

WRITING SCIENTIFIC ARTICLES

Evelyn Mae Tecson-Mendoza, PhD
Academician, National Academy of Science and
Technology Philippines
Research Professor & UP Scientist III, Institute of Plant
Breeding Crop Science Cluster
College of Agriculture, Univ Philippines Los Baños
Email: emtendoza@nast.ph; emtphil@yahoo.com



WHY WRITE SCIENTIFIC PAPERS

- We conduct research to contribute
 - new knowledge
 - new technology
- We have the responsibility to have our contribution known and utilized through
 - Scientific papers
 - Serve to validate scientific merit of study
 - Science articles
 - Commercialization of technology



SCIENTIFIC ARTICLES AND SCIENCE ARTICLES

Scientific papers

- Written by experts to inform other experts
- Published in established format such as research journals

Science articles

- Written for the general audience
- To inform and to entertain



SAD

THE REALITY

- Most of UPLB research reports stay as reports and are not published as scientific articles.
- Not disseminated to the scientific community and the general public.
- Probably, not utilized afterwards.



REQUISITES OF A PUBLISHABLE PAPER

- Originality
 - Innovative
 - Developmental, mechanistic
- Technically sound experimental design and methodology
- Technical quality and analysis
- Clarity of presentation
- Importance to field



Quality ----very good to excellent quality!!!

WHAT ONE NEEDS TO PUBLISH

- Complete good quality study
- Make time to write, analyze, review literature
- Patience
- Persistence
- Open-mindedness
- Patience and persistence



PREPARING A SCIENTIFIC ARTICLE REALLY BOILS DOWN TO CONDUCTING GOOD QUALITY RESEARCH!!!

- Choosing a research topic
- Conducting an exhaustive literature search
- Preparing the research proposal
- Conducting the research



Doing a comprehensive literature review is a must!



THE WORLD IS YOUR LIBRARY ...

- Exhaust local literature
- Use (enjoy) the internet databases of published literature, journals, get free papers



PUB MED Central

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FOR THE SOCIAL SCIENCES

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site is available at: www.unesco.org/shs/most.

The database also contains special references to

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the DARE Database

MANY JOURNALS CAN BE FREELY ACCESSED ONLINE

- Proceedings of the National Academy of Sciences (all issues for the Philippines)
- Plant Physiology
- Journal of Biological Chemistry
- Other journals
- Get Abstracts and full papers from PUBMED
- Ask copies from authors, friends and relatives
- Philippine Agricultural Scientist (PAS) is now available online for subscribers
- **Analyze literature**
- **Be original**





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- ACM Digital library—a vast collection of citations and full text from ACM journal and newsletter articles and conference proceedings;
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WRITING A PAPER STARTS EARLY---

RESEARCH STAGE

Documenting experiments

○ Research notebook

- Date
- Title of experiment
- Objective(s) of experiment
- Protocol
- Results
- Prepare tables/figures; tape on notebook
- Analysis, conclusion
- Store data, analysis, tables and figures in electronic form



RESEARCH STAGE



- Research notebook
 - Keep it clean, neat, legible
 - Do not crowd
 - Must be comprehensible to others
 - On left side, write calculations, weights etc, complete references (so you need not go back to library!)
 - Do not tape thermal paper on notebook; it will fade, worse, it will 'burn' notebook paper!
 - Take digital photos
 - **Honesty is the best policy!!!**



AM I READY TO START WRITING A PAPER?

- Check your progress against your objectives and outline
- If you are three-fourths through, yes do start!
- With a good research notebook, the writing should be a lot easier



PUBLICATION PROCESS



HOW TO START

- Write an outline
- Under each topic, put the corresponding table or figure, analysis and conclusion
- Figures must be clear and aesthetically appealing
- Tables must be clear, substantial; combine tables if needed
- Is a story becoming evident? Building up?
- Can you make conclusions?



