. (BULPRA) Km. 23 McArthur Highway, Tuktukan, Guiguinto Bulacan	100
Region 2	Cagayan Valley (Center -- Tuguegarao, Cagayan)		CENTRAL LUZON LIVESTOCK & POULTRY RAISERS ASSN. (CLASSIC) El Cano Village, Angeles City Manager: PEPITO F. MALONZO Consultant: DR. WILFREDO FLORES	15
	CAGAYAN KAISA FEEDMILL ENTERPRISE Carig, Tuguegarao, Cagayan Manager: ALEXANDER M. MONTERO Consultant: DR. TEODOLO M. TOPACIO, JR.	5	CHAMPION FEED MILLS, INC. (CHAMPION) Borol II, Balagtas, Bulacan Manager: MANUEL SANDIKO Consultant: DR. RUFINO GAPUZ Tel. Nos. 99-38-24 & 99-51-26	60
	CAVADECO FEED MILL Barangay Nappaccu Pequeno, Reina Mercedes, Isabela Manager: DOMINGO TUTAAN Consultant: DR. REGALADO ZAMORA	48	DIAMOND FEED MILLS (DIAMOND) Mosesgeld St., Magsaysay District, Cabanatuan City Manager: ARTURO VILLASAN Consultant: DR. NAPOLEON CAPULONG Tel. No. 963-26-41	20
Region 3	Central Luzon (Center - San Fernando, Pampanga)		EL VIC TRADING & DEVELOPMENT CORP. (EL VIC) Panghulo St., Ubando, Bulacan Manager: ELPIDIO DUCA Consultant: DR. PERFECTO MONTANCES Tel. No. 47-66-97	8
	ALCO FEEDS MANUFACTURER (ALCO) Fatima Village, Sta. Cruz, Porac, Pampanga Manager: ALEJANDRO E. ROQUE Consultant: GEMINIANO R. ATIENZA	20		

\*Persons/entities who mix feed ingredients into complete feed and/or process feed ingredients, for sale

\*\*MT/8 - hr. Shift

\*\*\*Brand Name

85

FEEDMASTER CORPORATION (MASTER) Bagbaguin, Sta. Maria, Bulacan Manager: VICENTE DEL ROSARIO Consultant: DR. CATALINO G. SACDALAN	8	VITARICH CORPORATION (VITARICH) Bo. Abangan, Marilao, Bulacan Manager: ANGEL O. VILLASIN Consultant: DR. GREGORIO GOLOYUGO Tel. No. 34-20-20	500
GOLDEN COUNTRY FARMS (HUBBARD) Turo, Bocaue, Bulacan Manager: ONOFRE C. SEBASTIAN Tel. No. 832-15-31 to 34	400	WONDER AGR'L. SUPPLY (SUPERMIX FEEDS) Bo. Parada, Sta. Maria, Bulacan Manager: JESUS REDAJA Consultant: DR. AMADO E. BALADAD Tel. No. 26-94-29	10
JCA FARMS, INC. (ALTA FEEDS) Poblacion, Pandi, Bulacan Manager: RICAREDO ANDRES Consultant: DR. ESTELITO HULAR	36	Region 4 Southern Tagalog	
MASAGANA FEEDS, INC. (SM FORTE) Bagbaguin, Sta. Maria, Bulacan Consultant: DR. AMADO E. BALADAD	45	ABCD CORPORATION (ENERPRO) Nacoco, Calapan, Oriental Mindoro Manager: BENJAMIN CACHA Consultant: DR. DAN LIBUNAG	16
MINALIN POULTRY & LIVESTOCK COOP. (MIPOLCO) Minalin, Pampanga Manager: IGNACIO SANTOS Consultant: DR. AMADO E. BALADAD	50	CAVITE FARMERS FEEDMILLING MARKETING PRE COOP. (CAFFMACO) By-pass, Silang, Cavite Manager: EUSTAQUIO ESPIRITU Consultant: DR. AMADO E. BALADAD	5
NUTRI-FEEDS, INC. (NUTRI) Bo. Tabing Bakod, Sta. Maria, Bulacan Manager: GREGORIO INOCENCIO Consultant: GREGORIO INOCENCIO	16	DALISAY FARMS, INC. (DALISAY) Dasmariñas, Cavite Manager: LUIS CAMPOS Consultant: DR. AMADO E. BALADAD	5
POULTRY INGREDIENTS & LIVESTOCK TRADING CORP. (PILTRACOR) Bagbaguin, Sta. Maria Bulacan Manager: ROMAN P. CUCIO Consultant: DR. CONSTANCIO ADVINCULA, JR.	20	FAIRYLAND & FARMS TRADE CORP. (FAIRMIX) Bo. Sampaloc, Sariaya, Quezon Manager: ROBERTO C. LECUP Consultant: DR. PLACIDO ALCANTARA	30
STA. MARIA FEED MILLS, INC. (MIRACLE) P. Burgos St., Sta. Maria, Bulacan Manager: SILVERIO INOCENCIO Consultant: DR. CAROLINA RALLOS	50	FRESH COCONUT-BASED POULTRY & LIVESTOCK FEEDS Catanauan, Quezon Manager: EDGARDO MENDOZA Consultant: DR. AMADO E. BALADAD	60
STA. MARIA YELLOW CORN CENTER (GOLDEN) Km. 28 Turo, Bocaue, Bulacan Manager: OSCAR REYES Consultant: DR. LINO DE VERA	60	LA SUERTE FEED MILL Brgy. Colla, Lucena City Manager: VIOLETA T. KATIGBAK Consultant: DR. REGALADO G. ZAMORA	10
ULTRA AGRO-INDUSTRIAL CORPORATION (BALMIX) Km 29 Tungkong Mangga, San Jose del Monte Bulacan	16	LIMCOMA MARKETING COOPERATIVE, INC. (LIMCOMA) Sabang, Lipa City Manager: CLARO MALIETA Consultant: DR. AMADO E. BALADAD Tel. No. 656-17-14	200
UP-GRADE FEEDS MANUFACTURING (UP-GRADE) Bo. San Agustin, San Fernando, Pampanga Manager: BETTY CO Consultant: DR. SIMPLICIO LOMINGKIT	10	MONTEREY FARMS CORPORATION (MFG) Bo. Majada, Loob, Calamba, Laguna Manager: ROMEO G. BADILLA Consultant: DR. ROMULO VALENCIA Tel. No. 88-30-41	100
UPLAND POULTRY CORPORATION (UPLAND) Taal, Bocaue, Bulacan Manager: HERMOGENES PUNZALAN Consultant: DR. AMADO E. BALADAD	25	PACIFIC MULTI-AGRO INDUSTRIAL CORP. (PACIFIC) Campo, Lumbangan, Nasugbu, Batangas Manager: ALFONSO R. CHUA	48

PALAWAN KAISA FEEDMILL ENTERPRISE Antipolonan, Narra, Palawan Manager: ELISEO C. ORLIDO Consultant: DR. TEODOLO M. TOPACIO, JR.	5	CENTRAL LUZON MERCHANDISING CORP. (ATLAS) 110 F. de Jesus St., Caloocan City Manager: PILO MELITANTE Tel. No. 35-29-69	50
RIZAL POULTRY & LIVESTOCK ASS., INC. (RIZAL FEEDS) Malanday, San Mateo, Rizal Manager: BENJAMIN SAN DIEGO Consultant: DR. AMADO E. BALADAD Tel. Nos. 96-43-77 & 96-11-05	70	DERKEN TRADING (SUPREME ENER PAK) Malinta, Valenzuela, Metro Manila Manager: ELIZABETH CHUA	5
ROSE INDUSTRIES, INC. (ROSE-N-BLOOM) Bo. Lalig, Tiaong, Quezon Manager: DIOSCORO CAMACHO Consultant: DR. ROBERTO GARCIA Tel. No. 693-43-00 to 04	12	FAR EAST AGRICULTURAL SUPPLY, INC. (LIFE) Malanday, Valenzuela, Metro Manila Manager: CAW BUN Consultant: DR. CONSTANCIO ADVINCULA	60
W.V.GARCIA & SONS AGRI. CORPORATION (SUPREME) Bo. Lodora, Binan, Laguna Manager: WILFREDO V. GARCIA Consultant: DR. REYNALDO ASINO	2	FEEDRITE PRODUCTS, INC. (VICTORY, MATAMIS & FEEDRITE) 35 Marvex Drive, Balintawak, Quezon City Manager: SHEW WAI LEE Consultant: DR. JAIME CRUEL Tel. No. 34-29-07	20
Region 4-A Metro Manila (Center - Manila)			
ANIHAN IMPORT-EXPORT ENTERPRISES, INC. (HI-PROTEIN) 126 7th St., 7th Ave., Grace Park, Caloocan City Manager: PABLO GONZAGA Consultant: DR. JOSE A. CAYABYAB Tel. Nos. 35-58-09 & 35-59-34	70	FOREMOST FARMS, INC. (FAMOUS & RICH) Bo. Santolan, Pasig, Metro Manila Manager: TAN ENG CHAN Consultant: DR. FELIXBERTO ELAGO Tel. No. 61-15-59	20
AQUINO ASSOCIATES, INC. (IKUTON) Marsman Bldg., Buendia cor Washington Makati, Metro Manila Manager: SERVILLANO AQUINO Consultant: DR. EDUARDO BARTILAD	5	FRANZ FEEDS & FEEDING INC. (MILKO-MIX) Stall Nos. 518 to 523 Bldg. No. 5, FTI Complex Taguig, Metro Manila Manager: EDGAR CHENG Consultant: ISIAS LUMANTA, JR. Tel. Nos. 828-75-51 to 59 loc. 645 & 911	25
BALKAN INDUSTRIES, INC. (BALKAN) Bo. Mambungan, Sumulong Hi-way, Antipolo, Rizal Manager: ULPIANO GONZALES Consultant: DR. LORENZO LLAMAS Tel. No. 78-16-36	5	GENERAL MILLING CORPORATION (GENERAL) Bo. Ugong, Pasig, Metro Manila Manager: WILFREDO UYTENGU Consultant: DR. GERONIMO DELA CERNA Tel. No. 88-47-01	160
BANTAN TRADING (BANTRADE) 20 Dona Juana de Rodriguez Ave., Potrero, Malabon, Metro Manila Manager: TAN KO BAN Consultant: DR. JAIME CRUEL Tel. Nos. 35-07-71 & 361-28-27	5	GOLDWIN COMMERCIAL 388 San Diego St., Santolan, Malabon Metro Manila Manager: PACITA YU Tel. No.	10
BEAUCHAMP FARM 149 Argonne St., San Juan Rizal Manager: PHILIP M. CEN Consultant: DR. TEODULO M. TOPACIO, JR.	4	HI-GRADE FEEDS CORPORATION (HI-GRADE) 31 Reparó Rd., Baesa, Caloocan City Manager: JOSE A. MADULID Consultant: DR. FABIAN ROSACIA Tel. Nos. 34-38-74 & 35-01-31	20
BRACOMA, INC. (BRACOMA) 259 Int. Karuhatan, Valenzuela, Metro Manila Manager: EPHRAIM L. CASTRO Consultant: DR. NOEL P. GUZMAN Tel. No. 35-38-43	12	HI-LEVEL FEEDS CO., INC. (HI-LEVEL) No. 4 L. R. Yangco St., Navotas, Metro Manila Manager: ERNESTO GONZAGA Consultant: DR. CAROLINA RALLOS Tel. Nos. 23-11-44 & 23-99-16	16.8



INTERFEED COMMERCIAL (GROWEL) 14 Marcel Drive, Bo. Sangandaan, Quezon City Manager: ERNESTO CHING Consultant: DR. RODRIGO J. BUDUAN Tel. No. 90-42-55	12	PHILIPPINE FEEDS MILLING CO., INC. (ALL BEST) 662 Rizal Ave. Ext., Caloocan City Manager: JOSE Y. TOLENTINO Consultant: DR. JOSE CAYABYAB, JR. Tel. Nos. 47-76-27 & 40-53-72	100
KAWILIHAN MERCANTILE AND INDUSTRIAL CORP. No. 38 Gen. Concepcion St., Caloocan City Manager: JOHN C. KAW Consultant: DR. FABIAN ROSACIA	5	PHILIPPINE SUPER FEEDS CORPORATION (SUPER) 135 North Bay Blvd., Navotas, Metro Manila Manager: CO CHENG HAY Consultant: DR. FABIAN ROSACIA Tel. Nos. 23-71-55 & 23-42-71	25
LA FUERZA INDUSTRY & GENERAL MERCHANT (VITAMIX) Km. 15 McArthur Highway, Valenzuela Metro Manila Manager: JOSEFINA GARCIA Consultant: DR. FABIAN ROSACIA Tel. No. 35-07-36	50	PREMIUM FEEDS MANUFACTURING CORPORATION (PREMIUM) 272 M.H. del Pilar, cor. C. Tongco St., Malabon, Metro Manila Manager: VICTOR C. UY Consultant: DR. CONSTANCIO ADVINCULA Tel. No. 23-99-20	30
LIBERTY FLOUR MILLS (RANCHERO) 528 Blumentritt St., Mandaluyong, Metro Manila Manager: DANIEL K. MARAMBA Consultant: DR. GERED CAHATOL Tel. No. 78-49-81	40	PROGRESSIVE POULTRY SUPPLY (PROGRESSIVE) 1013 E. de Los Santos Ave., Quezon City Manager: TERESITA PE	1.5
LK TRADING, INC. (SUNFLOWER) Lingunan, Valenzuela, Metro Manila Manager: LETICIA K. IBASCO Consultant: DR. PERFECTO MONTANCES Tel. No. 35-75-01	5	RELIABLE FEEDS MILLING (PURINA) 1176 La Campana Cpd., Balintawak, Quezon City Manager: BERNARD CHAM Consultant: DR. MANUEL ABENOJA	3
MANLO FEEDS, INC. (SAVER--MIX) F. Bernal St., Rosario, Pasig, Metro Manila Manager: AGRIPINO D. MANALO Consultant: DR. ROLANDO V. LOTILLA Tel. No. 693-35-81	80	RELIANCE FEEDS MILLING CO., INC. (TRIPPLE--CHICK) 339 Teodor St., Grace Park, Caloocan City Manager: MARTIN CHAN Consultant: DR. JAIME CRUEL Tel. No. 35-88-93	2
MASAGANA MEAL SUPPLY (MASAGANA) 50 Obudan St., Bo. Manresa, Quezon City Manager: GO ENG LU Consultant: DR. OSCAR DIZON Tel. No. 35-53-50	8	REPUBLIC FLOUR MILLS (BLUE RIBBON) Pioneer St., Mandaluyong, Metro Manila Manager: AUGUSTO DE LEON Consultant: JERRY DEAN O. CONCEPCION Tel. No. 77-37-11	112
N. CARLOS ENTERPRISES (PREMIERE) Ususan, Taguig, Metro Manila Manager: NUMERIANO CARLOS Consultant: TIRSO OLIQUIANO Tel. No. 692-55-88	8	MML DEVELOPMENT CORPORATION 411 Celery Rd., FTI Complex Taguig Metro Manila Manager: DR. MARIO M. LABADAN	18
PACIFIC POULTRY SUPPLY (FEEDMASTER) 3 Camachili Rd., Malabon, Metro Manila Manager: CHUA KIEN KIET Consultant: DR. JAIME CRUEL Tel. Nos. 35-83-35 & 361-26-57	10	ROYAL FEEDS & MERCANTILE CORPORATION (ROYAL) Maysilo St., Malabon, Metro Manila Manager: QUIRINO L. ALBERTO Consultant: DR. CAROLINA RALLOS Tel. Nos. 49-13-11 & 48-56-22	10
		R.S. CARLOS GENERAL ENTERPRISES (PROVEN) Verzosa St., Taguig, Metro Manila Manager: ROBERTO S. CARLOS Consultant: DR. AMADO E. BALADAD Tel. Nos. 693-89-38 & 693-49-81	10

<p>SAN MIGUEL POULTRY &amp; LIVESTOCK            FEED PLANT (B-MEG) 480            658-670 A. Bonifacio St., Balintawak, Quezon City            Manager: JOSE S. LIMJAP            Tel. No. 35-30-71 to 75            Consultant: DR. LEON FERNANDEZ</p>	<p>VIGOFEEED MILLING (VIGOFEEED) 3.5            32 Maria Clara St., Acacia, Malabon            Metro Manila            Manager: TAN POK            Consultant: DR. OSCAR DIZON            Tel. No. 23-91-84</p>
<p>SELECTA FEEDS, INC. (SELECTA) 35            32 Selecta Drive, Balintawak, Quezon City            Manager: MAURO C. ARCE            Consultant: DR. PERFECTO MONTANCES            Tel. Nos. 34-24-30 &amp; 34-23-05</p>	<p>VIRGINIA, INC. (SUPERIOR) 5.6            Malinta, Valenzuela, Metro Manila            Manager: BLANQUITA S. GONZALES            Consultant: DR. NICOLAS SEVILLA            Tel. Nos. 49-71-58 &amp; 23-44-46</p>
<p>SPECIALISTS IN LIVESTOCK &amp;            POULTRY, INC. (SUNSHINE) 40            411 FTI Complex, Taguig, Metro Manila            Manager: DR. MARIO LABADAN            Consultant: DR. MARIO LABADAN            Tel. Nos. 828-75-51 loc. 743 &amp; 916</p>	<p>WILLINGTON FLOUR MILLS (WFM) 40            Shaw Blvd., Pasig, Metro Manila            Manager: PHILIP TAN            Consultant: DR. JOSE CAYABYAB            Tel. Nos. 682-34-31 &amp; 682-34-21</p>
<p>TECHNO-DYNAMICS INTERNATIONAL, INC.            Suite 42 A Zeta Bldg.,            Salcedo St., Legaspi Village            Makati, Metro Manila            Manager: EDUARDO M. HIDALGO            Tel. No. 817-69-62</p>	<p>YANGTZE TRADING (TOP MOST) 40            290 Karuhatan, Valenzuela, Metro Manila            Manager: YU TEK BENG            Consultant: DR. ADOLFO ACORDA            Tel. No. 35-89-62</p>
Region 5 Bicol (Center - Legaspi City)	
<p>TRIUMPH PRODUCTS            67 North Bay Blvd., Navotas, MM            Manager: LILY TAN CHAN            Consultant: DR. TIAN SIN P. TAN</p>	<p>IBASCO ENTERPRISES (EXCELSIOR) 2            Burok 9, Barangay 8, Daet, Camarines Sur            Manager: SANTIAGO IBASCO            Consultant: DR. VIRGINIA SILVERIO</p>
<p>TRI-SOL FEEDS MILL (TRI-SOL) 24            26 Karuhatan, Valenzuela, Metro Manila            Manager: TRINITARIO URRUTIA            Consultant: DR. NICOLAS SEVILLA            Tel. No. 35-70-82</p>	<p>ISMA AGRICULTUREAL ENTERPRISES (ISMA) 16            Canaman, Camarines Sur            Manager: EDMUNDO CEA            Consultant: MANUEL MARANAN            Tel. No. 89-39-48 Makati Office</p>
<p>UNITED POULTRY SUPPLY (NUTRENA) 50            165 Maria Clara St., Grace Park, Caloocan City            Manager: EULOGIO DE ASIS            Consultant: DR. JAIME CRUEL            Tel. Nos. 35-54-23 &amp; 35-26-98</p>	<p>KAISA-CAMARINES SUR FEEDMILL            ENTERPRISES (BISA) 5            Barangay Palong, Libmanan, Camarines Sur            Manager: VIRGILIO J. ORBINA</p>
<p>UNIVERSAL ROBINA CORPORATION            (STAR FEEDS 555) 450            Bagong Ilog, Pasig, Metro Manila            Manager: HENRY L. GO            Consultant: DR. RAUL BARON            Tel. No. 682-54-02 to 07</p>	<p>PIONEER FEED MILL (PIONEER) 8            884 Blumentritt St., Naga City            Manager: JOSUE ENVERGA            Consultant: DR. ESMERALDA NIERVA</p>
Region 6 Western Visayas (Center - Iloilo City)	
<p>UPLAND POULTRY CORPORATION            (UPLAND FEEDS) 5            26 Karuhatan, Valenzuela, Metro Manila            Manager: HERMOGENES PUNZALAN            Consultant: DR. AMADO E. BALADAD            Tel. No. 34-23-37</p>	<p>CANLAON FEEDRICH CORPORATION (CANLAON) 2            78 Tindalo Ave., Capitol Shopping Center,            Bacolod City            Manager: ROMEO ARAGON            Consultant: DR. SERAPIO FONTANEZA            Tel. No. 2-75-57</p>

