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出席「第四十六屆國際農藥分析聯合會年會」
(46th Session of CIPAC meeting)

報告書

服務機關：行政院農委會農業藥物毒物試驗所

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主辦機關:

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內容摘要: 第四十六屆國際農藥分析聯合協會年會(46th CIPAC Annunal Meeting) 及世界糧農組織(FAO)農藥規格會議聯合於2002年6月15日至6月23日在義大利羅馬舉行。主辦單位為CIPAC, FAO, 及Italian Istituto Superiore di Sanita。CIPAC為「Collaborative International Pesticides Analytical Council」的簡稱, 中譯為「國際農藥分析聯合會」。本會議計有CIPAC委員、國家代表、國際組織代表、農藥工業界代表共卅三國八十六人出席。會議議程包括二天FAO農藥規格會議、一天JMPS會議、一天CIPAC Symposium 及三天CIPAC農藥成品分析方法討論會。本人以CIPAC Correspondents member 身分出席, 經費由藥毒所91年度公務預算支付。本年度世界糧農組織所負責之農藥規格會議依往例除討論現存之規格外, 並對舊農藥每十年檢討一次。本次規格會議也包括第一次JMPS會議。CIPAC Symposium 計有十二篇相關論文以口頭報告發表, 五篇poster。CIPAC每年就農藥成品主成分及規格之分析方法, 經過嚴謹之檢驗方法開發及實驗室間之認證過程, 提出年會討論通過後才列入由CIPAC出版之「CIPAC Handbook」。本次為第四十六屆年會, 計討論十七種農藥之成品主成分分析方法及二種理化性質檢驗方法。CIPAC所出版之「CIPAC Handbook」是世界採用之農藥主成分分析方法, 目前已出版至第十冊「CIPAC Handbook J」(2000年出版), 本人名字(Mrs. Wong Sue Sun, Taiwan)也列在該冊"Members of CIPAC"中。

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目的

國際農藥分析聯合會(Collaborative International Pesticides Analytical Council, 簡稱CIPAC) 始於1954年在巴黎舉行之第三屆國際植物保護會議，會議中決議成立一個由官方認定之農藥主成分標準檢驗方法委員會。1957年歐盟先行成立類似功能之組織，1960年代由CIPAC通過之農藥主成分分析方法尚歸類在世界糧農組織植物保護專刊之一，1970年出版第一冊「CIPAC Handbook」才奠定其在農藥成品規格分析上之權威地位。目前CIPAC除取得國際組織如FAO, WHO, AOAC, UNIDO及CLI之肯定外，FAO農藥規格製備以CIPAC之結果為骨幹，AOAC也和CIPAC取得協議彼此承認及引用對方研發之農藥成品主成分、不純分及其它理化性質之檢驗方法。CIPAC/FAO聯合年會所討論之分析方法結集成冊，不定期發行「CIPAC Handbook」供各國農藥成品檢驗單位參考，目前已出版至第十冊「CIPAC Handbook J」(2000年出版)。CIPAC年會及FAO非正式規格會議每年聯合舉行一次，大會所討論之農藥品質檢驗方法及規格認定為世界各國所重視。

我國加入WTO後在農藥研發及品管上不論是農藥成品進出口或品質檢驗標準及流程均不可避免要與世界各國採取一致的作法，一方面可以對進口之農藥原體及成品作嚴格的把關，也可以保障國產農藥品質，強化農藥管理。且農藥品質之優劣間接影響農產品中之農藥殘留及安全品質，會對消費者造成隱憂。參加本會議可了解執國際農藥成品分析牛耳之CIPAC製訂分析方法之流程，並藉此維繫參與國際間實驗室聯合檢驗及認證之機會，將國內農藥品質管理推向國際化。由於出席聯合國組織之周邊會議常會有來自中國之關切。本人於1998年獲選為correspondent CIPAC member，得以台灣名義正式與會。也希望國內政府及民間農藥相關單位正視本會議之重要性。