TENTATIVE TITLE

- Introduction
- Materials and Methods
 - Materials---coconut, VCO, chemicals, etc
 - Methods---method 1, 2, 3, 4
- Results and Discussion
 - Extraction of VCO by different methods (Table 1)
 - Physical characteristics (Table 2)
 - Fatty acid composition (Table 3)
 - Phenolic content (Table 4)
 - Antioxidant activity (Figure 1)
 - etc



FORMAT REQUIREMENTS

To consider

- Format (journals have specific format)
- Get latest guidelines, study carefully, follow religiously
- FOLLOW INSTRUCTIONS



WRITING STYLE

Each one has his or her own style of writing, but for technical scientific papers, style should be

- Simple and direct
- Use primarily the active voice
- Avoid difficult humongous words
- Cut long sentences



Writing a paper is like writing a story

Title page, Abstract

Introduction

Materials and Methods

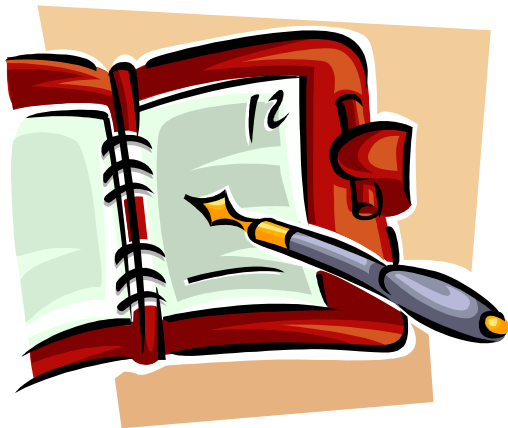
Results and Discussion

Conclusion

Literature Cited

Tables

Figures



- Title page
- Abstract---write last
- **Introduction**
 - Sets the tone of paper
 - Brief background and rationale
 - Cite relevant literature (up-to-date)
 - Establish gap which is topic of paper
 - Importance of working on topic
 - State objectives or aims of work
 - two-three pages max



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0115-463 x/00

Awareness of and Attitudes Towards Modern Biotechnology of Selected UPLB Personnel

Trina Leah T. Mendoza* and **Higino A. Ables**

College of Development Communication, University of the Philippines Los Baños
College, Laguna 4031

*Corresponding author; present address: MIN-PCARRD, Los Baños, Laguna 4030.

Awareness of and Attitudes Towards Modern Biotechnology of Selected UPLB Personnel



INTRODUCTION

- Definition of biotechnology
- Other studies on awareness

Several studies have been conducted to study consumer views on biotechnology in the United States (Hoban and Kendall, 1993; Hoban and Katic, 1998), which consistently showed support for the use of biotechnology among consumers. In the Philippines, a survey showed that NGOs have a “critical attitude”...



Simple and direct:

Objectives:

This study attempted to determine the awareness level and attitudes of selected personnel of UPLB, possible effects of type of work, field of study, and gender on their awareness levels and attitudes.



MATERIALS AND METHODS



- Follow format
- Just cite source of common methods (eg Bradford)
- Describe in more detail uncommon methods
- May need to cite some specs even for common methods (use of 12% or 15% polyacrylamide gels for SDS-PAGE)



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Comparative Physicochemical Characteristics of Virgin Coconut Oil Produced by Different Methods

Vermont P. Dia^{1*}, Virgilio V. Garcia¹, Reynaldo C. Mabesa¹ and Evelyn Mae Tecson-Mendoza²



Describe in more detail uncommon methods

For the first wet method, coconut milk was first extracted from freshly ground meat. Coconut milk was incubated for 24 hours in a 40°C-water bath to hasten separation of the cream from the skim milk following the procedure described by Del Rosario and Mabesa (1976), Del Rosario (1979) and Banzon and Velasco (1982). The oil layer that separated was further centrifuged at 8000 x g for 15 minutes to separate water clear virgin coconut oil from the non-oil components. This method is termed “coconut milk-40°C incubation method.”



***Just cite source of
common methods***

Physicochemical Analysis

The melting point, specific gravity, saponification number and iodine value of the laboratory produced and commercial VCO were determined following standard procedures (AOAC 2000). All analyses were done in triplicate.

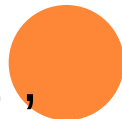


Specify conditions, equipment model, manufacturers etc

Fatty Acid Composition

The fatty acid methyl esters (FAME) of the oil were produced by weighing 30 mg of oil in screw cap tubes to which 4 mL of methanolic HCl was added and mixed (AOAC 2000). The mixture was incubated at 50°C for 10 h and cooled to room temperature. The FAME was extracted using hexane three times. The hexane extracts were combined and passed through anhydrous Na₂SO₄ for drying.