FIRST FARMERS MILLING & MKTG. COOP ASSN., INC. (FIRST FARMERS) Dos Hermanas, Talisay, Negros Occidental Manager: FERNANDO CUENCA Consultant: DR. AMADO E. BALADAD Tel. No. 2-40-67	15	GENERAL MILLING CORPORATION (GENERAL) Lapu-Lapu City, Cebu Manager: GEORGE YOUNG Consultant: DR. GERONIMO DELA CERNA Tel. No. 7-34-51	160
H.P. FAST GROW FEED MILLS (HP FAST GROW FEEDS) Bo. Capuling, Duenas, Iloilo Manager: RODOLFO BALMACEDA Consultant: DR. JOSE EUSEBIO Tel. No. 7-46-64	2	ISLAND FEED MILLS, INC. (ISLAND) Highway Magulkay, Mandaue City Manager: BENJAMIN CHUA Consultant: DR. CATALINO BAUTISTA Tel. No. 3-39-49	100
ILOILO COCOFEED, INC. (QUALITY) Kirayan Norte, Miagao, Iloilo Manager: RAMON FLORES Consultant: BERNABE COCJIN	5	JBT CORPORATION (JBT) Lower Pakigne, Minglanilla, Cebu Manager: WILLY TIU Consultant: DR. LINO DE VERA Tel. No. 7-58-39	16
NEGROS PRODUCERS COOP. MAKTG. ASS. (NECOM) Loreta Chang Bldg., North Drive, Bacolod City Manager: ROBERTO SULIT Consultant: DR. SOLOMON BLOOM	25	KAISA-NEGROS ORIENTAL FEEDMILL ENTERPRISES (BISA) Sitio Bancolotan, Mayabon, Zamboanguita Negros Oriental Manager: HOMER V. LANDIZA	5
SUGARLAND FEEDMILL (SUGARLAND) Lugos Ext., Bacolod City Manager: ANA F. GO Consultant: DR. SERAPIO FONTANEZA	5	UNIVERSAL ROBINA CORPORATION (STAR FEEDS 555) Tipolo, Mandaue City Manager: HENRY L. GO Consultant: DR. RAUL BARON	450
Region 7 Central Visayas (Center - Cebu City)		Region 8 Eastern Visayas (Center - Tacloban City)	
ALPHA FEED MILLS, INC. (ALPHA) 412 Rizal St., Mandaue City Manager: MAXIMO TAN GAW Consultant: DR. NESTOR ALONZO II Tel. No. 9-28-87	14.5	VILLANUEVA FARMS, INC. (VFI FEEDS) Caraman, Calbayog City Manager: EUGENIO C. VILLANUEVA Consultant: DR. EDUARDO ALVAREZ	2.5
Region 9 Western Mindanao (Center - Jolo)		Region 10 Northern Mindanao (Center - Cagayan de Oro City)	
BEST FEEDS (BEST) cor. North CPG Ave., & Dan Rd., Tagbilaran City Manager: ELDEFONSO UY Consultant: DR. AMADO E. BALADAD Tel. No. 33-91	2	EK ENTERPRISES (MINDANAO ACE) Divisoria, Zamboanga City Manager: ERNESTO GULAP Chemist: BELINDA A. REYES	5
CEBU AGRIBUSINESS, INC. (AGRICO) S. E. Jayme St., Paknaan, Mandaue City Manager: ELY CHUA Consultant: DR. GERONIMO DELA CERNA Tel. No. 929-12	3.34	KAISA-ZAMBO NORTE FEEDMILL ENTERPRISE FSDC-Poblacion Polanco Zambo Norte Manager: NICANOR NAQUILA Consultant: DR. TEODULO M. TOPACIO, JR.	5
CEBU B-MEG FEED PLANT (B-MEG) Progreso St., Paknaan, Mandaue City Manager: GUILLERMO A. PRAT Consultant: DR. REMBERTO M. BERNARDO Tel. No. 8-50-11	160	INTEGRATED LIVESTOCK & POULTRY RAISERS COOP., INC. (ILIPCO) Balulang, Cagayan de Oro City Manager: ALDRICO T. MANUS Consultant: THELMA ZABLAN	50

KAISA-FEEDMILL ENTERPRISES, INC. (BISA) San Vicente, Butuan City Manager: REYNALDO VILLANUEVA	5	JULU ENTERPRISES (JULU) Dumoy, Toril, Davao City Manager: JULIAN LU Consultant: DR. ROMEO DELA CERNA	100
MOUNTAIN SPRINGS DEVELOPMENT CORP. (PROTEIN) Sankanán, Manelo Fortich, Bukidnon Manager: EDGAR L. BULLECER	11	INTEGRATED FEED MILL CORPORATION (BEST) Km. 12 Catlunan Pequeno, Davao City Manager: ERROL S. NEREZ Consultant: DR. ORLANDO MANGAHIS	30
ORO SWINE GROWERS & SERVICE COOP., INC. (COOP-MINDANAO) Bulua, Cagayan de Oro City Manager: GLORIA GARCIA Consultant: THELMA ZABLAN	.06	KAISA-DAVAO DEL SUR FEEDMILL ENTERPRISES (BISA) Km. 66 Sinaragan, Matano, Davao, del Sur Manager: RAMONITO S. OLID	5
VITARICH CORPORATION (VITARICH) Nomalag, Cagayan de Oro City Manager: WARMELO G. CHING Consultant: DR. GREGORIO GOLOYUGO	4.5	VITARICH CORPORATION (VITARICH) Panacan, Davao City Manager: VICTOR P. SALVADO Consultant: DR. GREGORIO GOLOYUGO	4.5
Region 12 Central Mindanao (Center - Cotabato City)			
XAVIER UNIVERSITY AGRICULTURAL FEEDMILL (MANRESA) Manresa, Farm, Searsolin, Xavier University Cagayan de Oro City Manager: ANGELITO MERCADO Consultant: DR. BLAS GARCIA	2.4	ANIMAL RAISERS ASSN. FEED PROCESSING (CORUM) Midsayap, North Cotabato Manager: ZACARIAS PRINCIPE Consultant: DR. SOFRONIA BARBER	2.5
Region 11 Southern Mindanao (Center - Davao City)			
ANBOCO ENTERPRISES (SUPREME) Cagampang St., General Santos City Manager: YU MIN	10	KAISA SULTAN KUDARAT FEEDMILL ENTERPRISES Impao, Isulan, Sultan Kudarat Manager: LEONARDO A. DANAO Consultant: DR. TEODULO M. TOPACIO, JR.	5
FULVITE FEEDS (FUL-VITE) National Hi-way, General Santos City Manager: CLEMENTE R. USON Consultant: DR. ANDREA S. ABAGA	2	PILLSBURY MINDANAO FLOUR MILLING CO., INC. Kiwalan Kobe, Iligan City Manager: QUINTIN MARTINEZ Consultant: DR. REYNALDO MACARAIG Tel. No. 818-80-82 Makati Office	120

## Appendix 2. Feed Ingredient Manufacturers

### ANNUAL BY PRODUCTS

- |  |   |  |
|--|---|--|
| 1. INTER-ISLAND FEEDS<br>Bo, Parada, Valenzuela, MM<br>Manager: WILLIAM ONG<br>Reg. Cert. No. 1030<br>Product: Bone Meal | 2. ROMAR MERCHANDISING<br>303 Mabolo St., Santolan<br>Malabon, Metro Manila<br>Manager: VICENTE ONG<br>Tel. No. 23-96-96<br>Reg. Cert. No. FM-80<br>Products: Bone Meal | 3. V & T COMMERCIAL<br>No. 41-A Ignacio St.,<br>Daanghari, Navotas, MM<br>Manager: VICENTE YU<br>Reg. Cert. No. 2045<br>Product: Bone Meal |
|--|---|--|

## YEAST

1. ASIAN ALCOHOL CORPORATION  
1515 Roxas Blvd., Metro Manila  
Manager: JOSE MA. BRIAS  
Reg. Cert. No. FM-11  
Product: Yeast
2. ASIAN ALCOHOL CORPORATION  
Tungbongan, Consolacion, Cebu  
Manager: BERNARDINO CAISIDO  
Reg. Cert. No. FM-46  
Product: Yeast
3. ASIAN ALCOHOL CORPORATION  
Bo. Canjusa, Pulupandan, Neg.  
Occidental  
Manager: EDMUNDO TOGADO  
Reg. Cert. No. FM-70  
Product: Yeast
4. CENTRAL AZUCARRERA DON PEDRO  
Nasugbu, Batangas  
Manager: FRANCISCO BLAS  
Reg. Cert. No. 53  
Product: Dry Yeast
5. PANIQUI SUGAR MILLS  
Paniqui, Tarlac  
Manager: PABLITO H. SING  
Reg. Cert. No. FM-28  
Product: Dried Yeast
6. TARLAC DISTILLERY CORPORATION  
San Miguel, Tarlac  
Manager: SALVADOR F. LAXAMANA  
Reg. Cert. No. 1419  
Product: Yeast
7. TEESON CHEMICALS CORPORATION  
Balagtas, Bulacan  
Manager: ISIDRO A. TEE  
Reg. Cert. No. 2015  
Product: Dried Yeast

## COCONUT BY-PRODUCTS

1. BLUE BAR COCONUT PHILS. CORP  
Lunacan, Tiaong, Quezon  
Manager: LUIS HABANA  
Tel. No. 88-41-08 Manila  
Reg. Cert. No. FM-49  
Product: Copra Cake
2. CENTRAL VEG. OIL MFTG. CO., INC.  
1765 Paz M. Guazon St., Paco, MM  
Manager: FEDRICK CHUA  
Tel. No. 59-09-61  
Reg. Cert. No. 273  
Product: Copra Cake Expeller Meal
3. IMPERIAL VEGETABLE OIL CO., INC.  
Tomas Claudio, Pandacan, MM  
Tel. No. 58-45-46  
Reg. Cert. No. 335  
Product: Copra Meal Pellet
4. INTERNATIONAL OIL FACTORY  
20 F. Manalo St., San Juan, MM  
Manager: CHUNG KIAT HUA  
Tel. No. 79-19-32  
Reg. Cert. No. 131  
Product: Copra Pellet
5. LU DO & LU YM CORPORATION  
Tupas St., Cebu City  
Manager: GEN. VALENTIN VELASCO (Ret.)  
Reg. Cert. No. FM-12  
Products: Copra Meal  
Corn Gluten Feed
6. PHILIPPINE MANUFACTURING CORP.  
2279 Velasquez, Tondo, MM  
Manager: MELQUIADES GAMBOA, JR.  
Tel. Nos. 88-55-81 & 88-53-81  
Reg. Cert. No. 68  
Product: Copra Cake Meal
7. PHILIPPINE REFINING COMPANY, INC.  
1351 United Nation Ave., MM  
Manager: LUIS DURAN  
Tel. Nos. 59-96-44 & 50-41-11  
Reg. Cert. No. FM-15  
Products: Copra Expeller  
Cake/Meal/Pellet
8. SUNRIPE COCONUT PRODUCTS, INC.  
747 Muelle de la Industria  
Binondo, Metro Manila  
Manager: FRANCISCO CHUA  
Reg. Cert. No. 337  
Product: Copra Cake

## FEED SUPPLEMENTS/ADDITIVES

1. AQUINO ASSOCIATES, INC.  
 Marsman Bldg., Buendia cor  
 Washington, Makati, MM  
 Manager: SERVILLANO AQUINO  
 Reg. Cert. No. FM-35  
 Product: Ikuton
2. BAYER PHILIPPINES, INC.  
 Ortigas Ave., San Juan, MM  
 Manager: CARLITO CALMLIM  
 Tel. No. 70-40-71  
 Reg. Cert. No. FM-51  
 Products: Bayo-N-Ox-Premix  
 Pecutrin Grobic Broiler  
 Grobic PS/S Grobic Fort w/  
 ARN-Systems Bayo-N-Ox PS/S  
 Grobic-Fort. w/Bayo-N-Ox G/F  
 Bayo-N-Ox Plus  
 Tribin Premix 2%, 10%  
 Tribin SP 50%  
 Grobic Layer
3. CYANAMID PHILIPPINES, INC.  
 3rd Flr. Saville Bldg., Paseo  
 de Roxas cor. Buendia, Makati, MM  
 Manager: C. I. ELSENHART  
 Tel. No. 89-97-81 to 85  
 Reg. Cert. No. FM-22  
 Products: Aureo Soluble Tinted  
 Aureovet Powder  
 Aureo SP 250  
 Aurovim Powder  
 Dynamycin Powder  
 Payzone Premix  
 Aurolac 2A  
 Aurolac Simple  
 Cycostat Powder
4. DOCTORS PHARMACEUTICALS, INC.  
 345 2nd St., 10th Ave., Grace  
 Park, Caloocan City  
 Manager: JOSE RAMON C. SANTOS  
 Tel. No. 34-59-71  
 Reg. Cert. No. FM-24  
 Products: Citravim  
 Apimix  
 Soluvim  
 Tetravet SP  
 Furanicol  
 roriavim  
 Biovim FC  
 Egg-O-Mix Layer
5. ELI LILLY PHILIPPINES, INC.  
 5th Flr., Dona Narcisa Bldg.  
 Paseo de Roxas, Makati, MM  
 Manager: LEO P. WASSMER, JR.  
 Tel. No. 88-09-56  
 Reg. Cert. No. 1974  
 Products: AF 10 Tylan Premix  
 AF 40 Tylan Premix  
 AF 2080 Hygromix
6. E. R. SQUIBB & SONS PHILS. CORP.  
 cor. Malugay St., Pasong  
 Tamo, Makati, MM  
 Manager: WILLIAM A. WAKEFIELD  
 Tel. No. 88-66-66  
 Reg. Cert. No. 378  
 Products: Dymutilin Feed Premix  
 Mycostatin 20  
 Quizalud Feed Additives  
 Afsillin Feed Fortifier  
 Verminum Swine Application  
 Afsillin Improved  
 Vionate for Pets  
 Shellgard Vitamin-Mineral  
 Roxazole Feed Additive  
 Supplement for Dogs
7. G-R INTERNATIONAL CORPORATION  
 0153 Quirino Ave., Paranaque, MM  
 Manager: GEORGE CHUA  
 Reg. Cert. No. FM-74  
 Product: Grobest
8. HAYCO CHEMICAL CORPORATION  
 Mabolo, Cebu City  
 Manager: CHING HA I CO  
 Reg. Cert. No. FM-79  
 Product: Hycaphos (Calcium  
 phosphate)
9. HENRY'S LABORATORIES, INC.  
 66 Howmart R., Bo. Kangkong  
 Quezon City  
 Manager: ANTONIO C. TIU  
 Tel. No. 35-68-21  
 Reg. Cert. No. FM-62  
 Product: V-M Feed Supplements
10. INTERNATIONAL PHARMACEUTICALS, INC.  
 San Jose de la Montana, Mabolo  
 Cebu City  
 Manager: PIO WONG CASTILLO  
 Reg. Cert. No. FM-27  
 Products: Benzomycin  
 Soluble Powder  
 Chlortetra-Vite  
 Quadro-Vite  
 Chloram-Fur  
 Salvimim  
 Vita-Pencin  
 Germedex-20 Solution  
 Sulfaline 3.5 Solution  
 Sugro-Mix (Feeds)

11. MABUHAY FEEDS, INC.  
 km. 17 Quirino Hi-way  
 Novaliches, Quezon City  
 Manager: GREGORIO ABREU  
 Tel. No. 90-12-14  
 Reg. Cert. No. FM-23  
 Products: Colistram  
 Furavim Poultry  
 Furavim Swine  
 Tra-Phos D  
 Zoable

Destonate  
 Spiremet  
 Stenorol

12. PFIZER, INC.  
 Sucat, Muntinlupa, MM  
 Manager: GEORGE SUTER  
 Tel. No. 88-26-21 to 28 (Makati)  
 Reg. Cert. No. FM-29  
 Products: Mecadox 10 Premix  
 TM-50, 5  
 Swine Premix  
 Poultry Premix  
 Super Vigofac  
 TM-Plus  
 Neo-Terra 50/50  
 Custom Premix  
 Horse Premix

13. PHIL. UNITRADE COMPANY  
 27 Samson Road, Lanug  
 Cebu City  
 Manager: GUADALUPIO TAN OQUIAS  
 Reg. Cert. No. FM-84  
 Product: Tri-Calcium Phosphate