過程

一、議程

第四十六屆國際農藥分析聯合會年會(46th CIPAC Annunal Meeting)、及世界糧農組織非正式農藥規格會議 (Informal Meeting on FAO Pesticide Specifications)及第一次農藥規格專家會議 JMPS (Joint FAO/WHO Meeting on Pesticide Specifications) 於2002年6月15日至6月22日在義大利羅馬舉行。議程為見表一：

表一、第46屆CIPAC年會及FAO農藥規格會議議程

日期	議程
6月15-17日	FAO Meetings
6月18日	First Joint FAO/WHO Meeting on Pesticide Specifications
6月19日	CIPAC Symposium
6月20-21日	46 th CIPAC Annual Meeting
6月22日	CIPAC Management Meeting

二、參加人員

本會議計有CIPAC委員、國家代表、國際組織代表、農藥工業界代表八十六人出席。分別來自Germany, Sri Lanka, P.R.China, Taiwan, Portugal, USA, South Korea, Australia, UK, Belgium, Denmark, Italy, Thailand, Japan, France, Switzerland, India, Spain, South Africa, Slovak Republic, The Netherlands, Nigeria, Brazil, Argentina, Lebanon, Romania, Cyprus, Slovenia, Greece, Czech Republic, Ukraine, EI Salvador, Hungary等三十三國。

三、會議內容

(一) **FAO 農藥規格會議：**

FAO自1995年會議後已出版四本有關農藥規格專刊，並於1996年將FAO Manual 及Specifications放在國際網路上。另為加速農藥規格製備及評估之時效，上次會議決議以小組方式審查資料，如此每年至少可完成十五種農藥之作業。FAO於1997年3月在羅馬召開之農藥規格會議中制定新的農藥規格審查步驟，並建議比照FAO/WHO農藥殘留專家會議（JMPR）模式，成立FAO/WHO農藥規格專家會議（JMPS），以討論農藥成品及不純物之毒理問題。該會議已於今年成立併入本次會議。

(二) **CIPAC年會：**

CIPAC會議討論重點包括農藥主成分檢驗方法及農藥理化性質試驗方法。要成為CIPAC Handbook之農藥主成分檢驗方法必須經過一連串的檢驗方法開發、實驗室間認證、聯合檢驗及提至大會審查。例行之程序為先由地區性或國內之農藥分析委員會(Pesticide Analytical Committees, 簡稱PAC)就其區域內廠商開發之農藥選擇至少六個農藥檢驗實驗室進行方法比對及結果統計分析，結果提交CIPAC會議審查後依CIPAC制訂之Guideline進行國際間至少十五家實驗室間之比對，結果經審查通過後依其完成之程度歸類為「CIPAC Method」、「Provisional CIPAC Method」或「Tentative CIPAC Method」。

本次會議進程序為由主席報告議程，各相關組織（FAO、WHO、AOAC、GCPF/ECPA、UNIDO、RENPAAC、GTZ、ISO、IUPAC、EU、OECD、ASTM）報告與農藥品質管理技術相關成果或會議，單一農藥檢驗方法報告，農藥成

品規格檢驗方法報告，各參加國農藥品質管理結果報告，上次會議結論報告，及決定下次會議時間及地點。

提交本次會議討論之主分檢驗方法農藥計有十七種，及二種規格檢驗方法。結論摘要列於表二。

表二、46th CIPAC會議討論結果摘要

CIPAC Code No	農藥名稱	檢驗對象	分析方法 (方法分類)
12	Malathion 馬拉松	TG, EC, EW, DP	Capillary GC method (Provisional CIPAC method)
171	Oxydemeton- methyl滅多松	TC, EC, SL	HPLC method (Full CIPAC method)
221	Chlorpyrifos 陶斯松	UL	HPLC method (provisional CIPAC method)
288	Chlorothalonil 四氯異苯晴		AOAC審查中,暫不列入
391	Chlorosulfuron	WP	HPLC method (Full CIPAC method)
441	Metsulfuron methyl	WP	HPLC method (Full CIPAC method)
471	Etofenprox 依芬寧	TG, WP, EC, OW	Capillary GC method (Full CIPAC method)
481	Esfenvalerate 益化利	TG, ULV	Capillary GC and HPLC (provisional CIPAC method)
484	Fenoxypop-p- ethyl 芬殺草		Enantioselective HPLC method, columns stable, back to DAPA
502	Bensulfuron- methyl 免速隆	WP	HPLC method (Full CIPAC method)
510	Cycloxydim 環殺草	TK, EC	HPLC method (provisional CIPAC method)
568	Kresoxim- methyl克收欣	TG, WG, SC, SE	HPLC method (Full CIPAC method)