Two mL of the FAME extract was injected into a Hewlett-Packard 5890A gas chromatograph equipped with flame ionization detector and a Hewlett-Packard Model 3396 integrator (Hewlett Packard, 1983). Separation was done on an 80/100 Chromosorb-WAW (Supelco, 1989) column containing 10% DEGS (3.0 mm id x 216 mm). Elution of FAME was carried out with temperature increases programmed from 90-200°C at a ramp rate of 10°C min⁻¹, and nitrogen at a flow rate of 20ml min⁻¹ . . .



MATERIALS AND METHODS



- For thesis, there is no need to write the procedure in detail or step-by-step. Better to write following style of journal
- Cite original source of protocol, not a thesis or paper that used the protocol.
- Indicate modification, if any.
- Provide conditions, manufacturers of instruments, kits, critical or special reagents





RESULTS AND DISCUSSION

- Results separate from Discussion?
- Building a story---how?
 - Build up to climax
- Do I always need to “introduce” a topic or “define” a topic?
- If you cannot finish a topic, go to next one



RESULTS AND DISCUSSION



What to write per topic

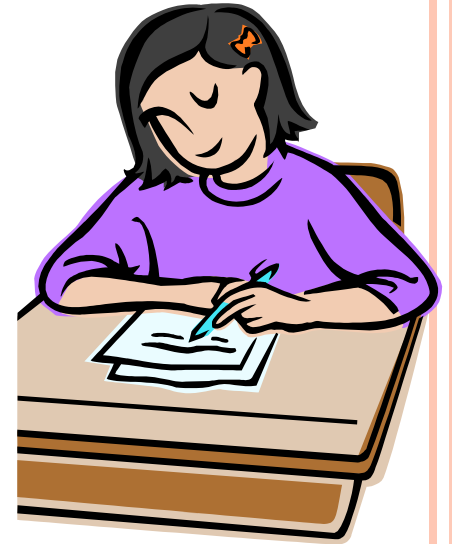
- Brief one sentence introduction especially useful if topic is not so common
- Go directly to your results, not results of other authors
- Present results---describe quantitatively table or figure
- Cite table or figure



RESULTS AND DISCUSSION

When discussing a Table or Figure

- Point out the highlights, the ranges, the highs and the lows
- Point out what you want to emphasize
- Be quantitative, cite numbers, % comparison
- Lead the reader!
- Discuss results with recent literature



- Point out the highlights, the ranges, the highs and the lows
- Point out what you want to emphasize
- Be quantitative, cite numbers, % comparison

Improve:

Yield

The yield of VCO from the three processing methods did not differ significantly from each other (Table 1). Following the desiccated coconut meat-40°C incubation method, the yields were 23.33% for the LT variety, 21.28% for CGD variety and 22.97% for the hybrid of LT and CGD (or LT x CGD). For the coconut milk-40°C incubation method, the yields were 23.14% for LT, 21.43% for CGD and 22.03% for LT x CGD.

Table 1. Yield of virgin coconut oil (VCO) using three different production methods.

Method	Yield (%) ¹
Desiccated coconut meat-40 C incubation method	
Laguna Tall (LT)	23.33
Catigan Green Dwarf (CGD)	21.28
LT x CGD	22.97
Coconut milk-40 C incubation method	
Laguna Tall	23.14
Catigan Green Dwarf	21.43
LT x CGD	22.03
Coconut milk-freeze-and-thaw method	20.54

¹Yields are expressed on a fresh weight basis.

Discuss with
results published
in literature.

Table 1. Yield of virgin coconut oil (VCO) using three different production methods.

Method	Yield (%) ¹
Desiccated coconut meat-40 C incubation method	
Laguna Tall (LT)	23.33
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LT x CGD	22.97
Coconut milk-40 C incubation method	
Laguna Tall	23.14
Catigan Green Dwarf	21.43
LT x CGD	22.03
Coconut milk-freeze-and-thaw method	20.54

¹Yields are expressed on a fresh weight basis.

The coconut milk-freeze-and-thaw method exhibited the lowest yield of 20.54%. These yields, based on the weight of fresh coconut meat, are low when compared to the copra method which can produce coconut oil from 30% to 35% based on the weight of mature coconut meat (Harries 1994).

Briefly introduce topic if not so common

Quality Characteristics

The quality of fats and oils is usually determined by the extent of rancidity they have undergone. Exposure to air and use in cooking of RBD CO will result in very high rancidity (Fennema, 1996). Rancidity in oils is measured by free fatty acid (FFA) and peroxide value (POV). FFA measures the extent of hydrolytic rancidity while POV measures the extent of oxidative rancidity.