14. PREMIUM LABORATORIES, INC.  
 San Rafael, Montalban, Rizal  
 Manager: ROMEO JORGE  
 Products: Premium Poultry  
 Premix  
 Premium Swine Premix

15. RIZAL POULTRY & LIVESTOCK ASSN, INC.  
 Malanday, San Mateo, Rizal  
 Manager: BENJAMIN SAN PEDRO  
 Tel. No. 697-39-29  
 Reg. Cert. No. FM-79  
 Products: Poultry Premix  
 Hog Premix

16. TRYCO PHARMACEUTICAL CORP.  
 117 M. Ponce St., Caloocan City  
 Manager: WILFREDO C. RIVERA  
 Reg. Cert. No. FM-85  
 Products: Vitafac Feed Supplement

17. UNION-HIKARI FERTILIZER  
 INDUSTRIES, INC.  
 E. Rodriguez Ave., Bo. Ugong  
 Pasig, Metro Manila

Manager: SHIGEKI SONODA  
 Reg. Cert. No. FM-41  
 Product: Fermented Mother  
 Liquef (FML)

18. UNIVET AGRICULTURAL PRODUCTS  
 Mayflower St., Mandaluyong, MM  
 Tel. No. 70-87-61  
 Reg. Cert. No. FM-20  
 Products: Pigromix 100  
 Pigromix 200  
 New Poltrex  
 Pigrotabs  
 Custom Mix  
 Univite Ganador  
 Matador



1. ALFLO FISH MEAL & GEN. MDSG.  
 28 San Marcos St., Navotas, MM  
 Manager: ALBERTO LOPEZ  
 Tel. No. 22-33-47  
 Reg. Cert. No. FM-47  
 Product: Fishmeal

2. BANTAN TRADING  
 Potrero, Tenejeros, Malabon, MM  
 Manager: TAN KO BAN  
 Tel. No. 361-28-27  
 Reg. Cert. No. 1931 M-59  
 Product: Fishmeal

3. CEBU AGRIBUSINESS, INC.  
 S. E. Jayme St., Paknaan, Mandaue  
 Manager: ELY CHUA  
 Tel. Nos. 93834 & 92912  
 Reg. Cert. No. 1931  
 Product: Fishmeal 50% CP  
 60% CP

4. JBT CORPORATION  
 Lower Pakigne, Minglanilla, Cebu  
 Manager: WILLY TIU  
 Tel. No. 7-58-39  
 Reg. Cert. No. FM-61  
 Products: Fishmeal 50% EP  
 Cassava Meal  
 Ipil-Ipil Meal

5. KIMBA FISHMEAL SUPPLY  
 Kimba, Consojong, Talisay, Cebu  
 Manager: SOFREMIDA S. BAIGOS  
 Tel. No. 9-77-95  
 Reg. Cert. No. FM-38  
 Product: Fishmeal 45% CP

6. LA FUERZA INDUSTRY & GEN. MERCHANT  
 Km. 15 MacArthur Highway, Valenzuela  
 Manager: JIMMY ANG


- Tel. No. 35-07-36  
Reg. Cert. No. 1726  
Product: Fishmeal
7. LUSCO FISHMEAL FACTORY  
547 Gov. Pascual St., Daanghari  
Navotas, MM  
Manager: LOLLY KING  
Tel. Nos. 23-37-09 & 23-61-57  
Reg. Cert. No. FM-05  
Products: Steam Cook Fishmeal  
45% & 50% CP
8. MAR FISHING CO., INC.  
Recodo, Zamboanga  
Manager: JOSE MA. BUCOY, JR.  
Reg. Cert. No. FM-67  
Product: Fishmeal 45% CP
9. SBF GENERAL MERCHANT  
No. 82 Arkong Bato, Valenzuela, MM  
Manager: SE BING FENIX  
Reg. Cert. No. FM-25  
Product: Fishmeal 45% CP  
50% CP
10. VALENZUELA AGRO-INDUSTRIAL CORP.  
84-F. Bautista St., Valenzuela, MM  
Manager: JESUS REDAJA  
Tel. Nos. 34-67-51 & 34-65-59 (Mla.)  
Reg. Cert. No. FM-55  
Product: Fishmeal  
Bone Meal
11. NAVOTAS ABC GUILINGAN  
L.R. Yangco St., Navotas, MM  
Manager: ELIZABETH DIAZ  
Tel. No. 23-36-08  
Reg. Cert. No. 1664  
Product: Fishmeal 45% CP
12. NORTH SEA FISHMEAL FACTORY  
North Bay Blvd., Navotas, MM  
Manager: YU SUI KIAT  
Tel. No. 23-30-02  
Reg. Cert. No. 1012  
Product: Fishmeal 45% CP  
50% CP
13. PHILIPPINE FISHMEAL FACTORY  
North Bay Blvd., Navotas, MM  
Manager: YU TIAN SEE  
Tel. No. 22-24-86  
Reg. Cert. No. 1660  
Product: Fishmeal 45% CP  
50% CP
14. PHILIPPINE SUPER FEED CORP.  
135 North Bay Blvd., Navotas, MM  
Manager: CO CHENG HAY  
Tel. Nos. 23-71-55 & 23-43-71
- Reg. Cert. No. 1947  
Product: Fishmeal 45% CP  
50% CP  
60% CP
15. VICTORIA FISHMEAL SUPPLY  
Dumlog, Talisay, Cebu  
Manager: INOCENCIO JUEZAN  
Reg. Cert. No. FM-68  
Product: Fishmeal

**IPIL-IPIL LEAF MEAL**

1. BESABELLA MILLING  
509 Pagsabungan, Mandaue City  
Manager: GREGORIO BESABELLA  
Tel. No. 8-12-46  
Reg. Cert. No. FM-32  
Product: Ground Ipil-ipil Leaves
2. CEBU EVERGREEN ENTERPRISES  
Bulacao, Talisay, Cebu  
Manager: ROBERTO PA-AYAS  
Tel. No. 9-95-11  
Reg. Cert. No. FM-53  
Product: Ipil-Ipil Leaf Meal
3. CEBU RBC ENTERPRISES  
Bulacao, Pardo, Cebu City  
Manager: ROLANDO B. CHAN  
Reg. Cert. No. FM-34  
Product: Ipil-Ipil Meal
4. CLEMENTE ENTERPRISES  
Tabunok, Talisay, Cebu  
Manager: HUAN CLEMENTE  
Reg. Cert. No. FM-50  
Product: Ipil-Ipil Leaf Meal
5. MANDAUE MANUFACTURING INDUSTRIES  
CORPORATION  
Tabok, Mandaue City  
Manager: BENJAMIN CHUA  
Reg. Cert. No. FM-13  
Products: Ipil-Ipil Powder  
Ipil-Ipil Leaf Meal  
Shell Grits  
Shell Powder
6. MANILA SEEDLING BANK FOUNDATION, INC.  
Binocan, Bagac, Bataan  
Manager: LUCITO M. BERTOL  
Reg. Cert. No. FM-86  
Products: Ipil-Ipil  
Leaf Meal



- Tel. No. 35-07-36  
Reg. Cert. No. 1726  
Product: Fishmeal
7. LUSCO FISHMEAL FACTORY  
547 Gov. Pascual St., Daanghari  
Navotas, MM  
Manager: LOLLY KING  
Tel. Nos. 23-37-09 & 23-61-57  
Reg. Cert. No. FM-05  
Products: Steam Cook Fishmeal  
45% & 50% CP
8. MAR FISHING CO., INC.  
Recodo, Zamboanga  
Manager: JOSE MA. BUCOY, JR.  
Reg. Cert. No. FM-67  
Product: Fishmeal 45% CP
9. SBF GENERAL MERCHANT  
No. 82 Arkong Bato, Valenzuela, MM  
Manager: SE BING FENIX  
Reg. Cert. No. FM-25  
Product: Fishmeal 45% CP  
50% CP
10. VALENZUELA AGRO-INDUSTRIAL CORP.  
84-F. Bautista St., Valenzuela, MM  
Manager: JESUS REDAJA  
Tel. Nos. 34-67-51 & 34-65-59 (Mla.)  
Reg. Cert. No. FM-55  
Product: Fishmeal  
Bone Meal
11. NAVOTAS ABC GUILINGAN  
L.R. Yangco St., Navotas, MM  
Manager: ELIZABETH DIAZ  
Tel. No. 23-36-08  
Reg. Cert. No. 1664  
Product: Fishmeal 45% CP
12. NORTH SEA FISHMEAL FACTORY  
North Bay Blvd., Navotas, MM  
Manager: YU SUI KIAT  
Tel. No. 23-30-02  
Reg. Cert. No. 1012  
Product: Fishmeal 45% CP  
50% CP
13. PHILIPPINE FISHMEAL FACTORY  
North Bay Blvd., Navotas, MM  
Manager: YU TIAN SEE  
Tel. No. 22-24-86  
Reg. Cert. No. 1660  
Product: Fishmeal 45% CP  
50% CP
14. PHILIPPINE SUPER FEED CORP.  
135 North Bay Blvd., Navotas, MM  
Manager: CO CHENG HAY  
Tel. Nos. 23-71-55 & 23-43-71
- Reg. Cert. No. 1947  
Product: Fishmeal 45% CP  
50% CP  
60% CP
15. VICTORIA FISHMEAL SUPPLY  
Dumlog, Talisay, Cebu  
Manager: INOCENCIO JUEZAN  
Reg. Cert. No. FM-68  
Product: Fishmeal
- IPIL-IPIL LEAF MEAL**
1. BESABELLA MILLING  
509 Pagsabungan, Mandaue City  
Manager: GREGORIO BESABELLA  
Tel. No. 8-12-46  
Reg. Cert. No. FM-32  
Product: Ground Ipil-Ipil Leaves
2. CEBU EVERGREEN ENTERPRISES  
Bulacao, Talisay, Cebu  
Manager: ROBERTO PA-AYAS  
Tel. No. 9-95-11  
Reg. Cert. No. FM-53  
Product: Ipil-Ipil Leaf Meal
3. CEBU RBC ENTERPRISES  
Bulacao, Pardo, Cebu City  
Manager: ROLANDO B. CHAN  
Reg. Cert. No. FM-34  
Product: Ipil-Ipil Meal
4. CLEMENTE ENTERPRISES  
Tabunok, Talisay, Cebu  
Manager: HUAN CLEMENTE  
Reg. Cert. No. FM-50  
Product: Ipil-Ipil Leaf Meal
5. MANDAUE MANUFACTURING INDUSTRIES  
CORPORATION  
Tabok, Mandaue City  
Manager: BENJAMIN CHUA  
Reg. Cert. No. FM-13  
Products: Ipil-Ipil Powder  
Ipil-Ipil Leaf Meal  
Shell Grits  
Shell Powder
6. MANILA SEEDLING BANK FOUNDATION, INC.  
Binocan, Bagac, Bataan  
Manager: LUCITO M. BERTOL  
Reg. Cert. No. FM-86  
Products: Ipil-Ipil  
Leaf Meal

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| <p>7. PILLSBURY MINDANAO FLOUR MILLING<br/>CO., INC.<br/>Kiwalan Kobe, Iligan City<br/>Manager: QUINTIN MARTINEZ<br/>Reg. Cert. No. M-42<br/>Product: Ipil-Ipil Pellet</p> <p>8. TKC MARKETING CORPORATION<br/>41-43 F. Gonzales St., Cebu City<br/>Manager: LEON TIO<br/>Reg. Cert. No. FM-76<br/>Product: Ipil-Ipil Meal</p> <p>9. VIRONE MILLING CO., INC.<br/>cor. Nat. Highway, Indrina Sts.<br/>San Carlos, Negros Occidental<br/>Manager: ROBERTO TAN<br/>Reg. Cert. No. FM-33<br/>Products: Ipil-Ipil Powder<br/>Ipil-Ipil Leaf Meal</p> | <p>2. MALABON MERCHANDISING CORP., INC.<br/>272 M. H. del Pilar St., Maysilo<br/>Malabon, MM<br/>Manager: JORGE H. CHIN<br/>Tel. No. 23-95-59<br/>Reg. Cert. No. FM-63<br/>Product: MAMERCO Feedstuffs</p> <p>3. STANDARD CEREAL CENTER CORP.<br/>39 MacArthur Highway, Malabon, MM<br/>Manager: QUINTIN TONGCO<br/>Tel. No. 35-98-39<br/>Reg. Cert. No. FM-48<br/>Products: Corn Grain<br/>Corn Grits<br/>Corn Meal</p> <p>4. EVER CORN MILL<br/>303 Mabolo St., Santolan<br/>Malabon, MM<br/>Manager: CRISOSTOMO CHAN<br/>Reg. Cert. No. FM-75<br/>Product: Corn Grits</p> <p>5. STANDARD CEREAL CENTER CORP.<br/>T. Santiago St., Dalandanan<br/>Valenzuela, MM</p> |
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|---|--|
| <p>1. CENTRAL LUZON MERCHANDISING<br/>110 G. de Jesus St., Caloocan City<br/>Manager: PILO MELITANTE<br/>Tel. No. 35-29-52<br/>Reg. Cert. No. FM-52<br/>Product: Corn-by-products</p> |  |
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### The Dealer's Creed

WE BELIEVE that man should not want in food and that food sufficiency gives meaning to man's right to life itself.

WE BELIEVE that as producers of food, we contribute to the fulfillment of this right.

WE BELIEVE that as producers, our right to a fair return on our investments and efforts can only be justified by high product quality, fair pricing, adequate supply and proper distribution of our products.

WE BELIEVE that only by a conscious adherence of these beliefs can we dignify our roles and render service to all.

PHILIPPINE ASSOCIATION OF DEALERS IN  
LIVESTOCK AND POULTRY SUPPLIES, INC.

## Appendix 3. Feed Laws and Control

### A. Presidential Decree Which Prescribes New Regulations on Animal Feeds

MALACAÑANG PALACE  
Manila

#### PRESIDENTIAL DECREE NO. 7\*

##### PREScribing THE ORDERLY MARKETING OF LIVESTOCK AND ANIMAL PRODUCTS AND NEW REGULATIONS ON ANIMAL FEEDS.

WHEREAS, the prices of meat and other livestock products have been increasing to the detriment of our people inspite of government efforts to expand the production of livestock and animal products;

WHEREAS, the livestock and poultry industry is one of the major agricultural industries in the Philippines and its accelerated development would mean the increased production of meat and other animal products necessary to improve the health of the people and to bolster the national economy;

WHEREAS, producers and marketers of livestock and animal products encounter numerous legal and illegal fees and charges in the production, transport, and marketing of their products;

WHEREAS, these fees and charges operate to increase livestock production and marketing costs and therefore increase meat prices;

WHEREAS, the livestock industry also largely depends upon the quality of animal feeds and therefore a stricter law to control and regulate the manufacture, importation, sale and distribution of animal feeds is imperative;

WHEREAS, there were pending before Congress prior to the promulgation of Proclamation No. 1081, dated September 21, 1972, certain priority measures vital to the livestock industry;

NOW, THEREFORE, I, FERDINAND E. MARCOS, as Commander-in-Chief of all the Armed Forces of the Philippines, and pursuant to Proclamation No. 1081, dated September 21, 1972, and General Order No. 1, dated September 22, 1972, as amended, in order to effect the desired reforms in the social, economic, and political structure of the country, do hereby order and decree that, with the exception of the ante-mortem and post-mortem inspection fees, as well as delivery, and slaughter or fees as may be authorized by the Secretary of Agriculture and Natural Resources the collection of all other fees and charges including reinspection fees, inventory fees, certificate of ownership fees, Mayor's permits, City Hall fees, customs fees, shipping certificate fees, and check-point charges are hereby terminated.

Ante-mortem and post-mortem inspection of animals and their carcasses done by duly designated veterinarians in the employ of the National Government shall be valid when the said carcasses are transported from any accredited slaughterhouse in the Philippines to any trading center in the country, provided the safeguards for the proper transport of the meat are undertaken. Any additional post-mortem inspection if deemed necessary are to be done only at the requests of the buyer and only by veterinarians in the employ of the National Government or by veterinarians duly accredited by the National Meat Inspection Commission to be organized as specified hereunder.

The Secretary of Agriculture and Natural Resources is hereby authorized to establish a National Meat Inspection Commission which shall promulgate, with his approval, specific policies and procedures governing the flow of livestock and livestock products through the various stages of marketing and the proper preservation and inspection of such products. Such policies and procedures shall thereafter have the effect of law and shall be implemented by the Secretary of Agriculture and Natural Resources, by the National Meat Inspection Commission, by the Bureau of Animal Industry, and by all other agencies and instrumentalities of the national, provincial, city and municipal governments.

\* Amended by Presidential Decree No. 45.

I also hereby order and decree that Senate Bill No. 627, as hereto attached and entitled "AN ACT TO AMEND THE TITLE AND CERTAIN SECTIONS OF REPUBLIC ACT NUMBERED ONE THOUSAND FIVE HUNDRED FIFTY-SIX, OTHERWISE KNOWN AS THE LIVESTOCK AND POULTRY FEEDS ACT, AND TO PROVIDE FUNDS THEREFOR," shall be adopted and approved, as it is hereby adopted, approved, and made as part of the law of the land.

Done in the City of Manila, this 30th day of September, in the year of Our Lord nineteen hundred and seventy-two.

(SGD.) FERDINAND E. MARCOS  
President

Republic of the Philippines

B. The Livestock and Poultry Feeds Act  
(R.A. 1556, as amended by Presidential  
Decree No. 7).

The following is the text of Senate Bill  
No. 627 attached to Presidential Decree  
No. 7:

Seventh Congress of the Republic  
of the Philippines  
Second Session

SENATE  
S. No. 627

AN ACT TO AMEND THE TITLE AND  
CERTAIN SECTIONS OF REPUBLIC  
ACT NUMBERED ONE THOUSAND  
FIVE HUNDRED FIFTY-SIX OTHER-  
WISE KNOWN AS THE LIVESTOCK  
AND POULTRY FEEDS ACT, AND TO  
PROVIDE FUNDS THEREFOR.

Be it enacted by the Senate and House of  
Representatives of the Philippines in  
Congress assembled:

SECTION 1. The title of Act Num-  
bered One thousand five hundred fifty-  
six is hereby amended to read as follows:

"An Act to regulate and control the  
manufacture, importation, labelling,  
advertising, DISTRIBUTION, and sale  
of livestock and poultry feeds, AND  
PROVIDING FUNDS THEREFOR."