CIPAC Code No	農藥名稱	檢驗對象	分析方法 (方法分類)
582	Imidacloprid 益達胺	FS	HPLC method (Full CIPAC method)
599	Niclosamid	SC	HPLC method (Full CIPAC method)
546	Tribenuron-methyl	TG, DF, WG	HPLC method (provisional CIPAC method)
740	Icaridin	TG, lotion	Capillary GC and HPLC (provisional CIPAC method)
741	Transfluthrin	TG	Capillary GC and HPLC (provisional CIPAC method)
MT-178.2	Attrition resistance of water dispersible granules		(provisional CIPAC method)
MT 187	Particle size analysis by laser diffraction		(provisional CIPAC method)

(三) First JMPS meeting :

第一屆FAO/WHO 農藥規格專家會議由UK Dr. Alan Hill 擔任主席。此會議之精神為將農藥及環衛用藥之管理統一化，並在規格製訂上考慮其對環境及人類之毒性影響。

本會議針對二十四種在毒性上引起關切之持久性污染物建議撤銷其規格。分別為anilazine, bromophos, camphechlor (toxaphene), chlorbenside, chlordane, demeton, demeton-S-methyl, DDT + its mixtures, HEOD (dieldrin), HEOD+mercury, dimefox, dinoseb, dioxathion, endrin, fenoprop, HHDN(aldrin), heptachlor, mehoxyethylmercury silicate, methoxyethylmercury chloride, monuron, nicotine, nicotine sulphate, schradan, 2,4,5-T. 其中因DDT在環衛上還使用，故暫緩撤銷。Nicotine 類雖還有國家使用，但無廠商願提供規格資料，故仍撤銷。

會議並決議重新整編FAO農藥規格手冊，更名為「Manual on Development and Use of FAO and WHO

Specifications for Pesticides」，預計於2002年底完並公告於網站上。新手冊除了加入新的劑型規格，含環衛用藥、生物農藥、及特殊處理如防蚊纖維等，並統一FAO及WHO對農藥規格之要求。全書分九章及八個附錄，主要內容目錄見表三。

表三、Contents of 「Manual on Development and Use of FAO and WHO Specifications for Pesticides, First Edition」

1.	Introduction
2.	The process of developing FAO/WHO specifications
3.	Requirements and procedures for development of FAO/WHO specifications
4.	Aims, applicability, and requirements of specification clauses
5.	Specification guidelines for technical materials and technical concentrates (except microbial TKs)
6.	Specification guidelines for solid formulations
7.	Specification guidelines for liquid formulated pesticides
8.	Specification guidelines for pesticides formulated as, or in, devices for application
9.	Specification guidelines for microbial pesticides
A	Guidelines for sampling
B	Supply and certification of reference substances
C	Glossary of terms
D	Coding of active ingredients, specifications and method status
E	CropLife International codes for technical and formulated pesticides
F	CIPAC codes for pesticides, in numerical order

G	CIPAC codes for pesticides, in alphabetical order
H	Declarations of interests and confidentiality by FAO/WHO experts