Discuss results with recent literature

Together with the VCO samples the total phenolic contents of coconut meat, olive oil and grape wine were also analyzed. The total phenolic content of coconut meat was 1092.55 mg catechin/kg coconut meat. For olive oil and grape wine, the total phenolic contents were 318.64 mg catechin/kg and 1326.12 mg catechin/kg, respectively. Baldiviano et al. (1999) reported that mature coconut endosperm (11-12 months) had a total phenolic content of 1.00 mg catechin/g sample (1000 mg catechin/kg sample). Keceli and Gordon (2001) reported that the total phenolic contents of olives and olive oil extracts were 5100 mg caffeic acid/kg and 180 mg caffeic acid/kg, respectively. However, it is difficult to compare the values obtained by various authors because of the different standards and/or methodology used.



Critique:

Chemical Properties

Phenol in the presence of sulfuric acid is used for the quantitative microdetermination of sugars. The sugar or carbohydrate present are degraded to furfural by the action of sulfuric acid. Furfural reacts with phenol to give an orange colored compound. The color intensity of the solution as measured by the absorbance is proportional to the amount of furfural produced which is measured as total carbohydrates in the sample (Madamba, 1987).

The percent total sugar content of the gum isolates slightly increased with increasing maturity of the nut: sample A, had 59.6%; sample B, 65.6%; and sample C, 68.6%. Guar gum has the highest total sugars (98.2%) followed by gum tragacanth (88.4%) and gum ghatti (85.2%) and the last is gum arabic has the lowest percent sugar (70.4%) which is not significantly different with samples B and C (Table 5).

Go directly to your results, not results of other authors or introduction not so relevant to topic.

REVISED

Chemical properties

The percent total sugar content of the gum isolates slightly increased with increasing maturity of the nut: young (8–12 mo old), 59.6%; mid mature (16–18 mo old), 65.6%; and mature (22–24 mo old), 68.6% and were significantly different from those of the commercial gums except for gum Arabic (Table 5). Guar gum had the highest total sugars (98.2%) followed by gum tragacanth (88.4%) and gum ghatti (85.2%) and



PRACTICE

- Point out the highlights, the ranges, the highs and the lows
- Point out what you want to emphasize
- Be quantitative, cite numbers, % comparison

Table 4. Quality characteristics of different virgin coconut oil (VCO) and refined, bleached and deodorized coconut oil (RBDCO) samples.

Sample	Free Fatty Acid ¹	Peroxide Value ¹	% MC ¹
RBDCO	0.02e	0.00d	0.00d
CS 1	0.18b	2.07a	0.42a
CS 2	0.06d	1.00b	0.14c
CS 3	0.32a	1.01b	0.33b
CS 4	0.12c	1.00b	0.10c
CS 5	0.14c	0.48c	0.12c
CS 6	0.10c	0.95b	0.12c
CPVCO	0.12c	0.24d	0.10c
LTVCO-W	0.09cd	0.50c	0.06c
CGDVCO-W	0.09cd	0.49c	0.10c
LCVCO-W	0.09cd	0.49c	0.08c
LTVCO-D	0.18b	0.48c	0.12c
CGDVCO-D	0.11c	0.49c	0.10c
LCVCO-D	0.15c	0.49c	0.09c

¹ In a column, means followed by the same letter are not significantly different from each other, $p = 0.05$.

CS - commercial sample of virgin coconut oil

Table 1. Fatty Acid Profile of the Oils in Different Coconut Cultivars and Hybrids (wt %)^a