SECTION 2. Sub-sections (d), (e), (k),  
(n) and (o) of Section 3 are hereby amen-  
ded to read as follows:

"(d) "Feeds" or "Feeding Stuff" shall  
[include] EMBRACE all such  
articles TO BE used AS FEEDS  
[for the purpose of feeding]

purporting to supply proteins,  
carbohydrates, fats, minerals,  
vitamins, antibiotics, GROWTH  
PROMOTING FACTORS WHE-  
THER IDENTIFIED OR UN-  
IDENTIFIED, and/or correcting  
nutritional disorders. Such ar-  
ticles may be locally produced  
or imported, mixed or in the form  
of simple ingredients [.] ; PRO-  
VIDED, HOWEVER, THAT THE  
FOLLOWING ARE EXCLUDED:

- (1) WHOLE SEEDS OR GRAINS,  
UNMIXED.
- (2) FRESH GREEN ROUGH-  
AGE AND UNPROCESSED  
LIQUID MILK IN ALL ITS  
FORMS.
- (3) DRIED AND GROUND  
HAYS AND STRAWS ,  
DRIED AND GROUND  
CORN STALKS OR OTHER  
PARTS OF THE CORN  
PLANT NOT INCLUDED IN  
THE GRAIN, RICE HULLS,  
CANE SUGAR BAGASSE,  
DRIED BEET PULP, OAT  
HULLS, BARLEY HULLS,  
CLIPPED OAT BY-PRO-  
DUCT, SORGHUM PLANT  
BY-PRODUCT AND FLAX  
PLANT BY-PRODUCTS ,  
COTTON SEED HULLS,  
MONGO BEAN HULLS,  
BUCKWHEAT HULLS, CO-  
COA SHELLS, OR OTHER  
MATERIALS OF A SIMI-  
LAR CHARACTER.

"(e) "Owner" is the person, firm,  
partnership, COOPERATIVE, as-  
sociation or corporation applying

for the [accord] REQUIRED re-  
gistration under this Act OR  
ANY PERSON OR ESTABLISH-  
MENT ACTUALLY ENGAGED  
IN THE MANUFACTURE, IM-  
PORTATION, DISTRIBUTION  
AND SALE OF LIVESTOCK  
AND POULTRY FEED.

"(k) "Analyst" means any official  
analyst appointed [under this  
Act] OR DESIGNATED AS  
SUCH BY THE DIRECTOR  
OF ANIMAL INDUSTRY FOR  
THE PURPOSE OF IMPLEMEN-  
TATION OF THIS ACT.

"(n) "Concentrates" shall apply to  
[no materials other than those  
known as concentrates.] FEED-  
STUFF LOW IN FIBER AND  
HIGH IN TOTAL DIGESTIBLE  
NUTRIENTS [and shall include  
linseed meals, cotton seed meals,  
pea meals, bean meals, peanut  
meals, coconut meals, gluten meals, velvet  
bean meals, soya bean meals,  
dried vinegar grains, corn germ  
meal, feeding molasses, gluten  
feeds, cotton seeds feeds, maize  
feeds, velvet bean feeds, peanut  
feeds, dried distiller's and brewer's  
grains, hominy feeds, rice meals,  
corn and oat chops, corn feed  
meal, corn and cob meals,  
wheat bran, wheat middlings,  
wheat feed, rye feed, rye midd-  
lings, buckwheat middlings, and  
buckwheat feed, ground beef or  
fish scraps, meat meals, meat  
and bone meals mixed, dried  
blood, milk by-products, mixed  
feeds, compounded feeds, condi-

mental stock and poultry feeds, proprietary or trade-marked stock and poultry feeds, and all other materials of a similar nature; but shall not include the materials defined in this article as roughages, the whole seed nor pure whole seed nor pure whole grains ground together nor the unmixed meals, made directly from the entire grains of wheat, rye, barley, oat, corn, buckwheat and boom corn nor malt sprouts, rye, barley, oat, corn, buckwheat and boom corn nor malt sprouts, when sold as such by the maltster at retail nor ground or cracked bone not mixed with any other substance, nor shall it include poultry feeds consisting of whole or whole and cracked grains mixed together, with or without grit, oyster shells, or charcoal, when all the ingredients may be identified by the naked eye.]

"(c) "Roughages" shall include dried and ground hays and straws, dried and ground corn stalks or other parts of the corn plant not included in the grain, dried beet pulp, oat hulls, barley hulls, clipped oat by-products, sorghum plant by-products and flax plant by-products, cotton seed hulls, buckwheat hulls, cocoa shells, grain screening or other materials of a similar character. This shall not include [whole ground grains not mixed with any other substance] "ADULTERATED FEED OR MIXED FEEDS, FEEDSTUFFS OR INGREDIENTS FOUND TO CONTAIN ANY MATERIAL THAT IS PROVEN INJURIOUS, DAMAGED OR OF NO FOOD VALUE OR IF ANY SUBSTANCE HAS BEEN ADDED THERETO THUS INCREASING ITS BULK OR WEIGHT OR REDUCING ITS QUALITY OR STRENGTH. FOR PURPOSES OF THIS ACT A MIXTURE OF TWO OR MORE MIXED FEEDS OF DIFFERENT FORMULAS OR BRAND WITH INTENT TO SELL IS ALSO CONSIDERED ADULTERATED FEED."

SECTION 3. Sub-sections (b), (c) and (g) of Section 4 of Republic Act Numbered One thousand five hundred fifty-six are hereby amended to read as follows:

"(b) Application for registration or annual renewal thereof, shall be made by the person, partnership, COOPERATIVE firm, corporation, or association marketing, manufacturing, importing, INDENTING, or DISTRIBUTING such form and manner as may be prescribed from time to time by regulations. EACH TYPE OR KIND OF FEEDS OR FEEDSTUFFS MANUFACTURED OR IMPORTED SHALL BE REGISTERED SEPARATELY. AND IN THE CASE OF RETAILERS EVERY STORE SHALL ALSO BE REGISTERED SEPARATELY.

"(c) An application for registration shall be accompanied by a registration fee of five pesos for EACH STORE REGISTERED BY a person, firm COOPERATIVE, partnership, corporation or association engaged in retailing [or distribution of] commercial feeds or feeding stuffs, FIFTY PESOS FOR DISTRIBUTORS, [and] one hundred pesos for [manufacturers and/or importers] LOCAL FEEDSTUFFS SUPPLIERS WITH GROSS SALES OF ONE THOUSAND PESOS OF MORE, TWO HUNDRED PESOS FOR IMPORTERS AND/OR INDENTORS AND THREE HUNDRED PESOS FOR MANUFACTURERS of commercial feeds or feeding stuffs. THE REGISTRATION FEE SHALL BE PAYABLE, AT THE OPTION OF THE PERSON, PARTNERSHIP, FIRM, COOPERATIVE, CORPORATION OR ASSOCIATION ENGAGED IN THE MANUFACTURE, IMPORTATION; SALE OR DISTRIBUTION OF FEEDS OR FEEDINGSTUFFS, ANNUALLY, ON OR BEFORE THE TWENTY-FIRST OF JANUARY, OR SEMI-ANNUALLY, ON OR BEFORE THE THIRTY-FIRST OF JANUARY AND JULY, WHEN A BUSINESS IS NEWLY OPENED. DURING

ANY YEAR THE REGISTRATION FEE SHALL BE RECKONED FROM THE COMMENCEMENT OF THE CURRENT SEMESTER; AND WHEN EITHER AT ANY TIME ABANDONED THE REGISTRATION FEE SHALL NOT BE EXACTED FOR A LONGER PERIOD THAN TO THE END OF THE SEMESTER; PROVIDED, THAT THOSE WHO ELECTED TO PAY THE REGISTRATION FEE IN FULL SHALL NOT BE ENTITLED TO A REFUND OF THE FEE CORRESPONDING TO THE UNUSED PERIOD FOR WHICH THE FEE HAD BEEN PAID.

"(g) The Director MAY [is empowered to recommend to the Secretary of Agriculture and Natural Resources the cancellation of] SUSPEND, SUBJECT TO THE RULES AND REGULATIONS PROMULGATED FOR THE IMPLEMENTATION OF THIS ACT, the registration of any feed or feeding stuff which is found after proper investigation to be not in conformity with the provisions of this Act, in registration, importation, manufacture, distribution, labelling, advertising or sale, UNLESS SUBSEQUENT PRODUCTION IS PROVEN TO BE INNOCUOUS, HARMLESS AND IN ACCORDANCE WITH THE QUALITY STANDARD FOR THE PARTICULAR PRODUCT SET FORTH IN THE REGISTRATION UNDER THIS ACT. ONCE SUSPENDED, FORMAL INVESTIGATION SHOULD BE CONDUCTED THEREON BY THE COMMITTEE CREATED FOR THIS PURPOSE PURSUANT TO SECTION 5 OF THIS ACT. BUT THE ACTION OF THE DIRECTOR OF ANIMAL INDUSTRY MAY BE APPEALED TO THE SECRETARY OF AGRICULTURE AND NATURAL RESOURCES WITHIN THIRTY DAYS FROM NOTICE OF THE ACTION; PROVIDED, THAT PENDING FINAL ACTION BY THE SECRETARY

OF AGRICULTURE AND NATURAL RESOURCES ADULTERATED, DAMAGED OR INJURIOUS FEED SHALL BE IMPOUNDED AND THE SUBSEQUENT MANUFACTURE THEREOF PROHIBITED BY THE DIRECTOR OF ANIMAL INDUSTRY: PROVIDED, FURTHER, THAT WHEN THERE IS REASONABLE CAUSE TO BELIEVE THAT CERTAIN FEEDS OR FEEDSTUFFS ARE DAMAGED, ADULTERATED OR INJURIOUS SUCH FEEDS OR FEEDSTUFFS SHALL BE IMMEDIATELY IMPOUNDED AND PORTION THEREOF SOLD TO THE PUBLIC BE RETRIEVED BY AND AT THE EXPENSE OF THE MANUFACTURER, IMPORTER OR RE-TAILER UPON NOTICE OF THE DIRECTOR OF ANIMAL INDUSTRY"

SECTION 5. One sub-section is hereby inserted after Section 4 to be known as sub-section (h) and to read as follows:

1. CHIEF, ANIMAL FEED CONTROL DIVISION, BUREAU OF ANIMAL INDUSTRY, CHAIRMAN;
2. CHIEF, LABORATORY SERVICES DIVISION, BUREAU OF ANIMAL INDUSTRY, MEMBER;
3. ONE MEMBER FROM THE ANIMAL HUSBANDRY DEPARTMENT, U.P. COLLEGE OF AGRICULTURE;
4. ONE MEMBER FROM THE LEGAL DIVISION, DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES;
5. ONE MEMBER FROM THE LEGAL UNIT, BUREAU OF ANIMAL INDUSTRY;
6. ONE MEMBER FROM THE DULY RECONGNIZED FEED MILLERS ASSOCIATION;
7. ONE MEMBER FROM THE DULY RECOGNIZED SWINE RAISERS ASSOCIATION;
8. ONE MEMBER FROM THE DULY RECOGNIZED POULTRY RAISERS ASSOCIATION; AND
9. ONE MEMBER FROM THE

PHILIPPINE SOCIETY OF ANIMAL SCIENCE RECOMMENDED BY THE ANIMAL SCIENCE COUNCIL OF SAID SOCIETY.

THIS COMMITTEE SHALL UPON REQUEST, REFERRAL OR ORDER OF THE DIRECTOR OF ANIMAL INDUSTRY CONDUCT STUDIES, EVALUATION AND FORMAL INVESTIGATION AND MAKE RECOMMENDATIONS ON MATTERS ARISING FROM THE IMPLEMENTATION OF THIS ACT. FOR THIS PURPOSE THE COMMITTEE IS AUTHORIZED TO CONDUCT FIELD INVESTIGATIONS, HEARINGS, AND RECEIVE EVIDENCE ON MATTER APPERTAINING THERETO INCLUDING THE AUTHORITY TO ISSUE SUBPOENA, SUBPOENA DUCES TECUM, SUMMON WITNESSES AND SECURE OR OBTAIN THE ASSISTANCE OR FACILITIES OR PERSONNEL OF OTHER OFFICES UNDER THE DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES.

THE COMMITTEE SHALL ALSO ASSIST OR ADVISE THE DIRECTOR OF ANIMAL INDUSTRY IN THE FORMULATION OF RULES AND REGULATIONS FOR THE IMPLEMENTATION OF THIS ACT.

Section 6. Sub-section 2, 3 and 4 of Section 5 of Republic Act Numbered One thousand five hundred fifty-six are hereby deleted, one sub-section is hereby inserted after sub-section 1 of Section 5 to be known as sub-section 2 and to read as follows:

"[2. Labels of imported feed ingredients intended for sale shall conspicuously and clearly

- (a) Net weight.
- (b) Brand.
- (c) Name of Article.
- (d) Name and address of manufacturer or suppliers.
- (e) Minimum crude protein (except mineral mixture).
- (f) Minimum fat (except mineral mixtures).
- (g) Maximum fiber (except mineral mixtures).
- (h) Registration number of importer.]

"[3. Labels of imported feed mixtures

intended for sale shall show conspicuously and clearly:

- (a) Net weight.
- (b) Brand.
- (c) Name and address of manufacturer.
- (d) Nutritive purpose.
- (e) Minimum crude protein (except mineral mixtures).
- (f) Minimum fat (except mineral mixtures).
- (g) Maximum fiber (except mineral mixtures).
- (h) Maximum moisture.
- (i) Name of all ingredients used.
- (j) Registration number of importers.]

"[4. Label of feed mixtures manufactured locally shall show conspicuously and clearly:

- (a) Net weight.
- (b) Name and address of manufacturer.
- (c) Brand.
- (d) Nutritive purpose.
- (e) Minimum crude protein (except mineral mixtures).
- (f) Maximum fiber (except mineral mixtures).
- (g) Maximum fat (except mineral mixtures).
- (h) Maximum moisture.
- (i) Names of ingredients used in the mixtures.
- (j) Registration number of manufacturer.]

"2. EVERY CONTAINER OF FEED OR FEEDING STUFFS MANUFACTURED, SOLD OR DISTRIBUTED SHALL HAVE AFFIXED THERETO A TAG OR LABEL, IN A CONSPICUOUS PLACE ON THE OUTSIDE THEREOF, CONTAINING A LEGIBLE AND PLAINLY PRINTED STATEMENT CERTIFYING:

- (A) THE NET WEIGHT IN METRIC EQUIVALENT OF THE CONTENTS.
- (B) THE NAME, BRAND OR TRADEMARK AND NUTRITIVE PURPOSE.
- (C) THE NAME AND PRINCIPAL ADDRESS OF THE

MANUFACTURER OR PERSON RESPONSIBLE FOR PLACING THE COMMODITY ON THE MARKET.

(D) THE MINIMUM PERCENT OF CRUDE PROTEIN.

(E) THE MINIMUM PERCENT OF CRUDE FAT.

(F) THE MAXIMUM PERCENT OF CRUDE FIBER.

(G) THE MAXIMUM PERCENT OF ASH.

(H) THE MAXIMUM PERCENT OF MOISTURE.

(I) THE MAXIMUM PERCENT OF MINERAL IT CONTAINS.

(J) IN THE CASE OF MIXED FEEDS CONTAINING MORE THAN 5 PERCENT OF MINERAL INGREDIENTS, THE MAXIMUM PERCENTAGE OF CALCIUM (Ca), OR PHOSPHOROUS (P).

(K) IN THE CASE OF FEEDS OR FEEDING STUFFS INTENDED TO BE USED AS FEED SUPPLEMENTS OR PREMIXES FOR WHICH SPECIAL QUALITIES ARE CLAIMED, SUCH AS VITAMIN, MINERAL, ARSENICAL, SURFACTANT, UNIDENTIFIED GROWTH FACTOR, HORMONE, ANTIBIOTIC AND AMINO ACID CONTENTS, A DEFINITE GUARANTEE RELATIVE TO ITS QUALITY.

(L) THE REGISTRATION NUMBER OF THE PARTICULAR KIND OF FEEDS OR FEEDING STUFFS.

(M) THE ACCEPTED OR OFFICIAL NAME OF EACH INGREDIENT USED IN ITS MANUFACTURE.

(N) THE PERCENT OF SUCH INGREDIENTS AS CORN COBS, OAT HULLS, RICE HULLS, BARLEY HULLS, MONGO BEAN HULLS, COCOA SHELLS OR SIMILAR MATERIALS WHEN SUCH CONSTITUTE A PORTION OF THE FEED OR FEEDSTUFFS IN QUANTITIES IN EXCESS OF WHAT IS NORMALLY FOUND IN SUCH FEEDSTUFFS.

(O) ANY FEEDS OR FEEDING STUFF CONTAINING A SUBSTANCE WHICH IS TOXIC OR

POISONOUS IF CONSUMED IN QUANTITIES GREATER THAN RECOMMENDED BY THE MANUFACTURER SHALL BE SO LABELLED THAT THE USER WILL BE WARNED OF THE TOXIC POISONOUS EFFECTS RESULTING FROM FEEDING SUCH EXCESS QUANTITY.

(P) ANY FEEDS OR FEEDING STUFFS CONTAINING A NON-NUTRITIVE SUBSTANCE WHICH IS INTENDED FOR USE IN THE DIAGNOSIS, CURE, MITIGATION, TREATMENT, OR PREVENTION OF DISEASE OR ANY FUNCTION OF THE ANIMAL BODY, SHALL BE LABELLED TO SHOW THE AMOUNT OF SUCH SUBSTANCE, PRESENT, DIRECTIONS FOR USE, AND ANY NECESSARY WARNING AGAINST MISUSE.

(Q) CONTROL NUMBER, CODE NUMBER OR BATCH NUMBER AND DATE OF MANUFACTURE."

SECTION 7. Sub-sections 5 and 6 of Section 5 of Republic Act Numbered One thousand five hundred fifty-six shall become sub-sections 3 and 4.

SECTION 8. Section 6 of Republic Act numbered One thousand five hundred fifty-six is hereby amended to read, as follows:

SEC. 6. There should be created in the manner authorized by law [an adequate section or division composed of employees taken from the present personnel of the Bureau of Animal Industry as the Director may consider necessary for effectively carrying out the provisions of this Act] A SEPARATE DIVISION, KNOWN AS ANIMAL FEED CONTROL DIVISION, IN THE BUREAU OF ANIMAL INDUSTRY, AND PROVIDING POSITIONS THEREOF, FOR THE PURPOSE OF IMPLEMENTING THIS ACT IN SO FAR AS REGISTRATION, INSPECTION, SAMPLE COLLECT-

ION AND FIELD INVESTIGATIONS ARE CONCERNED.