JMPS 排訂 2002 及 2003 農藥規格審議農藥種類，見表四。

表四、Programme for Development of FAO and WHO
Specifications for Pesticides

FAO	WHO
2002	2002
Azadirachtin Bensulfuron-methyl TC, WP, WG Beta-cypermethrin TC, TK Butralin (withdrawn) Dicamba TC, WG, SL (SG) Flufenzine TC, TK Glyphosate SL Maleic hydrazide TC, TK, SL, SG Iprodione (withdrawn) Methomyl TC, SP, SP-SB, SL Quinclorac TC, WP, WG, SC Tribenuron methyl TC, WG	d-allethrin TC d-phenothrin TC Prallethrin TC Transfluthrin TC FAO & WHO: Chlorpyrifos TC, EC, UL, WP Niclosamide TC, TK, EC, SC, WP
2003	2003
Azadirachtin Chlormequat chloride Chlorsulfuron Flufenzine TC, TK Hexazinone Imidacloprid Iprodione Maleic hydrazide Paraquat TK, SL, SG Propanil	Bioallethrin TC Cyfluthrin TC, EW, WP Esbiothrin TC Trans-cyphenothrin TC, EC FAO & WHO: Deltamethrin TC, DP, SC, UL, WG, WP, WT Lambda-cyhalothrin TC, CS, EC, WP Malathion TC, DP, EC Novaluron TC, EC, WG Propoxur TC, WP

心得

一、國際農藥分析聯合會(CIPAC)之任務及作業程序

國際農藥分析聯合會(CIPAC)主要任務為協助建立農藥成品規格及主成分之標準檢驗方法，而其公告之檢驗方法已成為世界各國對農藥管理及品質要求之基本檢驗方法。其制訂之規格也積極列為農藥產品國際貿易之合約內容之一以保障農藥品質。CIPAC年會進行實驗室聯合試驗結果之評估、規格製訂及規畫新農藥共同比對作業程序。大部分實驗室間共同比對(Collaborative Studies)由地區相對應之組織即「農藥分析協會」(Pesticide Analytical Council, 簡稱PAC)配合進行，依據「Guidelines for CIPAC Collaborative Study Procedures for the Assessment of Performance of Analytical Methods」循序完成檢驗。國際間實驗室比對應提出「CIPAC Information Sheets」由會議主辦人確定其準確性及再現性後才同意進行「Full-Scale Collaborative Studies」。檢驗結果經審查通過後依其完成之程度歸類為「CIPAC Method」、「Provisional CIPAC Method」或「Tentative CIPAC Method」。「CIPAC Method」為完成完整之國際性比對工作符合各項要求，分析方法之結果具高度之重覆性(repeatability)及再現性(reproducibility)。「Provisional CIPAC Method」為準CIPAC方法，須再補齊比對工作或分析方法不夠完美。「Tentative CIPAC Method」為未完成Full Scale Study，但因需要而接受其方法者。

CIPAC除於每年年會討論檢驗方法外，並負責規畫實驗室分析能力認證及國際性實驗室分析結果比對工作。不定期出版「CIPAC Handbook」，目前已發行十冊，「CIPAC Handbook J」於2000出版。中國大陸取得部分之中譯權，已譯成五冊。

二、農藥主成分分析及標準規格之重要性

我國農藥管理法中規定之農藥標準規格可分為原體、成品及增效劑之標準規格三種。原體規格中以有效成分含量及不純物含量為最重要，此與農藥原體合成方法及生產品管有關，常列為生產機密資料。主成分最低含量標準或不純物最高含量限制也常列為品管標準。成品農藥除主成分含量外，不同劑型有其理化安定性之標準及檢驗方法。

農藥原體及成品規格對農藥使用時之效果及使用後在作物上及環境中之殘留及副作用均有很大之影響。不純物的毒性若認定有致癌或畸胎性時常導致農藥被禁用，或要求廠商改變生產流程減少不純物產生。因此原體主成分檢驗方法有時必須包括不純物之檢驗。農藥成品之安定性、細度、懸浮率或分散性等都會影響農藥的效果，因此產品規格制訂及標準測試方法之建立非常重要。大陸各主要大學農學院中有農藥化學系，農藥工廠合成農藥的技術也很高明，農藥成本較低。唯品管不一，且忽視農藥專利權，其產品經各種管道行銷全世界，造成各國農藥管理上的困擾，在作物殘留及環境安全上也造成威脅。目前我方開放大陸原體進口，未來大陸生產之農藥成品在台上市為期不遠。台灣因農藥被視為污染工業，農藥原體合成工廠很少，大部分為成品加工或分裝工廠，在成品規格檢驗方面也應加強。雙方若均遵循FAO及CIPA之農藥規格及檢驗方法，業者能支持政府以FAO及CIPA為基礎之相關農藥法規修正，相信對農藥品質保障及業者產品品管之提昇均有助益。