variety/hybrid	fatty acid							18:2 linoleic
	6:0 caproic	8:0 caprylic	10:0 capric	12:0 lauric	14:0 myristic	16:0 palmitic	18:0 + 18:1 stearic + oleic	
Bago-Oshiro Tall (BAOT)	0.52 bc	7.40 cd	6.28 abc	48.95 abc	19.61 abc	8.71 bcd	5.48 de	3.05 efg
Baybay Tall (BAYT)	0.46 dc	7.64 bc	6.48 abc	48.31 bc	18.66 abcd	8.46 cde	6.80 abc	3.19 defg
Laguna Tall (LAGT)	0.56 ab	7.64 bc	6.55 abc	49.70 ab	18.07 d	8.34 cde	6.02 bcde	3.13 efg
Tagnanan Tall (TAGT)	0.41 d	6.70 def	6.00 de	48.11 bc	19.87 a	9.12 abcd	6.56 abcd	2.30 defg
West African Tall (WAT)	0.53 abc	8.30 ab	6.43 abc	49.32 ab	19.78 ab	7.39 f	5.32 e	2.92 fgh
Caligan Green Dwarf (CATD)	0.41 d	6.29 f	5.86 dc	48.74 abc	18.83 abcd	9.11 abcd	6.73 abc	4.02 ab
Malayan Red Dwarf (MRD)	0.43 d	6.26 f	5.65 d	49.33 ab	19.04 abcd	8.95 abcd	6.91 ab	3.41 cde
Tacunan Green Dwarf (TACD)	0.60 a	8.26 ab	7.01 a	50.50 a	17.73 d	7.76 ef	5.29 e	2.86 gh
PCA 15-1 (CATD × LAGT)	0.52 abc	6.82 cdef	5.96 dc	48.37 bc	18.51 bcd	9.20 abc	6.95 ab	3.72 abc
PCA 15-2 (MRD × TAGT)	0.48 bcd	7.01 cdef	6.18 dc	48.27 bc	18.09 d	9.12 abcd	7.47 a	3.36 cdef
PCA 15-3 (MRD × BAYT)	0.46 dc	6.71 def	5.97 dc	47.48 c	18.91 abcd	9.62 ab	7.63 a	3.23 cdefg
PCA 15-4 (CATD × TAGT)	0.42 d	6.35 ef	5.88 dc	47.91 bc	18.51 bcd	9.50 ab	7.36 a	4.07 a
PCA 15-5 (CATD × BAOT)	0.46 dc	6.52 ef	5.93 dc	47.29 c	18.78 abcd	9.81 a	7.61 a	3.63 bcd
PCA 15-6 (CATD × PYT)	0.45 de	7.17 cde	6.15 dc	47.36 c	18.21 d	9.51 ab	7.52 a	3.49 cde
PCA 15-7 (MRD × PYT)	0.52 abc	7.49 bcd	6.36 abc	48.85 abc	18.20 d	8.82 bcd	6.90 ab	2.86 hg
PCA 15-8 (TACD × BAOT)	0.47 dc	7.51 bcd	6.38 abc	50.45 a	18.79 abc	8.18 def	5.69 cde	2.51 h
PCA 15-9 (TACD × TAGT)	0.52 abc	8.59 a	6.97 ab	50.26 a	18.28 cd	7.70 ef	5.17 e	2.56 h
mean	0.48	7.21	6.24	48.96	18.70	8.79	6.56	3.26
C. V. (%)	16.10	11.64	10.85	3.54	6.83	10.23	16.96	13.70

^a DMRT: In a column, means followed by a common letter are not significantly different at 5% level. ns, not significant. The fatty acids are given as a percentage relative to the total fatty acids. The different coconut hybrids and cultivars were collected from the germplasm collection of the Philippine Coconut Authority, Zamboanga Research Center, San Ramon, Zamboanga City. In each cultivar/hybrid, five (5) trees were chosen at random. For each tree, five mature nuts were harvested. The coconut meat of the five nuts per tree was grated and combined, and a representative sample was taken for oil extraction.

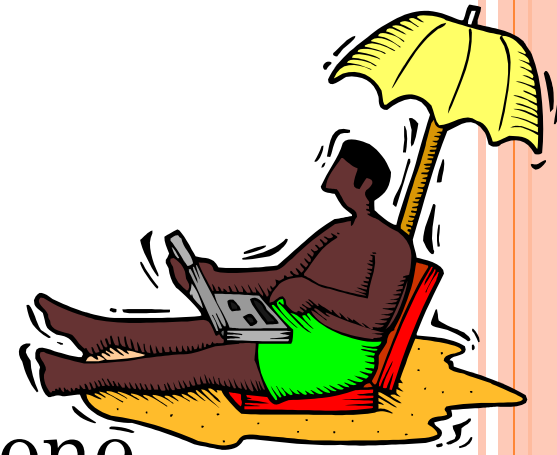
RESULTS AND DISCUSSION

- Practice
- Rewrite
- Rephrase
- Do not plagiarize



RESULTS AND DISCUSSION

- Connecting the topics---use bridging sentences to connect one topic to another
- Integrating or synthesizing results and observations
 - Write a paragraph at end to integrate R and D
 - Illustrate mechanism with a diagram
 - Summarize results in a table with comparison with literature values



**Integrating,
synthesizing,
concluding**

While the VCOs produced by the three methods and using different varieties have some differences in chemical and quality properties, such differences may not be large enough to significantly affect the overall quality of the VCO. Further, their levels are still within the CODEX standards for coconut oil and the proposed BAFS-PNS standards for virgin coconut oils. This may be due to the relatively mild process used in the three methods in which the highest temperature attained was 47°C. Some of the commercial samples, however, exceeded the limits of the standards such as for moisture content and free fatty acid content.