"THE SUM OF FIVE HUNDRED THOUSAND PESOS IS HEREBY AUTHORIZED TO BE APPROPRIATED, OUT OF ANY FUNDS IN THE NATIONAL TREASURY NOT OTHERWISE APPROPRIATED FOR THE ORGANIZATION AND OPERATION OF THE SAID DIVISION DURING ITS FIRST FISCAL YEAR SUCH SUMS AS MAY BE NECESSARY FOR ITS OPERATION AND MAINTENANCE IN SUBSEQUENT YEARS SHALL BE INCLUDED IN THE ANNUAL GENERAL APPROPRIATIONS ACT."

SECTION 9. Section 7 of Republic Act Numbered One thousand five hundred fifty-six is hereby amended to read as follows:

SEC. 7 THE DIRECTOR AND/OR [an] HIS inspectors shall be permitted at all reasonable times to enter AND INSPECT any premises AND/OR CONVEYANCES in which feeds OR FEED INGREDIENTS are sold, PRODUCED, PROCESSED, TRANSPORTED, or held in possession for sale or DISTRIBUTION, when he has reasonable cause to believe any feed or feeding stuff is being prepared or has been prepared for sale [and may take for analysis samples of any feed of feeding stuff there found without cost.] AND MAY OPEN ANY PACKAGE CONTAINING OR SUPPOSED TO CONTAIN ANY FEED OR FEEDING STUFF, AND TAKE THEREFROM SAMPLES FOR ANALYSIS WITHOUT COST, AND SHALL LIKEWISE BE PERMITTED TO INSPECT ONLY RECORDS OR DOCUMENTS WHICH ARE NECESSARY IN VERIFYING THE VOLUME OF PRODUCTION AND/OR IMPORTATION FOR PROPER ASSESSMENT OF THE INSPECTION FEE AS PROVIDED FOR IN THIS ACT."

Section 10. Section 8 Republic Act Numbered One thousand five hundred fifty-six is hereby amended to read as follows:

SEC. 8. Regulations - The Director,

UPON RECOMMENDATION OF THE ADVISORY COMMITTEE CREATED UNDER SECTION 5 HEREOF AND subject to the approval of the Secretary, shall promulgate rules and regulations:

- "(a) Prescribing the basis under which grains and their by-products may be classified;
- "(b) Providing for the prevention of false and/or misleading claims that may be made for any feeding stuff;
- "(c) Prescribing the definition and uses of such terms as complete ration, concentrate supplement and/or base as used in livestock nutrition [;], DEFICIENT, DAMAGED, ADULTERATED, AND INJURIOUS FEEDS TO LIVESTOCK AND POULTRY AND SUCH OTHER TERMS AS MAY BE NECESSARY IN CLARIFYING THE INTENTION OF THIS ACT;
- "(d) Prescribing PROCEDURES FOR IMPOUNDING; CONDEMNATION, AND disposition of DEFICIENT, damaged, ADULTERATED AND/OR INJURIOUS feed or feeding stuff: [and] PROVIDED, THAT THE DISPOSAL SHALL BE AT THE EXPENSE OF THE MANUFACTURER, IMPORTER, DISTRIBUTOR OR RETAILER CONCERNED;
- "(e) Prescribing methods [of procuring] FOR COLLECTION an analysis of samples [according to accepted standard procedure and such other rules and regulations as may be necessary to carry out the purpose of this Act];
- "(f) REQUIRING THE SERVICES OF LICENSED CHEMIST AND VETERINARIAN OR ANIMAL NUTRITIONIST BY MANUFACTURERS OF MIXED FEEDS IN CONNECTION WITH THE ANALYSIS, TESTS, FORMULATION, COMPOUNDING AND MIXING OF FEED AND FEEDING STUFF AND

TO PRESCRIBE SUCH OTHER RULES AND REGULATIONS AS MAY BE NECESSARY TO CARRY OUT THE PURPOSE OF THIS ACT;

- "(g) PRESCRIBING METHODS OF CHEMICAL AND BIOLOGICAL TESTS FOR DETERMINING THE PURITY AND SAFETY OF FEEDS AND FEEDING STUFFS, AND PRESCRIBING RULES AND REGULATIONS FOR THE SUPERVISION AND CONTROL OF SAID TESTING; AND
- "(h) REQUIRING THE PUBLICATION OF THE RESULTS OF ANALYSIS AND TESTS OF SAMPLES OF FEEDS AND FEEDSTUFFS COLLECTED FROM FEED INGREDIENT SUPPLIERS' AND FEED MANUFACTURERS; SAID PUBLICATION, AT LEAST THREE TIMES IN A CALENDAR YEAR PREFERABLY IN JANUARY, MAY, AND SEPTEMBER, SHOULD SPECIFY BOTH WHICH ARE IN COMPLIANCE AND NOT IN COMPLIANCE WITH THE GUARANTEED ANALYSIS OR QUALITY STANDARD SET FORTH UNDER THE RULES AND REGULATIONS PROMULGATED THEREUNDER."

SECTION 11. Sub-sections (b) and (c) of Section 9 of Republic Act Numbered One thousand five hundred fifty-six are hereby amended to read as follows:

"SEC. 9.

"(b) All fees, charges and other income derived from the operation of this Act, shall accrue to the Philippine Livestock Promotion Fund as provided in Commonwealth Act Numbered One hundred and eighteen, as amended, and shall be deposited with the National Treasury to the credit of the said fund; PROVIDED, HOWEVER, THAT EIGHTY PERCENT OF SAID INCOME SHALL BE SET ASIDE AND SPENT ONLY FOR THE MAINTENANCE AND IMPROVEMENT OF SERVICES AND LABORATORY FA-

CILITIES IN THE BUREAU OF ANIMAL INDUSTRY NEEDED IN THE IMPLEMENTATION OF THIS ACT, AND FOR TRAINING AND RESEARCH DIRECTLY RELEVANT TO THE IMPLEMENTATION OF THIS ACT.

"(c) ALL OTHER expenditures necessary to carry out the purposes of this Act, INCLUDING ALL EXPENDITURES FOR THE ADVISORY COMMITTEE CREATED UNDER SECTION 5 HEREOF, shall be paid from the unallotted balance of the Philippine Livestock Promotion Fund created under Commonwealth Act Numbered One hundred and eighteen, as amended."

SECTION 12. Sub-sections (a) and (b) of Section 10 Republic Act Numbered One thousand five hundred fifty-six are hereby amended to read as follows:

"SEC. 10. Offenses and Penalties. -

(a) It shall be unlawful for any person, partnership, firm, COOPERATIVE, corporation or association to engaged in the manufacture, importation, sale or distribution of feeds or feeding stuff, without having first registered in ACCORDANCE WITH THIS ACT in the Office of the Director of Animal Industry[:Provided, however,] that the provisions of this Act shall not apply to the sale or distribution of the by-products of grain, such as rice bran, rice crush, corn bran and corn crush, which are sold in their natural state as feeding stuff without having been further processed, mixed with other ingredients, or otherwise manufactured into another form).

"(b) Any [person] FIRM, partnership, COOPERATIVE, corporation or association OR ITS PRESIDENT/GENERAL MANAGER OR ANY PERSON which will unlawfully use a registration number, fraudulently lessen or adulterate the feeding value of any feed or feeding stuff, or tamper with packaged feeds for fraudulent purposes willfully remove, alter or efface the prescribed tags, labels, markings, or other information placed on packages of feeds or feeding stuffs, fraudulently alter or use certificates of analysis of any official analyst; willfully obstruct, hinder, resist or any other way oppose [an inspector] THE DI-



RECTOR OR HIS DULY AUTHORIZED REPRESENTATIVE in the execution of his duties under this Act; make unauthorized disposition of feeds placed under detention; imports, manufacture, distribute, advertise, sell or offer for sale or possess for sale any feed which does not conform with or contravenes the provisions of this Act; or otherwise violate any provision of this Act and the rules and regulations issued thereunder, shall be punished by a fine of not less than one thousand pesos [and not more than five thousand pesos] or by imprisonment of not more than one year and one day, or by both, in the discretion of the court **ASIDE FROM THE FINE IMPOSED BY THE COURT.**"

SECTION 13. SHOULD ANY PROVISION OR PROVISIONS OF THIS ACT THE DECLARED UNCONSTITUTIONAL, THE REST OF THE PROVISIONS SHALL NOT BE AFFECTED HEREBY.

SECTION 14. This Act shall take effect upon its approval.

The President of the Philippines issued Letter of Instruction No. 16, dated October 1, 1972, instructing the Secretary of Agriculture and Natural Resources, the Secretary of National Defense, the local government officials and the Price Control Council to implement strictly the provisions of this Decree on the orderly marketing of livestock and animal feeds.

### C. The Livestock and Poultry Feeds Regulations

Republic of the Philippines  
Ministry of Agriculture  
BUREAU OF ANIMAL INDUSTRY  
Metro Manila

September 23, 1975

ANIMAL INDUSTRY  
ADMINISTRATIVE ORDER  
NO. 35

SUBJECT: *Rules and Regulations Governing the Manufacture, Importation, Labeling, Advertising, Distribution and Sale of Livestock and Poultry Feeds and Feeds Stuffs.*

Pursuant to the provisions of Republic Act No. 1556, as amended by Presidential Decree No. 7, the following rules and regulations governing the manufacture, importation, labeling, advertising, distribution and sale of livestock and poultry

feeds are hereby promulgated for the information and guidance of all concerned:

#### ARTICLE I -- TITLE

Section 1. - This Order shall be known as the Livestock and Poultry Feeds Regulations.

#### ARTICLE II -- DEFINITIONS

Section 2. - For purposes of these regulations, the following words or terms shall mean:

1. *Act* - refers to Republic Act No. 1556, as amended by Presidential Decree No. 7.
2. *Adulterated feeds* - are mixed feeds, feedstuffs or ingredients found to contain any material that may be injurious, damaged or of no food value or if any substance has been added thereto that may increase its bulk or weight and/or may reduce its quality or strength. For purposes of this Order, a mixture of two or more mixed feeds of different formula or brand with intent to sell is also considered adulterated feeds.
3. *Analyst* - any official analyst appointed or designated as such by the Director of Animal Industry for the purposes of implementing this Act.
4. *Animal Nutritionist* - any person who has at least a scholastic credit of nine units in animal nutrition from a duly recognized educational institution and five (5) years experience in compounding animal feeds in a duly registered feed mill, or one who has a degree in animal science major in animal nutrition.
5. *Association, duly recognized* - any association of persons engaged in the development of livestock industry, either as animal raisers or animal feed manufacturers which has been extended recognition by the Bureau.
6. *Base* - refers to the main or chief ingredients (quantitatively) in a mixture.
7. *Brand* - means any distinctive mark or name applied to feed or feeding stuff.
8. *Commercial feed or feeding stuff* - refers to feed or feeding stuff intended for sale whether to the general public or to a limited clientele.
9. *Complete feed* - a mixture of feed ingredients by specific formula to be fed as the sole ration and is ca-

pable to furnish the nutritive requirements to maintain life for promoting production without any additional substance except water.

10. *Concentrates* - shall apply to feedstuffs low in fiber and high in total digestible nutrients.
  - a) *Concentrates, mixed* - these are mixed feed ingredients containing a high amount of protein, vitamins and minerals intended to be used as a complete feed after the addition of cereal grains and their by-products.
  - b) *Concentrates, simple* - these are single feed ingredients containing at least 60% total digestible nutrients, such as fish meal, soybean oil meal, etc and intended to be further diluted and mixed with other ingredients to produce a supplement or a complete feed.
11. *Custom mixed feeds* - are commercial feeds mixed in accordance with the specifications of the final buyer or consumer.
12. *Damaged feeds* - any feed or feedstuff which has been subjected to any factor that has decreased the nutritive value of any feed or feedstuff which when fed to livestock may be injurious to the health of the animals.
13. *Dealer* - any person engaged in the business of buying and selling to any person other than the end-user.
14. *Director* - means the Director of Animal Industry and Bureau refers to the Bureau of Animal Industry.
15. *Distributor* - an agent of the manufacturer for the purpose of marketing finished products.
16. *Feed or feeding stuff* - shall embrace all such articles to be used as feeds purporting to supply proteins, carbohydrates, fats; minerals, vitamins, antibiotics, growth promoting factors whether identified or unidentified and/or correcting nutritional disorders. Such articles may be locally produced or imported, mixed or in the form of simple ingredients; Provided, however, that the following are excluded:
  - (1) Whole seeds or grains, unmixed.
  - (2) Fresh green roughage and unprocessed liquid milk in all its forms.

- (3) Dried and ground hays and straws, dried and ground corn stalks or other parts of the corn plant not included in the grains, rice hulls, cane sugar bagasse, dried beet pulp, oat hulls, barley hulls, clipped oat by-products, sorghum plant by-products and flax plant by-products, cotton seed hulls, mongo bean hulls, buckwheat hulls, cocoa shells, or other materials of a similar character.
17. *Importer* - a person who imports feed or feedstuff from any point outside of the Philippines.
18. *Indenter* - a person who makes an order for another for the importation of feed or feedstuff.
19. *Ingredient* - means any single article of feed or feeding stuff which enters into the composition of a ration, concentrate, or supplement.
20. *Inspector* - any person authorized by the Director of Animal Industry to enforce the provisions of the Act and the regulations provided for in this Order.
21. *Label* - means any written, printed or graphic matter attached or affixed to any package, bale or bundle of feeds.
22. *Licensed Chemist* - any person licensed to practice the Science of Chemistry by the Board of Chemist of the Philippines.
23. *Livestock* - include all domestic animals with economic value. For this purpose, poultry is included in the term livestock.
24. *Manufacturer* - any person who mixes feed ingredients into complete feed and/or processes feed ingredients, for sale.
25. *Manufacturer of non-commercial feeds* - any person who mixes feed ingredients into complete feed and/or processes feed ingredients solely for personal consumption of his or his immediate family's livestock.
26. *Mixture* - means any combination of two or more feed ingredients used in the manufacture of feeding stuff.
27. *Non-commercial feed or feeding stuff* - any feed or feeding stuff not intended for sale.
28. *Owner* - is the person, firm, partnership, cooperative, association, or corporation applying for the required registration under this Act or any person or establishment actually engaged in the manufacture, importation, distribution and sale of livestock and poultry feeds.
29. *Package* - means sack, bag, barrel, bin or any other container for feeds.
30. *Person* - refers to natural or juridical person in the singular or plural.
31. *Regulation* - refers to this Order and such other Orders issued by the Bureau of Animal Industry to implement the provisions of R. A. 1556, as amended.
32. *Retailer* - any person engaged in the business of selling feeds or feedstuffs to end-users.
33. *Roughages* - shall include dried and ground hays and straws, dried and ground corn stalks or other parts of the corn plant not included in the grain, dried beet pulp, oat hulls, barley hulls, clipped oat by-products, sorghum plant by-products and flax plant by-products, cotton seed hulls, buckwheat hulls, cocoa shells, grain screening, coffee ground or other materials of a similar character. This shall not include adulterated feed.
34. *Secretary* - means the Secretary of Agriculture and Department refers to the Department of Agriculture.
35. *Small Feed Miller* - any person engaged in the manufacture of animal feeds with a daily production of not more than twenty (20) metric tons.
36. *Supplement* - is a feed ingredient or mixture of feed ingredients intended to supply the deficiencies in a ration or improve the nutritive balance or performance of the total mixture.
37. *Supplier* - any person who supplies feed or feed ingredients with an average gross sale of P1,000.00 per day.
38. *Veterinarian* - any person authorized to practice veterinary medicine by the Board of Veterinary Medicine.

### ARTICLE III - REGISTRATION

Section 3 - Any person desiring to engage in the manufacture, importation, sale or distribution of feeds or feeding

stuffs shall first be registered with the Bureau.

Section 4 - All application for registration for the manufacture, importation, sale or distribution of livestock feeds shall be made in writing and under oath and shall be accomplished in forms provided by the Bureau. Said application shall be signed by the applicant himself, in case of natural persons, or by a partner or manager in case of juridical persons and shall distinctly indicate the kind or nature of feeds or feedstuffs to be manufactured, imported, sold or distributed, the brand name, and in the case of retailer, the number of stores and the locations thereof; and finally, in the case of manufactures, the number of factories and the locations thereof. The application shall be accompanied with a sample of the labels or tags which the manufacturer will use on the feed or feeding stuff manufactured and any subsequent changes therein shall be registered with the Bureau without additional cost.

Section 5. - Upon verification and approval of the application and payment of corresponding registration fee, a certificate of registration will be issued by the Director in the form adopted for the purpose, which shall be placed conspicuously in a place of business and readily visible to the public.

Section 6. - Registration shall automatically expire every end of the calendar year and may be renewed annually thereafter in accordance with the provisions of this Order.

Section 7. - There shall be a separate registration for feed ingredient manufacturers, feed importers, feed indentors, distributors, suppliers, and retailers. Registration shall not be transferable to any person and shall not apply to any location other than that specified in the certificate of registration.

Section 8. - Feed and feed ingredient manufacturer and/or importer who maintain retail establishments other than their main place of business shall pay both manufacturers' and/or importers' and retailers' fee.

### ARTICLE IV - QUALITY CONTROL SERVICE

Section 9. - All persons engaged or desiring to engage in the manufacture of mixed feeds for commercial purposes, shall establish and maintain a quality control laboratory and shall retain the services

of licensed chemist and a veterinarian or a licensed chemist and an animal nutritionist to be responsible for the analysis and test of mixed feeds before they are released for sale to determine their conformity with the feed formula of the particular feed and feeding stuff.

Section 10. - It shall be mandatory to all persons engaged in the manufacture of feeds for poultry and swine for commercial purposes to maintain livestock to be fed with its manufactured feeds for experimental purposes. The number of said experimental animals shall not be less than the following:

Poultry - 50 for broilers, 50 day-old pullets, 50 growers, and 50 layers

Swine - 5 piglets, 15 growers, 5 breeding gilts and sows and 5 finishers

Provided that, only the class of animals which are the object of the particular kind of feed produced need be maintained.

Section 11. - Two or more small feed millers may agree among themselves to establish and maintain a common quality control laboratory and retain the services of a common personnel thereafter and such shall be considered sufficient compliance to the provisions of Section 8 hereof; Provided, that in lieu of the above, any small feed miller may attach and avail itself of the laboratory services of any recognized college/institute/university offering its laboratory for feed quality control services.

#### ARTICLE V - LABELING

Section 12. - All containers of feed and/or feeding stuff offered for sale shall bear a complete label as required by Section 5 of Republic Act 1556, as amended by P.D. 7.