建議

一、重視農藥品質之管理

農藥原體合成過程會影響主成分含量及不純物種類及含量，因而影響產品品質及安全。成品之主成分含量、成品規格及其安定性則影響農藥的藥效、藥害及殘留量，因此農藥品質的管理非常重要。農藥原體合成過程牽涉到成本高低及專利權，因此除主成分含量管理外，毒性上值得考慮之不純物種類及含量也應列入管理。可由FAO公告之不純物種類及含量優先辦理。成分標示不明及品質不良之偽劣農藥常是造成作物上農藥殘留過量或藥害之原因之一，由榮總毒物中心的中毒案件中也常看到服食標示不明之農藥而導致急救發生困難的情形，此等皆會造成台灣農藥管理不善之印象。尤以本省農藥原體合成少，大陸農藥大量傾銷國外，本省也是其市場之一，如何強化進口農藥原體品質之檢驗及修正國內成品農藥之檢驗項目有待農藥主管機關研究。此外對於國內廠商外銷至開發中國家的農藥也要信守農藥品質管制之原則，不要因開發中國家無能力作農藥品管檢驗或行政管理不夠嚴謹而傾銷不良品。

二、提昇國內農藥品質檢驗水準

國內參與農藥主成分或規格檢驗的單位除農藥成品之法定檢驗單位及農藥工廠之品管室外，研究單位及大學實驗室也可能進行農藥主成分檢驗。故除加速公告農藥主成分之國家標準檢驗方法外，建立實驗室檢驗能力認證及規畫標準的檢驗流程也是非常重要的工作。另為建立我國檢驗水準之形象，有必要成立地區性農藥分析協會(PAC-Taiwan)，以進行實驗室檢驗能力認證、規畫標準檢驗流程、檢驗人員訓練、及負責接受國際間分析比對工作之聯繫，國內之品管結果能提交國際間流通，

使國內的農藥品質分析技術及水準能更上一層樓。以農藥主成分標準檢驗流程為例，分析樣品包括分析級標準劑、內標準劑及待檢樣品。書面資料包括分析流程、各化學品基本理化性質說明及注意事項、每日分析步驟及結果計算公式及表格(Data Sheet)。附件二為本會議建議之CIPAC發表格式，可供參考。

三、善用已建立之基本資料及資訊

農藥成品品質管制方法如主成分及理化性質試測方法CIPAC皆已建立很完善的檢驗制度，國內可參酌引用。另外國際網路上也可查到FAO所制定的農藥規格。直接進入FAO首頁(fao.org.)或進入FAO Pesticide Management首頁，網址為：<http://www/fao.org/waicent/facinfo/Agricult/AGP/AGPP/Pesticide/Default.htm>。其中與農藥成品相關的專刊如「FAO Specification for Plant Protection Products」及「Manual on the Development and Use of FAO and WHO Specifications for Pesticides」皆可載入，非常方便。

附件一、報告及農藥劑型簡稱對照表

Part I:

AOAC	Association of Analytical Chemists
CCPR	Codex Committee on Pesticide Residues
CIPAC	Collaborative International Pesticides Analytical Council
CLI	Crop Life International (formerly GCPF)
ECCA	Europe Crop Care Association
ETU	Ethylenethiourea
FAO	Food and Agricultural Organization
GC	gas chromatography
GCPF	Global Crop Protection Federation
GLC	gas liquid chromatography
HPLC	high performance liquid chromatography
ICRC	Interim Chemical Review Committee of the Rotterdam Convention
IPCS	International Programme on Chemical Safety
IR	infra-red
ISO	International Standards Organization
JMPR	Joint Meeting on Pesticide Residues
JMPS	Joint Meeting on Pesticide Specification
LCI	LifeCrop International
MRL	maximum residue limit
NMR	nuclear magnetic resonance
PIC	Prior Informed Consent
THF	Tetrahydrofuran
UNIDO	United Nations International Development Organization
WHO	World Health Organization