The free fatty acid contents of the samples as well as their moisture contents may eventually have a bearing on the qualities of the VCOs during storage.

Thus, a study on the storage stability of VCO samples produced by different methods is now being conducted. The effect of higher temperature (>50°C) during processing on the quality of VCO is likewise important to determine and is being investigated.

**Future or
ongoing
study**

CONCLUSION



- Journals do not like long conclusions especially if paper is not long.
- Write a concluding paragraph, three sentences
- You can include what you are doing to follow up work described in present paper



**8S Globulin of Mungbean [*Vigna radiata* (L.) Wilczek]: Cloning
and Characterization of Its cDNA Isoforms, Expression in
Escherichia coli, Purification, and Crystallization of the Major
Recombinant 8S Isoform**

AMY EMILIANA N. BERNARDO,[†] ROBERTA N. GARCIA,[†] MOTOYASU ADACHI,[‡]
JORGE GIL C. ANGELES,[†] AKITO KAGA,[§] MASAO ISHIMOTO,^{||}
SHIGERU UTSUMI,[‡] AND EVELYN MAE TECSON-MENDOZA^{*,†}

Concluding remarks

This paper reported the successful isolation and cloning of three isoforms of the mungbean 8S globulin genes. Their DNA and derived amino acid sequences were analyzed and characterized using databases and appropriate softwares. The major 8S α isoform was purified and successfully crystallized. The characterization of the physicochemical and functional properties of the recombinant 8S α mungbean globulin and the detailed analysis of its crystal structure by X-ray diffraction will be reported in separate papers.



WRITING THE ABSTRACT

- Follow instruction of Journal
- Abstract should reflect content of paper
- Brief introduction—two sentences max
- Present results clearly and explicitly, and quantitatively.
- Give reference for any literature/software cited (follow instruction of journal)
- “Results will be presented” is not acceptable.
- Add important keywords



200 words, quantitative, clear, explicit

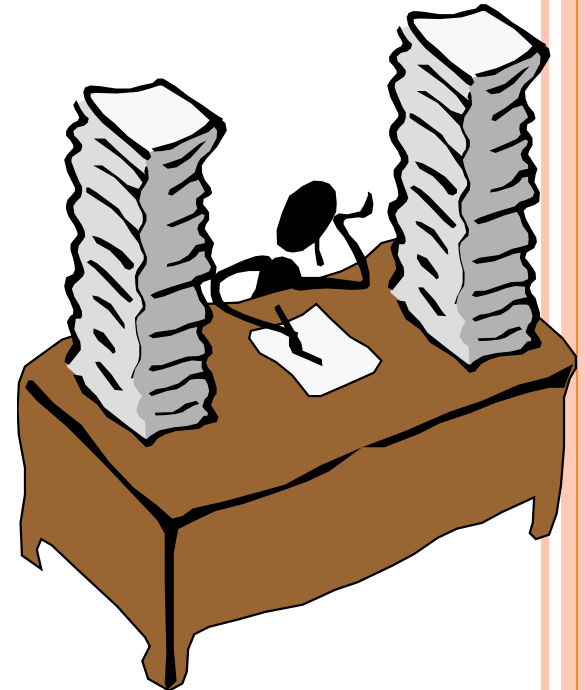
Three isoforms of the cDNA of the major 8S globulin of mungbean, 8S α , 8S α' , and 8S β , were isolated, cloned, and characterized. The cDNA sequences of 8S α , 8S α' , and 8S β had open reading frames of 1362, 1359 or 1362, and 1359 bp, respectively, which code for 454, 453 or 454, and 453 amino acids corresponding to molecular weights of 51 973, 51 627 or 51 758, and 51 779, respectively. Homology in terms of cDNA and amino acid sequences was 91–92% between 8S α and 8S α' , 87% between 8S α and 8S β , and 86–88% between 8S α' and 8S β . The signal peptide was found to be 1–25, 1–24 or 25, and 1–23 for 8S α , 8S α' , and 8S β , respectively, using the signalP website (Nielsen, H.; Engelbrecht, J.; Brunak, S.; von Heijne, G. *Protein Eng.* **1997**, *10*, 1–6). The propeptide was determined to be IVHREN. A single site for glycosylation (N-X-S/T) was observed about 90 amino acids from the C terminus. Homology between mungbean 8S isoforms and other 7–8S proteins ranged from 45 to 68% within members of the legume family and 29 to 34% for crops of different species. The major isoform 8S α was expressed in *Escherichia coli* and purified by successive ammonium sulfate fractionation, hydrophobic interaction, and Mono Q column chromatography. The recombinant 8S α , but not the native form, was successfully crystallized producing rhombohedral crystals.