Section 13. - Each label shall be printed in English, must be legible, clear and distinct in its meaning. Brand names of feeds must be printed in larger sized type than that of the ingredients. Labels must be attached to the package, printed or affixed on one side of the container in such a way that the whole content of the label can be read without detaching it. The standard name of the feed must likewise be clearly printed.

Section 14. - Custom mixed feed must be accompanied by an invoice issued to the consumer-buyer showing total weight of feed ingredients used, name of the con-

sumer-buyer, date and name, address and registration number of the manufacturer in lieu of the tag or label.

Section 15. - The guaranteed analysis specified in the label shall conform to the actual calculated nutrient contents of feed and any changes in the said analysis shall be made known in writing to the Director of Animal Industry before such changes are made.

Section 16. - The minimum percentage of crude protein shall form part of the brand name or all high protein mixed concentrates.

Section 17. - In the case of mineral feeds or mixed feeds containing more than a total of five per cent of one or more added mineral ingredients, the minimum and maximum percentages of calcium (Ca), the minimum percentage of phosphorus (P) and Iodine (I), and the maximum percentage of salt (NaCl) must be declared; *Provided, that* if no nutritional properties other than those of a mineral nature be claimed for mineral feed product, the percentage of crude protein, crude fat, and crude fiber may be omitted.

Section 18. - Feeds containing drug or drug ingredients for the prevention of diseases of livestock should be labeled to show:

(a) The name and percentage of drug used;

(b) Directions for use;

(c) Warning against use under those conditions in which its use may be dangerous to the health of livestock and man.

Section 19. - Net weight - label on each container must show the net weight in kilograms of the feed and/or feeding stuff in the container. Such statements as "45 kilos gross" or "45 kilos when packed", etc. are prohibited. Each bag of mixed feeds/feeding stuff for commercial purposes shall have a net weight of either 10, 25, 40 or 50 kilograms.

Section 20. - Misleading advertisement. Labels of containers of feeds and/or feeding stuff must not contain any form of advertisement and/or claims that are false and misleading. Any advertisement con-

taining any claim that the feed is suited for all purposes shall be considered a misleading advertisement under this Order.

Section 21. - The use of urea in mixing feeds or the sale of mixed feeds, feedstuffs and ingredients, containing urea is prohibited except for mixed feeds for ruminants, the amount of which should appear in the label.

#### ARTICLE VI - CLASSIFICATION

Section 22. - By-products of grains shall be classified as follows:

##### 1. Rice by-products:

a. *Rice polish* is the finely powdered material obtained in polishing rice kernels. It shall have the following analysis:

Crude Protein . . . . . 12.0% min.  
Fat . . . . . 15.0% min.  
Fiber . . . . . 6.0% max.  
Moisture . . . . . 13.0% max.

b. *Rice bran* is the pericarp or bran layer of rice, with only such quantity of hull fragments as is unavoidable in the regular milling of rice:

Cone: D1 - First class or fine rice bran.

Crude Protein . . . . . 11.0% min.  
Fat . . . . . 12.0% min.  
Fiber . . . . . 7.0% max.  
Moisture . . . . . 13.0% max.

D1 - Second class or coarse rice bran.

Crude Protein . . . . . 8.0% min.  
Fat . . . . . 4.0% min.  
Fiber . . . . . 18.0% max.  
Moisture . . . . . 13.0% max.

##### Kisks:

Crude Protein . . . . . 4.0% min.  
Fat . . . . . 2.0% min.  
Fiber . . . . . 30.0% max.  
Moisture . . . . . 13.0% max.

##### 2. Corn by-products:

a. *Corn bran* is the outer coating of the corn kernel, with little or none of the starchy part of the germ. It shall have the following analysis:

Crude Protein . . . . . 10% min.  
Fat . . . . . 5% min.  
Fiber . . . . . 8% max.  
Moisture . . . . . 13% max.

b. *Corn grits* are hard, flinty portions of sound corn, with little or none of the bran or germ. These broken small particles are separated from the rest by screens of different gauges. Thus these grits are of three sizes -- fine (no. 22), intermediate (no. 16) and coarse (no. 14). They shall have the following analysis:

Crude Protein . . . . . 7.0% min.  
 Fat . . . . . 0.5% min.  
 Fiber . . . . . 2.0% max.  
 Moisture . . . . . 13.0% max.

c. *Corn gluten meal* - That part of commercial shelled corn that remains after the extraction of the larger part of the starch and germ, and the separation of the bran by the processes employed in the wet milling manufacture of corn starch or syrup. It may or may not contain either corn solubles or corn oil meal.

Crude Protein . . . . . 42.0% min.  
 Fat . . . . . 1.5% min.  
 Fiber . . . . . 4.5% max.  
 Moisture . . . . . 13.0% max.

d. *Corn gluten feed* - That part of commercial shelled corn that remains after the extraction of the larger part of the starch and germ by the processes employed in the wet milling manufacture of corn starch or corn syrup. It may or may not contain either corn solubles or corn oil meal.

Crude Protein . . . . . 20% min.  
 Fat . . . . . 2% min.  
 Fiber . . . . . 8% max.  
 Moisture . . . . . 13% max.

e. *Corn germ meal* - This is ground corn germ cake (the residual product after extraction of oil from corn germ with other parts of the corn kernel) as separated in the dry milling process of manufacture of corn meal, corn grits, hominy feed, and other corn by-products.

Crude Protein . . . . . 14% min.  
 Fat . . . . . 10% min.  
 Fiber . . . . . 9% max.  
 Moisture . . . . . 13% max.

3. *Wheat by-products:*

a. *Wheat pollard* is that portion of the

wheat bran between the skin or the bran and the white interior (source of white flour). It shall have the following analysis:

Soft:  
 Crude Protein . . . . . 12% min.  
 Fat . . . . . 4% min.  
 Fiber . . . . . 8% max.  
 Moisture . . . . . 13% max.

Hard:  
 Crude Protein . . . . . 16% min.  
 Fat . . . . . 3% min.  
 Fiber . . . . . 8% max.  
 Moisture . . . . . 13% max.

ARTICLE VII - METHODS OF ANALYSIS

Section 23. - The methods of analysis as published in the official methods of Analysis of the Association of Official Agricultural Chemists, latest edition, shall be adopted in making analysis.

ARTICLE VIII - PUBLICATION

Section 24. - Results of analysis and test of samples of feeds and feedstuffs collected from feed ingredient suppliers and feed manufacturers shall be published quarterly by the Bureau or as often as may be considered necessary, in which shall be specified the feeds and feedstuffs, the name of manufacturers and suppliers, the date of analysis and the result thereof.

ARTICLE IX - SAMPLING

Section 25. - The following methods of obtaining samples by feed inspectors shall be adopted:

A. The Director of Animal Industry or his authorized agent, representative, or inspector shall be permitted at all reasonable time to enter and inspect any premises or conveyances in which feeds or feed ingredients are sold, produced, processed, transported or held in possession for sale or distribution when he has reasonable cause to believe that any feed or feeding stuff is being prepared or has been prepared for sale and may open any package containing or supposed to contain any feed or feeding and take therefrom for analysis samples of any feed or feeding

stuff there found without cost. He shall likewise be permitted to inspect only records or documents which are necessary in verifying the volume of production and/or importation for proper assessment of the inspection fee as provided for in Republic Act No. 1556, as amended.

B. Duplicate samples of a total of not less than ¼ kilo and not more than ½ kilo may be taken from random sampled unopened bags.

C. Each sample must be properly labeled according to the tag attached to the feed containers where it was taken. Then each sample shall be sealed, signed and dated by the inspector in the presence of one of the manufacturer's/dealer's and/or importer's representative who shall also be requested to sign. One of the samples shall be taken to the Bureau of Animal Industry for appropriate analysis, and the other sample given to the manufacturer, owner, processor and/or importer.

D. Results of analysis will be recorded in the Bureau files and may be published in accordance with the provisions of this Order.

ARTICLE X - PAYMENT OF FEES

Section 26. - Any person applying for registration under the Act shall pay a registration fee of:

- a. For manufacturer of feed or feed-stuff, P300.00
- b. For manufacturer of non-commercial feed, free
- c. For importer or indenter, P200.00
- d. For supplier, P100.00
- e. For distributor, P50.00
- f. For retailer, P5.00 per store

Section 27. - Inspection fees of P0.20 per metric ton shall be levied on all feed ingredients, mixed feeds, supplement and/or concentrates that are manufactured locally or imported from abroad.

Section 28. - Inspection fees should be paid monthly on the basis of total feeds or feedstuffs manufactured or imported provided that the manufacturer or importer shall show to the inspector upon re-

quest all records of production or importation for the months in question. Part or fractions of one ton shall be considered as one ton.

Section 29. - The inspection fee shall be paid monthly to the Cashier of the Bureau of Animal Industry or his duly authorized representative directly. Payments of inspection fees shall be accompanied, showing the following:

- a. Name of manufacturer or importer
- b. Address
- c. Date
- d. Kinds of feeds manufactured or imported
- e. Total weight (metric ton) of each kind of feed manufactured and/or imported.

Section 30. - Surcharges - Fees imposed by the preceding sections which are not paid on the dates they are due shall be levied an additional charge in accordance with the following rates:

- Within fifteen (15) days after due date - 25% of the amount due.  
Over fifteen (15) days but not more than thirty (30) days after due date - 50% of the amount due.  
Over thirty (30) days but not more than forty-five (45) days after due date - 75% of the amount due.  
Over forty-five (45) days - 100% of the amount due.

Provided, that the surcharges herein provided shall be without prejudice to whatever other legal remedies or actions which the government may take for the protection of its rights and interests.

#### ARTICLE XI - PROHIBITIONS

Section 31. - Damaged and adulterated feed and feedstuff shall not be sold or offered for sale. For the purposes of this Order, the addition of ground rice hull to rice bran is expressly prohibited.

Section 32. - No custom mixed feed shall be sold in the open market.

Section 33. - Containers which have been previously used for things or objects harmful to animals shall not be used as containers for feed or feedstuffs. Feeds or feedstuffs found in said containers shall

be considered damaged for purposes of this Order.

#### ARTICLE XII - DAMAGED AND ADULTERATED FEED DISPOSITION

Section 34. - The Director may order the disposition and condemnation of feed and feeding stuff found to be damaged or adulterated under his direct supervision or he may order the disposition, under his supervision, of the damaged and/or adulterated feed and feeding stuff by the manufacturer, importer or any other person in possession thereof without prejudice to the cancellation of the registration of the person responsible for the damage or adulteration.

Section 35. - The Director, upon recommendation of the Animal Feed Control Advisory Committee and with the approval of the Secretary, may order, in lieu of the disposition provided in the preceding section, the sale subject to conditions he may impose of the said damaged or adulterated feeds of some other economic value other than as animal feed, in which event the proceeds thereof shall accrue to the fund established under the Act.

#### ARTICLE XIII - OFFENSES AND PENALTIES

Section 36. - (a) It shall be unlawful for any person, partnership, firm, cooperative, corporation or association to engage in the manufacture, importation, sale or distribution of feeds or feeding stuff, without having first registered in accordance with this Act in the Office of the Director of Animal Industry. (b) Any firm, partnership, cooperative, corporation or association or its president/general manager or any person which will unlawfully use a registration number, fraudulently lessen or adulterate the feeding value of any feed or feeding stuff, or tamper with packaged feeds for fraudulent purposes willfully remove, alter or efface the prescribed tags, labels, markings, or other information placed on packages of feeds or feeding stuffs, fraudulently alter or use certificates of analysis of any official analyst; willfully obstruct, hinder, resist or in any other way oppose the Director or his duly authorized representative in the execution of his duties under this

Act; make unauthorized disposition of feeds placed under detention; imports, manufacture, distribute, advertise, sell or offer for sale or possess for sale any feed which does not conform with or contravenes the provisions of this Act; or otherwise violate any provision of this Act and the rules and regulations issued thereunder, shall be punished by a fine of not less than One thousand pesos or by imprisonment of not more than one year and one day, or by both, at the discretion of the court.

#### ARTICLE XIV - REPEALING CLAUSE

Section 37. - This Order revokes Animal Industry Administrative Order No. 16 and shall revoke, amend and/or supercede such other orders, memoranda, rules and regulations which are inconsistent herewith.

#### ARTICLE XV - SEPARABILITY CLAUSE

Section 38. - Any section or portion of this Order which may hereafter be declared unconstitutional shall not affect the constitutionality or validity of any other portion of this Order.

#### ARTICLE XVI - EFFECTIVITY

Section 39. - This Order shall take effect six months after publication in the Official Gazette or in a newspaper of general circulation except the provisions of Articles II, III, IX, XI, XII and XIII which shall take effect one month after said publication. (Published in the Philippines *(Daily Express on November 26, 1975)*.)

SO ORDERED.

(SGD.) SALVADOR H. ESCUDERO III  
Director

RECOMMENDED BY:

THE ANIMAL FEED CONTROL  
ADVISORY COMMITTEE

By:

(SGD.) GERONIMO DELA CERNA  
Chairman

APPROVED:

(SGD.) ARTURO R. TANCO, JR.  
Secretary of Agriculture

D. Nutrient Standards of Commercial Mixed Feeds.

Republic of the Philippines  
Department of Agriculture  
OFFICE OF THE SECRETARY  
Diliman, Quezon City

1975-10-13

Animal Industry  
General Memorandum  
Order No. 1  
Series of 1975

SUBJECT: *Nutrient Standards for Poultry and Livestock Feeds*

Pursuant to the provisions of R.A. 1556, as amended by Presidential Decree No. 7 dated September 30, 1972, and upon recommendation of the Animal Feed Control Advisory Committee, the nutrient standards for poultry feeds, swine feeds, bovine and bubaline feeds and equine feeds approved by the Animal Feed Advisory in its Resolution No. 1 dated April 29, 1975, are hereby promulgated for the information and guidance of all concerned.

(Sgd.) ARTURO R. TANCO, JR.  
Secretary

RECOMMENDED BY:

(Sgd.) SALVADOR H. ESCUDERO III

NUTRIENT STANDARDS FOR POULTRY FEEDS

KINDS OF FEED	Crude Protein	Crude Fiber %	Crude Fat %	Moisture %	Ash %	Mineral %		
	NLT	NMT	NLT	NMT	NMT	NMT		
<b>For Broilers (Meat-type chickens)</b>								
Broilers Starter Mash/Crumble/Pellet	21	8	4	13	To be supplied by the feed manufacturer	If more than 5% the maximum percentage of calcium (Ca) or phosphorus (P) shall be indicated.		
Broiler Finisher Mash/Crumble/Pellet	18	9	4	13				
<b>For Egg-type Chickens:</b>								
Chick Starter Mash/Crumble/Pellet *	19	8	4	13				
Chicken Grower Mash/Crumble/Pellet	16	10	4	13				
Chicken Layer Mash/Crumble/Pellet No. 1	18	10	4	13				
Chicken Layer Mash/Crumble/Pellet No. 2	16	10	4	13				
Pigeon Feeds Pellet	18	10	4	13				
<b>For Turkeys:</b>								
Turkey Starter Mash/Crumble/Pellet	28	8	4	13				
Turkey Grower Mash/Crumble/Pellet No. 1	20	10	4	13				
Turkey Grower Mash/Crumble/Pellet No. 2	16	10	4	13				
Turkey Breeding Mash/Crumble/Pellet	15	10	4	13				
<b>For Ducks:</b>								
Duck Starter Mash/Crumble/Pellet	19	8	4	13				
Duck Grower Mash/Crumble/Pellet	16	10	4	13				
Duck Layer Breeder Mash/Crumble/Pellet	16	10	4	13				
Duck Finisher/Crumble/Pellet	16	10	4	13				

\*For both broilers breeders and egg-type chickens

### NUTRIENT STANDARDS FOR SWINE FEEDS

KINDS OF FEEDS	Crude Protein %	Crude Fiber %	Crude Fat %	Moisture %	Ash %	Mineral %
	NLT	NMT	NLT	NMT	NMT	NMT
Hog Pre-Starter Mash/Crumble/Pellet	22	5	4	13	To be supplied by the feed manufacturer.	If more than 5% the maximum percentage of calcium (Ca) or phosphorus (P) shall be indicated.
Hog Starter Mash/Crumble/Pellet	18	8	4	13		
Hog Grower Mash/Crumble/Pellet	16	10	4	13		
Hog Breeder Mash/Crumble/Pellet	14	12	4	13		
Hog Lactating Mash/Crumble/Pellet	15	10	4	13		
Hog Fattener finisher Mash/Crumble/Pellet	13	10	4	13		

### NUTRIENT STANDARDS FOR BOVINE AND BUBALINE FEEDS

(Cattle - Buffalo - Carabao)

KINDS OF FEEDS	Crude Protein %	Crude Fiber %	Crude Fat %	Moisture %	Ash %	Mineral %
	NLT	NMT	NLT	NMT	NMT	NMT
Milk Replacer	20	6	4	13	To be supplied by the feed manufacturer	If more than 5% the maximum percentage of calcium (Ca) or phosphorus (P) shall be indicated
Calf Starter Mash/Crumble/Pellet	18	6	4	13		
Dairy Concentrate Mash/Crumble/Pellet	16	—	4	13		
Beef Concentrate Mash/Crumble/Pellet	13	—	4	13		

### NUTRIENT STANDARDS FOR EQUINE FEEDS

KINDS OF FEEDS	Crude Protein %	Crude Fiber %	Crude Fat %	Moisture %	Ash %	Mineral %
	NLT	NMT	NLT	NMT	NMT	NMT
Race Horse Feed Mash/Crumble/Pellet	13	—	4	13	To be supplied by the feed manufacturer.	If more than 5% the maximum percentage of calcium (Ca) or phosphorus (P) shall be indicated.
Draft Horse Feed Mash/Crumble/Pellet	13	—	4	13		
Range Horse Feed Mash/Crumble/Pellet	13	—	4	13		

LEGEND: NLT – Not Less Than  
NMT – Not More Than

## Appendix 4. Methods of Test & Analysis for Mixed Feeds & Feed Ingredients

1. PHYSICAL METHODS – Certain physical characteristics of mixed feeds and feed ingredients can be evaluated to determine their quality at time of receipt with a minimum of facilities and expenses. Physical characteristics such as shape, color, odor, softness, hardness, particle size, flowability and general uniformity are readily detected by physical methods. Determination of the quality of feed ingredients can be done in five ways:

A. ORGANOLEPTIC – involves the observation made with one or more of the organs of special senses.

The characteristics that can be detected by organoleptic method are:

COLOR – typical, bright uniform color.