PartII

CIPAC Codes for Formulations

CS	capsule suspension
EC	emulsifiable concentrate
EW	emulsion, oil in water
FS	flowable concentrate for seed treatment
GR	Granule
LS	solution for seed treatment
MG	Microgranule
SC	suspension concentrate (= flowable concentrate)
SE	suspo-emulsion
SG	water soluble granule
SL	soluble concentrate
TC	technical material
TK	technical concentrate
UL	ultra-low volume (ULV)
WG	water dispersible granule
WP	wettable powder
WS	water dispersible powder for slurry treatment

附件二、

FORM OF CIPAC PUBLICATIONS - HANDBOOKS, ELECTRONIC OR BOTH

Introduction

The various possibilities for publishing CIPAC methods were considered under item 6.2 of the agenda of the joint Thirtieth Management Committee meeting and the 35th Council meeting in Granada on 3 June 2000 (CIPAC/CM+M/181).

The Chairman invited a number of members to report on various aspects of such publications. This report examines the potential use of the Internet for CIPAC publications.

Advantages and disadvantages of publishing on the internet

Shaw and Elliot (1998) reported some of the advantages and disadvantages for Internet publishing.

1. Speed of publication and access
2. Rapid retrieval of related papers
3. Accessibility from a wide variety of locations with minimum time constraints
4. Non-availability of a universal browser and the many different software packages in use that are not all mutually compatible
5. Copyright issues and intellectual property rights of authors are not easily resolved

Costs of electronic publishing

The American Geophysical Union reported on the experience of learned society publishers in providing online editions of their publications; the additional cost of online access was in the range of 20-30% (Shaw and Elliot, 1998). This includes the cost of providing access to and maintaining a digital archive. The term 'archiving' denotes not only the storage of materials but the systematic organisation and provision of access to these materials. Libraries have traditionally maintained archives of published books, but with electronic publication the costs of archiving will tend to fall on the publisher. A problem for electronic publications is the wide variety of formats in use and the resources required to update the archival material when new formats are introduced.

A former editor for the American Institute of Physics concluded that the addition of an electronic version to an established print-on-paper journal increases costs (Shaw and Elliot, 1998). An alternative electronic journal could be produced for about the same cost as a printed version.

CIPAC methods - what are the needs of users?

At CIPAC's annual meetings, results of collaborative studies are evaluated, and the status of the methods is decided.

Once a method has been accepted it may be classified as a CIPAC Method, a Provisional CIPAC Method, or a Tentative CIPAC Method. CIPAC Methods are methods that have been investigated in accordance with internationally accepted rules and have given results falling within the accepted ranges for repeatability and reproducibility. Provisional CIPAC Methods are either candidate CIPAC Methods, which may become full after a certain period, or methods with minor imperfections. Tentative CIPAC Methods have usually not been tested in a full-scale study but are still accepted because there is a certain need for them.

The needs of a user for a CIPAC analytical or test method are somewhat different from the needs for information in a paper published in a scientific journal.

The status of the methods will influence the needs of users. A full CIPAC method is valuable to laboratories in official accreditation or quality assurance systems. The value lies in the fact that the method has been properly tested, is published (CIPAC Handbook) and is unlikely to change at short notice. The published handbook, as a perpetual public record of the method from the date of publication to the date it is replaced by another published method, is valuable to quality systems.

If CIPAC methods were to be published in electronic form only, the costs of archiving would fall on CIPAC. From a user perspective an archive maintained by a single publisher is not as secure as published handbooks held by a number of libraries.

Provisional methods open for comment have some possibility for change in the near future, even if some of the changes are rather minor or editorial. In this case the electronic copy and immediate access to suggested changes are important.