KEYWORDS: 8S globulin; cDNA; isoforms; vicilin; amino acid sequence; crystallization; purification; homology analysis; signal peptide; propeptide; mungbean; *Vigna radiata* L.; legumes



ACKNOWLEDGMENTS, REFERENCES

- Acknowledge sources of funds, scholarships, those who have helped in work but not the whole barangay
- Follow carefully format for references
- Do not double cite; cite original source



LITERATURE CITED

- Follow format required by agency. If none, follow a format used by a technical journal or the University **consistently**.
- If possible, start using a software (Endnote, Reference Manager, Biblioexpress) for ease in storage and changing styles if needed.
- Check that all cited references in the text are in the Literature Cited section, and vice-versa.
- Check carefully the punctuation marks, the abbreviations, what should be capitalized, italicized or bold-face. Take note that the official abbreviations of journals should be utilized.

Open your yes!



Biblioexpress

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File Edit View References Help

New Reference APA

APA, American Association of Psychologists

Year	Authors	Title
1976	Bradford, M.	A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the p...
1998	Brunger, A. T.; Adams, P.D.; Clore, G.M.; Delano, W.L.; Gros, ...	Crystallography and NMR systems (CNS): a new software system for macromolecular structure de...
2001	Chachatee, P.; Jarvinen, K.M.; Bardina, L.; Villa, L.; Beyer, K.; S...	Identification of IgE and IgG binding epitopes on beta and kappa-casein in cow's milk allergic patients
2003	Codex Alimentarius Commission. Alinorm 03/34	Joint FAO/WHO Food Standard Programme, Codex Alimentarius Commission, 25th Session, Rome, ...
1997	DeLumen, B.O.; Krenz, D.C.; Revilla, J.	Molecular strategies to improve to protein quality of legumes
1980	Doel, M.T.; Eaton, M.; Cook, E.A.; Lewis, H.; Patel, T.; Carey, ...	The expression of E. coli of synthetic repeating polymeric genes coding for poly(L-aspartyl-L-phen...
1997	Dyer, J. M.; Nelson, J.W.; Murai, N.	Strategies for selecting mutation sites for methionine enhancement in the bean storage protein ph...
2001	FAO/WHO	Evaluation of allergenicity of genetically modified foods. Report of a Joint FAO/WHO Expert Cons...
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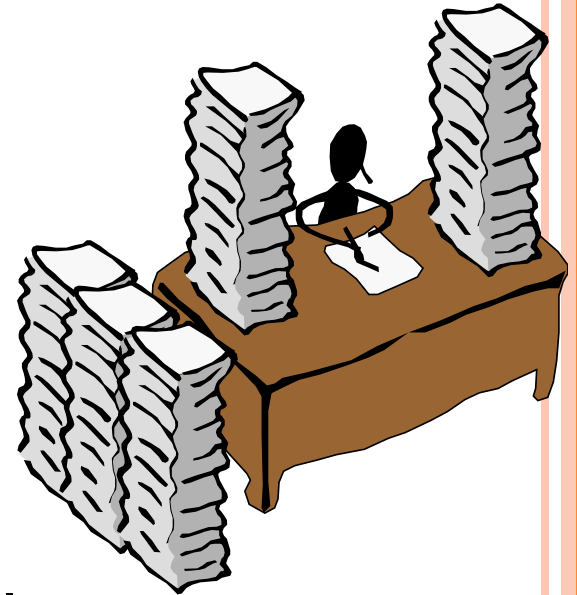
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