ODOR – clean, characteristic smell.

MOISTURE – free-flowing, non-sticking, no wet spots.

TEMPERATURE – no evidence of heating.

TEXTURE – reasonable particle size for the product.

UNIFORMITY – consistent in color, texture and overall appearance.

Absence of dirt, molds, sticks, metal objects, sand, gravel and other foreign materials.

No evidence of bird, rodent or insect contamination.

B. MICROSCOPIC EVALUATION (Feed Microscopy) – makes use of a hand lens or microscope which serves as an excellent tool for detecting off-quality feed ingredients or finished feeds.

This technique is a good example of a quick test which costs nothing except the time and effort of an experienced person. It does not require

extended formal training on the part of the analyst. One with a minimum amount of the part of the analyst. One with a minimum amount of training as a feed microscopist can develop through experience and practice the expertise to evaluate the physical characteristics of ingredients and determine percentage of each within limits.

The equipment and instruments required for feed microscopy are simple and need not be expensive – usually an excellent low power stereo-microscope, illuminator, sieves, twizzer or forceps, probe or needle, and spot plates.

This test is done by placing sufficient amount of the sample on the spot plates and then observed under the stereomicroscope. Searching through a sample under the microscope is made easier by starting at one edge and working across, raking the examined material away from the unexamined with a dissecting needle or probe. The shape, color, and appearance of the ingredients in the sample are observed and presence or absence of adulterants is noted. If the material being examined is a mixed feed, a list of the ingredients should be kept at hand and each ingredient checked off as it is found.

Feed microscopy would determine whether additional laboratory tests should be conducted.

C. SPOT TESTS – for identification of feed ingredients such as minerals (both macro and micro), vitamins, drugs and antibiotics. This system is particularly helpful for feed microscopists to confirm the presence of a medicament

(usually drug) declared as an ingredient in a registered medicated feed.

By means of a stereoscope, this test is done by means of observing the color developed at the pinpoint reaction sight when fine feed particles come in contact with the reagent surfaces. The pattern of the reaction is noted and compared to those in a table which is used as a guideline to distinguish various characteristic shades of color.

D. FLOTATION TECHNIQUE –

involves the separation of the different particles or ingredients in a pulverized feed sample according to their relative capacity for floating on a given liquid.

This technique is ideal for feed separation, identification of a specific feed, mixing times and detecting separation of materials of different densities.

The procedures employed in flotation technique are as follows:

1. Weigh 10 grams of sample on a triple beam balance and place in a coors O evaporating dish.

2. Add carbon tetrachloride until the dish is almost full.

3. Stir the surface and let stand to allow the heavy particles to settle.

4. Decant the floating material and most of the carbon tetrachloride into a 100 ml. beaker, taking care not to disturb the settled portion. Some rinsing is usually necessary.

5. Add petroleum ether (Skellysolve B or F may be used) to the beaker in about 5 ml. increments, stirring and allowing separation after each addition, until the desired separation is obtained.

Note: Sometimes the sample will separate into three fractions. In this case, add Skellysolve until only one fraction is floating.



6. Decant this onto a cheesecloth filter and then add carbon tetrachloride to the solution remaining in the beaker until it separates into two fractions.

7. Decant the floating fraction onto a cheesecloth filter and then pour the settled fraction onto another cheesecloth filter.

8. Allow all fractions to dry and then weigh them back onto an examining board on which some of the whole sample has been placed.

E. QUANTAT — test for determining the presence and quantity of specific materials. This particular test can determine the amount of chloride from 0.001 to 20 per cent in the sample which can be readily converted to per cent salt in the diet.

11. CHEMICAL METHODS — involve the use of chemicals in determining the quality of samples. Analysis is done in the laboratory strictly following established chemical procedures.

PROXIMATE ANALYSIS OR WEENDE ANALYSIS — it is considered as the most primitive and historical measurement of quality among feed ingredients.

Although proximate analysis does not define the nutrient content of feeds, it is widely used as an index of nutritive value because the fractions that it determines are correlated with some of the properties of feeds that have nutritional significance.

The information it gives may often be of uncertain nutritional significance or may even be misleading so it is important therefore, that some details on the nature, peculiarities and limitations of the proximate analysis as a description of the nutritional properties of feedstuffs be considered.

A feed ingredient is analyzed into six fractions namely: moisture, crude fiber (CF), ether extract (EE) or crude fat, crude protein (CP), ash, and nitrogen-free-extract (NFE).

Except water, each of the components represents a combination of substances, some of which are of nutritional value to

the animal and some of which are not of nutritional value at all.

#### 1. CRUDE PROTEIN (CP)

Crude protein includes the true proteins and all other nitrogenous compounds in feeds. It is obtained by multiplying the nitrogen (N) content of the feed by 6.25. Crude protein determination is based on the fact that most nitrogen containing materials in most feeds are proteins, and proteins on the average are approximately 16 per cent nitrogen.

Protein so determined in the analysis is referred to as crude protein since it may contain amounts of certain ammoniacal nitrogen-containing materials which are not true protein such as amino acids, enzymes, certain vitamins, urea, etc. Such materials are referred to as nonproteins or amids. They are usually present in natural feedstuffs, however, only in very small amounts and so do not ordinarily involve a sizeable error in the analysis.

Since proteins are being continually used by poultry and livestock either to build new tissues as in growth and production or repair of worn out tissues, a fairly regular intake of protein is required. If adequate protein is not present in the diet, a quick reduction or cessation of growth or loss of weight results.

With poultry, protein quality is very important, and that means the amino acid content. The necessary amino acids must be adequately supplied since poultry have no "fermentation vat" where to make and remake amino acids.

The amounts of protein as well as its quality are very important factors in poultry and swine feeding. The quality of protein is determined by the balance of amino acids in the ration. Animal proteins are the high-quality proteins. They contain needed amino acids in proper amounts and proper ratio. Grains also contain protein, but it is protein that is of rather poor quality because it lacks essential amino acids. The only plant protein that compares with animal proteins in quality is soybean meal. It is low in methionine, but it will adequately supplement grains. Soybean meal is much lower than animal proteins in calcium and phosphorus and it lacks vitamin B<sub>12</sub> activity. These deficiencies must be corrected

when soybean meal replaces animal protein in the diet.

Various kinds and classes of poultry and swine require different levels of protein. The amino acid requirements, likewise, vary according to the kinds and classes of poultry and swine to be fed. By knowing the protein content of a feed, one can get an idea of the class of feed to which it must belong.

Pure amino acids will be available in the future. At present, only methionine and lysine are in a competitive price range with natural proteins. Further research is needed to establish the proper balance or ratio of amino acids in the diet. Excess levels of protein in the diet are just utilized as a source of energy, usually at a greater cost than from carbohydrates or fats.

The protein content of a feed is also an indirect measure of its digestible energy since protein component of feeds is usually digested as compared with the coarser carbohydrates. Forages with high protein content are more digestible than those with lower protein content because high protein forages have correspondingly lower crude fiber than those with high fiber content and a lower protein content.

#### METHOD OF ANALYSIS FOR CRUDE PROTEIN:

##### REAGENTS:

1. Sulfuric acid ( $H_2SO_4$ ) — 93-98 per cent  $H_2SO_4$ , N-free.
2. Mercuric oxide ( $HgO$ ) or metallic mercury ( $Hg$ ) — reagent grade, N-free.
3. Potassium sulfate (or anhydrous sodium sulfate) — reagent grade, N-free.
4. Salicylic acid — reagent grade, N-free.
5. Sulfide or thiosulfate solution — dissolve 40 grams of commercial potassium sulfide ( $K_2S$ ) in liter of water. (Solution of 40 grams sodium sulfide ( $Na_2S$ ) or 80 grams sodium thiosulfate 5-hydrate ( $Na_2S_2O_3 \cdot 5H_2O$ )) in one (1) liter may be used).
6. Sodium hydroxide — pellets or solution, nitrate-free. For solution, dissolve about 450 grams of solid sodium hydroxide ( $NaOH$ ) in water, cool and dilute to one (1) liter. (Specific gravity of solution should be 1.36 or higher).
7. Zinc dust — impalpable powder.

8. Zinc granules -- reagent grade.

9. Methyl red indication -- dissolve one (1) gram of methyl red in 200 ml. alcohol.

10. Hydrochloric or sulfuric acid saturated solution -- 0.5 N or 0.1 N when amount of N is small. The following table gives approximate quantities of hydrochloric acid (HCl) [reagent quality, 35-37 per cent HCl] requirement to make 10 liters of saturated solution:

Approximate Normality	ml of HCl to be diluted to 10 liters
0.01	8.9
0.02	17.8
0.10	89.0
0.50	445.0
1.0	890.0

11. Sodium hydroxide saturated solution -- 0.1 N (or other specified concentrations): The following table gives approximate quantities of sodium hydroxide (NaOH) solution (1+1) necessary to make 10 liters of saturated solutions:

Approximate Normally	ml. of NaOH to be diluted to 10 liters
0.01	5.4
0.02	10.8
0.10	54.0
0.50	270.0
1.0	540.0

#### CAUTION:

1. Always add sulfuric acid to water.  
2. Wear face shield and heavy rubber gloves to protect against splashes.

3. Use freshly opened sulfuric acid or add dry phosphorus pentoxide ( $P_2O_5$ ) to avoid hydrolysis of nitrates and cyanates.

4. Mercury is hazardous in contact with ammonia ( $NH_3$ ), halogens, and alkali.

5. Vapors of mercury are extremely toxic and cumulative.

6. Regard spills of mercury on hot surfaces as extremely hazardous and clean up promptly. (Powdered sulfur [S] sprinkled over spilled mercury can assist in cleaning up spills.)

7. High degree of personal cleanliness is necessary for persons who use mercury.

8. When mercury evaporation is necessary, use effective fume removal device.

9. To avoid environmental contamination, dilute liquid remaining in Kjeldahl distillation flask 1 : 1 with water and filter out insoluble mercury salts.

10. Reserve precipitate in closed labeled container for recovery of mercury or disposal appropriate for mercury.

11. Ratio of salt to acid (weight:volume) should be about 1 : 1 at end of digestion for proper temperature control. (Digestion may be incomplete at lower ratio; N may be lost at higher ratio).

12. Each gram of fat consumes 10 ml, and each gram of carbohydrate consumes 4 ml, of sulfuric acid during digestion.

#### APPARATUS:

##### a. For Digestion --

1. Use Kjeldahl flasks of hard, moderately thick, well-annealed glass with total capacity about 500-800 ml.

2. Conduct digestion over heating device adjusted to bring 250 ml. of water at 25°C to rolling boil in about 5 minutes or other time as specified in method.

3. To test heaters, preheat for 10 minutes if gas, or 30 minutes if electric.

4. Add 3-4 boiling chips to prevent superheating.

##### b. For Distillation --

1. Use 500-800 ml. Kjeldahl or other suitable flasks, fitted with rubber stopper through which passes lower end of efficient scrubber bulb or trap to prevent mechanical carryover of sodium hydroxide during distillation.

2. Connect upper end of bulb tube to condenser tube by rubber tubing.

3. Trap outlet of condenser in such a way as to ensure complete absorption of ammonia distilled over into acid in receiver.

#### PROCEDURE:

(Provide adequate ventilation in laboratory and do not permit accumulation of exposed mercury).

1. Place weighed sample (about 0.7-2.2 grams) in digestion flask.

2. Add 0.7 grams of mercuric oxide or 0.65 of metallic mercury, 15 grams of powdered potassium sulfate or anhydrous sodium sulfate, and 25 ml. of sulfuric acid. (If sample used is more than 2.2 grams, increase sulfuric acid by 10 ml. for each gram of sample.)

3. Place flask in inclined position and heat gently until frothing ceases. (If ne-

cessary, add small amount of paraffin to reduce frothing).

4. Boil briskly until solution clears and then for at least 30 minutes longer (2 hours for samples containing organic material).

5. Cool, add about 200 ml. of water and then cool below 25°C.

6. Add 25 ml. of the sulfide or thio-sulfate solution, and mix to precipitate mercury.

7. Add few zinc granules to prevent bumping, tilt flask and add layer of sodium hydroxide (usually 25 grams of solid reagent or enough solution to make contents strongly alkaline) without agitation. (Thio-sulfate or sulfide solution may be mixed with the sodium hydroxide solution before addition to flask).

8. Immediately connect flask to distilling bulb on condenser, and with tip of condenser immersed in standard acid and 5-7 drops indicator in receiver.

9. Rotate flask to mix contents thoroughly.

10. Heat until all ammonia has distilled (at least 1500 ml. distillate).

11. Remove receiver, wash tip of condenser and titrate excess standard acid in distillate with standard sodium hydroxide solution.

12. Correct for blank determination on reagents.

13. Determine the percentage of crude protein as follows:

Nitrogen content of the feed x 6.25 = Protein

Amount of protein in sample x  
weight of sample  
100 = % Crude Protein (CP)

#### 2. MOISTURE

The significance of the water content of feeds depends on the kind of feed and the amount of water. The difference in nutritive value among many feeds is attributable to differing moisture content.

In calculating the relative cost of feed per unit of nutritional value, water content is considered since water is not a nutrient in the usual sense. Thus, grains or grain by-products which are offered for sale at what appears to be bargain prices are no bargain at all because upon investigation, one finds that these samples are high in water content.

Feeds containing more than 14 per cent moisture can not be stored in bulk since they are likely to mold and spontaneous combustion may take place.

#### METHODS IN THE ANALYSIS OF MOISTURE:

##### a. Drying in vacuo at 95-100°C

- (1) Grind sample to pass sieve with circular openings 1 mm. (1/25 inch) in diameter and mix thoroughly. (If sample can not be ground, reduce to as fine condition as possible).
- (2) Using covered Aluminum dish with not less than 500 mm. in diameter and not more than 40 mm. deep, dry quantity of sample containing about 2 grams of dry material to constant weight at 95-100°C under pressure not more than 100 mm. mercury (Hg) for about 5 hours. (For feeds with high molasses content, use pressure not more than 70 mm. Hg.)
- (3) Weigh sample after drying.
- (4) Calculate the percentage of water (H<sub>2</sub>O) or moisture using the formula below:

$$\frac{\text{Weight of sample after drying}}{\text{Weight of sample before drying}} \times 100 = \% \text{ Dry Matter (DM)}$$
$$100 - \% \text{ DM} = \% \text{ Moisture}$$

##### b. Drying at 135°C

(Not to be used when fat determination is to be made on same sample).

- (1) Grind sample to pass sieve with circular openings 1 mm. (1/25 inch) in diameter and mix thoroughly. (If sample can not be ground, reduce to as fine condition as possible).

\*Note: Do not grind molasses feeds.

- (2) Regulate electric air oven to 135 + 2°C.
- (3) Using low, covered aluminum dishes with not less than 50 mm. deep, weigh about 2 grams of sample into each dish.
- (4) Shake the dishes until contents are evenly distributed.

- (5) With covers removed, place dishes and covers in oven as quickly as possible and dry samples for 2 hours.
- (6) Place covers on dishes and transfer to desiccator to cool.
- (7) Weigh dried sample.
- (8) Calculate the percentage of moisture using the same formula as in (a).

#### 3. ETHER EXTRACT (EE) OR CRUDE FAT:

Crude fat includes all of that portion of a feed soluble in ether. Hence, crude fat is commonly referred to as ether extract or EE. While the crude fat in most feeds is usually mostly true fats, it may also embrace varying amounts of ether-soluble vitamins, carotene, chlorophyll, sterols, phospholipids, waxes, etc. — hence, the designation "crude" fat. The amounts of ether-soluble materials in a feed which are not true fats, however, usually represent only a very small percentage of the overall feed and consequently, no sizeable error is ordinarily involved in assuming that the ether-soluble fraction of a feed is mostly true fat.

Ether extract is considered as the source of the essential fatty acids (EFA) which serve as source of heat and energy of the body. Fats are the most concentrated form of energy in feeds. A unit of fats contains two and one fourth times (2-¼) as much energy as a unit of sugar or starch.

Sufficient amount of fats in the diet is important since this determines the performance of the animal. Excess or deficient intake of this nutrient can make a difference in the performance of chickens. For example, layer mash containing high energy is more apt to result in the development of fatty livers, hence, will result to decreased egg production. Excessive energy levels should therefore be avoided. On the other hand, low energy levels are also tantamount to reduced production performance be it for meat or for eggs.

In pigs, excess intake of fat tends

to make the boars reduce their reproductive ability.

The fat portion is the most unstable component of feeds which makes the storage of high fat feeds a problem. Feeds which are stored for quite a time become rancid because they have lost appreciable quantities of nutrients such as vitamin A or carotene and may also cause oxidative destruction of some of the essential fatty acids. Aside from these the chemical changes may cause the formation of undesirable substances such as amines and/or may proceed to the point of heating and actual combustion of the feed.

All plant oils are subject to easy rancidity because the lipases in the ground grain are likely to be activated by the heat and moisture of the process thus making the fatty fractions to quickly become rancid.

#### METHODS IN THE ANALYSIS OF ETHER EXTRACT:

##### CAUTION:

##### a. Sodium, Potassium, Lithium, Calcium Metals

- (1) Violently reactive with water or moisture, carbon dioxide, halogens, strong acids, and chlorinated hydrocarbons.
- (2) Emit corrosive fumes when burned.
- (3) Can cause severe burns.
- (4) Wear skin and eye protection when handling.
- (5) Use only dry alcohol when preparing sodium alcoholate and add metal directly to alcohol, one small piece at a time.
- (6) Avoid adding metallic sodium to reaction through condenser.

##### b. Diethyl Ether

- (1) Extremely flammable.
- (2) Unstable peroxides can form upon long standing or exposure to sunlight in bottles.

- (3) Can react explosively when in contact with chlorine, ozone, lithium aluminum hydride, or strong oxidizing agents.
- (4) Use effective fume removal device.
- (5) Avoid static electricity.

#### c. Ether Peroxides

- (1) These peroxides form in Et<sub>2</sub>O, dioxane, and other ethers during storage.
- (2) They are explosive and must be destroyed chemically before distillation or evaporation.
- (3) Exposure to light influences peroxide formation in ethers.
- (4) Filtration through activated alumina is reported to be effective in removing peroxides.
- (5) Store over sodium ribon to retard peroxide formation.

#### PROCEDURE:

##### 1. Direct Method

- (a) Grind sample to pass sieve with circular openings 1 mm. (1/25 inch) in diameter and mix thoroughly. (If sample can not be ground, reduce to as fine condition as possible).