However, in practice it is not just provisional methods that are subsequently modified. In fact provisional methods seem to be modified fairly rarely before they become "full". The last few years have seen several modifications of "full" methods, and perhaps more would be forthcoming if they could be introduced without (hidden) cost. The modifications are adopted as provisional but how does the user of the full method in the handbook know that a modification has been introduced? Having it temporarily on the internet be helpful if the user happens to look at that time but, otherwise, the "grapevine" may be the only source of such information.

CIPAC should ensure that its procedures for issuing and publishing revisions are readily compatible with quality systems.

Needs of CIPAC

CIPAC needs to sell its publications to remain viable. It also must find ways to best serve its clients.

Needs of FAO and WHO

The initial discussion on internet publication was linked to the desire for FAO and WHO to publish (or have links to) CIPAC methods on the web. Both organizations have indicated a willingness to provide some kind of financial support in return for this. We accept the management committee's argument that they do not wish to become too closely linked with FAO and WHO, because of the risks this entails. Is it possible to continue printing handbooks and publish on the internet at the same time, if we accepted some financial support from FAO and WHO. There should be little need to worry about being left with piles of unsold books: the costs of printing 1000 books seems to be covered when we have sold 2-300 of them, so why not sell them at a quarter of the price so that even internet users could afford the hard copy. Internet users could pay for internet access to the methods either as one-offs or by subscription.

Both WHO and FAO are willing to negotiate for internet access to CIPAC methods. One option is for internet access to be exchanged for sufficient cash to enable hard copies to be produced at roughly the same price as now (that is, subsidised as required by the FAO/WHO support) for those who want/need them. The option needs to be considered in terms of its financial feasibility and whether CIPAC would become dependent on FAO and WHO.

Practicalities - methods, procedures and costs

Information on the possibility of electronic publishing of CIPAC methods was provided by a staff member of Wageningen University and Research Publishing (WUR).

The two possibilities are:

- * Preparing the method as a Web page. A problem is that re-edition has to be done because a number of scientific symbols are not recognised and had to be programmed. This is expensive due to the working time;

- * The easiest way is to convert the method in a PDF format. The needed time for the WUR employee is very limited. For the printing of such a PDF format an Acrobat Reader program (free of charge) is required. The document could be printed preferably on A4.

The method has to be submitted to the WUR by the CIPAC secretary after the final copy has been prepared.

Then for the first method some development work has to be done. For later methods only a very limited time is needed for each method.

The title of the methods will be visible on the CIPAC Web Pages.

After selecting the desired method(s) , the user is redirected to a secure server and is presented with different payment options such as credit cards. After a successful payment transaction the method(s) will be visible and can be downloaded or printed.

A rough estimation has been made, but an offer could be made.

Lay out first method 1160 guilders or GBP332

Server costs p.m.

Over head (management etc.) Yearly costs 250guilders or GBP72

Lay out each method 30guilders or GBP9

Internet payment for each (handling) 2guilders or GBPO.6

According to the WUR there are two possibilities for submitting methods.

The preferable one for ease of use is sponsoring. Then the method is directly available for the chemist if he has access to the Internet. Due to the independent character of CIPAC, this may not be an acceptable solution.

The other one is the pay per view. The cost are low only fl 2.- for each action.

This form of payment is safe. WUR has contacted a specialised company for this financial transaction and has sufficient confidence in this method of payment.

Recommendations

1. Make provisional methods available on the Internet. The electronic system provides immediacy and accessibility. Archiving and the associated costs are not necessary for this application.
2. Continue to publish the final methods in Handbooks protected by copyright. When a method moves from provisional to full method it should be removed from the Internet.
3. Examine how revisions and modifications of full methods may be issued in a systematic way that will better satisfy quality systems.

Reference

Shaw, D.F. and Elliot, R.J. 1998. ICSU Press workshop on the economics, real costs and benefits of electronic publishing in science - a technical study. Available from the ICSU web site <http://www.bodley.ox.ac.uk/icsu>