##### Note:

1. Do not grind molasses feeds.
2. Large quantities of water-soluble components such as carbohydrates, urea, lactic acid, glycerol, and others may interfere with the extraction of fat; if present, extract 2 grams of sample on small paper in funnel with fine 20 ml. portions of water prior to drying for other extraction.

- (b) Dry about 2 grams of sample following the procedure used in the determination of moisture (drying in vacuo at 95-100°C).
- (c) Extract about 2 grams of sample with anhydrous ether. (Use thimble with porosity permitting rapid passage of ether).
- (d) Extraction period may vary from 4 hours at condensation rate of 5/6 drops/second to 16 hours at 2.3 drops/second.
- (e) Dry extract for 30 minutes at 100°C.
- (f) Cool and weigh.
- (g) Calculate the percentage of crude fat as follows:

$$\frac{\text{Weight of dried sample} - \text{Weight of extract}}{\text{Weight of original sample}} \times 100 =$$

% Crude Fat or Ether Extract

##### 2. Indirect Method

- (a) Grind sample to pass sieve with circular openings 1 mm. (1/25 inch) in diameter and mix thoroughly. (If sample can not be ground, reduce to as fine condition as possible).
- (b) Determine moisture following the procedure used in drying at 95-100°C.
- (c) Extract dried substance following the direct method above.
- (d) Dry again.
- (e) Cool and weigh.
- (f) Calculate the percentage of crude fat using the formula above.

#### 4. CRUDE FIBER

Crude fiber is composed of the coarse, fibrous portions of plants, relatively low in digestibility and in nutritive value. It is

not a chemically uniform substance but a variable mixture, the major components of which are cellulose, hemicellulose, and lignin.

While cellulose and hemicellulose are similar in nutritive value, they have much greater feeding values for ruminants than for nonruminants. On the other hand, lignin is essentially indigestible by all live stock.

There are cases where crude fiber is as highly digestible as the soluble carbohydrate usually referred to as nitrogen-free extract. The reason for this is that the cellulose which makes up 95 per cent of the crude fiber is broken down by microorganisms of the cecum for their own needed energy. In the process of breaking down of cellulose, the microorganisms produce volatile fatty acids which are absorbed and which supply energy to the host.

Swine can digest as much as 3 to 25 per cent crude fiber in the cecum. However, the data do not mean that unlimited quantities of fiber can be digested to the extent shown nor is there any optimum level of ration fiber for swine. The data show that the digestion of cellulose is necessary in estimating the energy value of feeds in the diet.

It was estimated that 10 per cent in crude fiber in the diet leads to reductions of 22 units in digestible energy (DE). Digestible energy is that part of the gross energy of a feed which does not appear in the feces.

#### METHODS IN THE ANALYSIS OF CRUDE FIBER:

##### Principle:

The sample is defatted and treated successively with boiling solutions of sulfuric acid and sodium hydroxide of specified concentrations. The residue is separated by filtration, washed, dried, weighed, ashed and reweighed. The weight of crude fiber divided by the weight of the original sample, then multiplied by 100 corresponds to the percentage of crude fiber present in the test sample.

#### Reagents:

1. Sulfuric acid ( $H_2SO_4$ ) solution — 0.255 N, 1.25 grams  $H_2SO_4/100$  ml.

2. Sodium hydroxide (NaOH) solution — 0.313 N · 1.25 grams NaOH/100 ml., free, or nearly so, from sodium carbonate ( $Na_2CO_3$ ).

#### 3. Prepared Asbestos:

Spread thin layer acid-washed, medium or long fiber asbestos in evaporating dish and heat for 16 hours at  $600^\circ C$  in furnace

Boil for 30 minutes with 1.25 per cent  $H_2SO_4$  filter, wash thoroughly with water and boil for 30 minutes with 1.25 per cent NaOH.

Filter again, wash once with 1.25 per cent  $H_2SO_4$ , wash thoroughly with water, dry and ignite for 2 hours at  $600^\circ C$ .

Determine blank by treating 1.0 grams prepared asbestos with acid and alkali as in determination.

Correct crude fiber results for any blank, which should be negligible (about 1 mg.).

Asbestos recovered from determination may be used in subsequent determinations.

4. Alcohol — methanol, isopropanol, 95 per cent or reagent alcohol.

5. Antifoam — Antifoam A compound diluted 1 + 4 with mineral spirits or petroleum ether, or water-diluted Antifoam A Emulsion (1 + 4). (Do not use Antifoam Spray).

6. Bumping chips or granules — broken Alundum crucibles or equivalent granules are satisfactory.

#### Apparatus:

1. Digestion Apparatus

2. Ashing dishes

3. Desiccator

4. Filtering device — Oklahoma State Filter Screen or modified California polyethylene buchner.

5. Suction filter — to accommodate filtering devices.

6. Liquid preheater — for preheating water ( $H_2O$ ), 1.25 per cent  $H_2SO_4$  and NaOH solutions to boiling point of  $H_2O$ .

#### Procedure:

1. Reduce sample to 100 grams and place portion in sealed container for water determination.

2. Immediately determine water or moisture.

3. Grind remainder to uniform fineness with screen 0.033 — 0.040 inch (Weber mill), or with screen 1/25 — 1/16 inch (Micro mill), or Wiley mill with 1 mm. screen.

4. Since most materials lose moisture during grinding, determine water on the ground sample at the same time sample is taken for crude fiber determination.

5. Extract 2 grams of ground material with ether or petroleum ether. (If fat is less than 1 per cent extraction may be omitted).

6. Transfer to 600 ml. beaker, avoiding fiber contamination from paper or brush.

7. Add about 1 gram of prepared asbestos, 200 ml. boiling 1.25 per cent  $H_2SO_4$ , and 1 drop of diluted antifoam. (Excess antifoam may give high results; use only if necessary to control foaming). Bumping chips or granules may also be added.

8. Place beaker on digestion apparatus with preadjusted hot plate and boil exactly for 30 minutes rotating beaker periodically to keep solids from adhering to sides.

9. Remove beaker, and filter using any of these procedures:

#### a. Oklahoma Filter Screen:

(1). Turn on suction and insert screen (Precoated with asbestos if extremely fine materials are analyzed) into beaker, keeping face of screen just under surface of liquid until all liquid is removed.

(2). Without breaking suction or raising filter, add 50 - 75 ml. of boiling water.

(3). After wash is removed, repeat

with three 50 ml. washings. (Work rapidly to keep mat from becoming dry).

(4) Remove filter from beaker and drain all water from line by raising above trap level.

(5) Return mat and residue to beaker by breaking suction and blowing back.

(6) Add 200 ml. of boiling 1.25 per cent sodium hydroxide (NaOH) and boil exactly for 30 minutes.

(7). Remove beaker, and filter as above. (1).

(8). Without breaking suction, wash with 25 ml. of boiling 1.25 per cent sulfuric acid ( $H_2SO_4$ ) and three 50 ml. portions of boiling water.

(9) Drain free of excess water by raising filter.

(10) Lower filter into beaker and wash with 25 ml. alcohol.

(11) Drain line, break suction, and remove mat by blowing back through filter screen into ashing dish.

(12) Dry mat and residue for 2 hours at  $130 - 2^\circ C$ .

(13) Cool in desiccator and weigh.

(14) Ignite for 30 minutes at  $600 + 15^\circ C$ .

(15) Cool in desiccator and reweigh.

(16) Calculate the percentage of crude fiber as follows:

$$\frac{\text{Weigh of crude fiber}}{\text{Wt. of Original Sample}} \times 100 = \% \text{ Crude Fiber}$$

#### b. California Polysethylene Buchner:

(1) Filter contents of beaker through buchner (precoated with asbestos if extremely fine materials are being analyzed).

(2). Rinse beaker with 50-75 ml. of boiling water and wash through buchner.

(3) Repeat with three 50 ml. portions of water suck dry.

(4) Remove mat and residue by snapping bottom of buchner against top while covering stem with thumb or forefinger and replace in beaker.

(5) Add 200 ml. of boiling 1.25 per cent sodium hydroxide (NaOH) and boil exactly for 30 minutes.

- (6) Remove beaker and filter as above. (1)
- (7) Wash with 25 ml. of boiling 1.25 per cent sulfuric acid ( $H_2SO_4$ ), three 50 ml. portions of water, and 25 ml. of alcohol.
- (8) Remove mat and residue; transfer to ashing dish.
- (9) Dry mat and residue for 2 hours at  $130 + 2^\circ C$ .
- (10) Cool in desiccator and weigh.
- (11) Ignite for 30 minutes at  $600 + 15^\circ C$ .
- (12) Cool in desiccator and reweigh.
- (13) Calculate the percentage of crude fiber applying the formula above.

## 5. ASH

Ash is the mineral matter of the substance remaining after burning off the dry matter.

Minerals are the most important constituents of bones. They are found in small quantities in all organs and tissues and fluids of the animal's body. These chemical elements are required for proper metabolic function of the animal.

Almost all swine rations need to be supplemented with salt, calcium and phosphorus. Under certain conditions, some of the trace minerals may also be needed. These can be added to the feed in a trace mineral premix or in trace-mineralized salt. The so-called trace minerals often added to swine rations are iron, cobalt, iodine, zinc, copper, and manganese. A mineral mix made up of bone meal and trace-mineralized salt will supply the mineral needs of pigs under almost all conditions if fed free-choice.

More complex mineral mixtures may be advantageous under complete confinement or with poorly balanced diets. Supplemental zinc is definitely needed when calcium content of the diet goes above one per cent. Excess calcium makes part of the zinc that is normally present unavailable to the animal.

The figure for crude ash has little direct nutritional use for plant materials, except for the calculation of nitrogen-free-extract. The reason for this is that the ash component of plant materials is highly variable.

The nutritional significance of the ash figure will depend, in part, on the feedstuff under consideration.

## CHEMICAL ANALYSIS OF ASH:

1. Weigh two (2) grams of sample into porcelain crucible.
  2. Place in muffle furnace preheated to  $600^\circ C$ .
  3. Hold at this temperature for two (2) hours with automatic control pyrometer.
  4. Transfer crucibles directly to desiccator
  5. Cool and weigh immediately, reporting percentage of ash to first decimal place.
- ### 6. NITROGEN-FREE-EXTRACT (NFE)

Nitrogen-free-extract (NFE) is a mixture of all the starches and sugars, plus some hemicellulose and much of the lignin. It is the difference between the original weight of the sample and the sum of the weight of its water, ether extract, crude protein, crude fiber and ash.

Thus, nitrogen-free-extract is calculated as follows: Original weight of the sample - (weight of the water + weight of the fat or ether extract + weight of the crude protein, + weight of the crude fiber + weight of the ash) = nitrogen-free-extract.

It may be calculated also as the sum of the percentage of water, ash, protein, fiber and fat subtracted from 100. Thus,  $100 - (\text{percentage of water} + \text{percentage of ash} + \text{percentage of protein} + \text{percentage of fiber} + \text{percentage of fat}) = \text{nitrogen-free-extract}$ .

The numerical value of the NFE may be affected by the chemical errors in the analyses of all five fractions as well as by the lack of precision of the crude fiber procedure separating the functional categories of carbohydrates.

NFE makes up about 70 per cent of the dry weight of concentrate feeds and 40 per cent of forage feeds.

## 7. ENERGY

Another method by which feed can be evaluated is in term of its energy content.

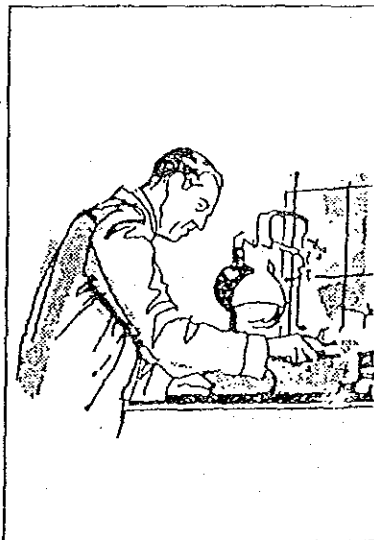
It is a fact that shortages of dietary energy in swine ration result in low pro-

ductivity, than are dietary deficiencies vitamins, minerals or amino acids. Deficiencies of most dietary essential nutrients give rise to syndromes that be easily recognized while shortages of dietary energy result in reduction in the pig's performance. Thus, to insure that the animal can attain optimal level of productivity a knowledge of the energy content of feed is important.

The three broad systems used to express energy requirements are total digestible energy (TDE) which is expressed as the sum total of all digestible organic nutrients such as proteins, nitrogen-free extract, fiber and (fat x 2.25); metabolizable energy (ME) which is the digestible energy (DE) which is that part of the gross energy of a feed which does not appear in the feces. These are expressed as amounts of energy needed per animal daily.

The bomb calorimeter is an instrument used for determining the gross energy content of a feed (solid or liquid). The energy value of a given sample is determined by burning it in an atmosphere of oxygen. When the sample is burned, the heat liberated raises the temperature of water surrounding the container in which the sample is enclosed, and the temperature increase provides the basis for calculating the energy value. The energy value is expressed in units called calories when

one (1) calorie is that amount of heat required to raise the temperature of one gallon of water from  $14.5^\circ$  to  $15.5^\circ C$



# STUDY OF THE FEED MILLING INDUSTRY IN THE PHILIPPINES

1982.

Statistical  
Data

## TABLE OF CONTENTS

Geographical Perspective of the Industry .....	1
Capacity Levels and Production Trends .....	12
Feed Sales .....	24
Raw Material Supply Conditions .....	43

## LIST OF TABLES

Table No.	Title	Page
II-1	Number of Commercial Feed Millers in the Philippines by Region, as of July 31, 1982 .....	3
II-2	Comparative Poultry Population in the Philippines, by Region, January 1, 1981 & January 1, 1982 .....	5
II-3	Comparative Poultry Population of Commercial Farms and Backyard Raisers in the Philippines, by Region, 1981 and 1982 .....	6
II-4	Comparative Hog Population in the Philippines, by Region, 1981 and 1982 .....	8
II-5	Comparative Hog Commercial Farms' and Backyard Raisers' Population in the Philippines, by Region, 1981 and 1982 .....	9
II-6	Poultry Population in the Philippines, by Region, 1982 .....	10
II-7	Hog Population in the Philippines, by Region, 1982 .....	11
III-1	Total Feed Mill Capacity of the Philippines, by Regional Location of Mill, 1982 .....	15
III-2	Comparative Production Output of PAFMI Member-Companies, 1981 and 1982 .....	16
III-3	Total Production Capacity and Utilization Rates of PAFMI Member-Companies, 1982 .....	17
III-4	Regional Allocation of PAFMI Member-Companies' Total Poultry & Hog Feeds Production Capacity, 1982 .....	18
III-5	Monthly Production of Total Poultry & Hog Feeds of PAFMI Member-Companies, 1982 .....	19
III-6	Monthly Production of Poultry Feeds of PAFMI Member-Companies, by Type of Feed, 1982 .....	20
III-7	Monthly Production of Hog Feeds of PAFMI Member-Companies, by Type of Feed, 1982 .....	21
III-8	Monthly Production of Feeds Other than Poultry & Hog of PAFMI Member-Companies, by Type of Feed, 1982 .....	22



PHILIPPINE ASSOCIATION OF FEED MILLERS, INC.

IV-1	Breakdown of PAFMI Member-Companies' Total Poultry & Hog Feed Sales, by Region, 1982	25	V-8	Comparison of PAFMI Companies' Actual and Estimated Weighted Profit Margins on All-Hog-Feeds, 1982	39
IV-2	Breakdown of PAFMI Member-Companies' Poultry Feed Sales, by Region, 1982	26	VI-1	Comparative Average Unit Cost per Kg. of Poultry & Hog Feed Ingredients, 1981 & 1982	40
IV-3	Breakdown of PAFMI Member-Companies' Hog Feed Sales, by Region, 1982	27	VI-2	Poultry Feed Ingredients: PAFMI Member-Companies' Weighted Average Volumes and Costs per 50-kg. Bag of the Five Types of Feed, 1982	41
IV-4	Estimated Total Sales of Commercial Feeds in the Philippines, 1978 to 1982	28	VI-3	Hog Feed Ingredients: PAFMI Member-Companies' Weighted Average Volumes and Costs per 50-kg. Bag of the Four Types of Feed, 1982	42
IV-5	Breakdown of Poultry and Hog Feed Sales, 1978-1982	29	VII-1	Comparative Raw Material Supply Conditions, 1981 & 1982	44
IV-6	Annual Sales of Poultry and Hog Feeds of PAFMI Member-Companies, by Region, 1982	30	VII-2	Total Volumes of Major Feed Ingredient Purchases by PAFMI Member-Companies from Domestic and Imported Sources during 1982	45
IV-7	Monthly Sales of Total Poultry and Hog Feeds of PAFMI Member-Companies, 1982	31	VII-3	Comparison of Prices of Domestic and Imported Feed Ingredients Paid by PAFMI Member-Companies in 1982	46
V-1	Poultry Feeds' Unit Cost and Price Trends: PAFMI Member-Companies' Weighted Average Unit Costs per 50-kg. Bag for 1981 & 1982	34	VII-4	Comparative Costs of Feed Ingredients Purchased by PAFMI Member-Companies from Domestic and Imported Sources during 1981-1982	47
V-2	Hog Feeds' Unit Cost and Price Trends: PAFMI Member-Companies' Weighted Average Unit Costs per 50-kg. Bag for 1981 & 1982	35	VII-5	Total Costs of Major Feed Ingredient Purchases by PAFMI Member-Companies from Domestic and Imported Sources during 1982	48
V-3	Poultry Feeds: PAFMI Members' Weighted Average Unit Costs per 50-kg. Bag of Five Types of Feed, 1982	36	VII-6	Total Philippine Imports of Selected Feed Ingredients: Volumes, FOB Values, and Average Unit Prices, 1975-1982	49
V-4	Hog Feeds: PAFMI Members' Weighted Average Unit Costs per 50-kg. Bag of Four Types of Feed, 1982	37	VII-7	Actual and Estimated FOB Prices of the Five Major Imported Feed Ingredients, 1982-1983	56
V-5	PAFMI Companies' Weighted Average Profit Margins on the Different Types of Poultry Feeds, 1982	38	VII-8	Calculation of Imported Feed Ingredient Weights	57
V-6	Comparison of PAFMI Companies' Actual and Estimated Weighted Profit Margins on All-Poultry-Feeds, 1982	38	VII-9	Total Estimated Feed Ingredient Cost Increase for 1983 Broken Down by Imported and Domestic Components	58
V-7	PAFMI Companies' Weighted Average Profit Margins on the Different Types of Hog Feeds, 1982	39			