

Master I Biochimie Appliquée

Intitulé de la matière: Analyse et valorisation des travaux de recherche

Crédits : 4

Coefficients : 2



Contenu de la matière

- Consultation des articles de recherches et de bases de données en ligne
- Définition d'une problématique
- Définition des objectifs d'un travail de recherche
- Définir une méthodologie de travail
- Initiation à la rédaction de rapports scientifiques (publications)
- Présentation orale (poster) sur la base d'un article scientifique récent qu'il sélectionne l'étudiant

La recherche scientifique

- Dans de la communauté scientifique, l'information passe essentiellement par le biais des publications scientifiques.
 - La communication et recherche scientifique sont étroitement liés entre elles, voire même complémentaires.
-
- Sans recherche on n'a rien à communiquer et sans communication la recherche n'avance pas.
 - La recherche a pour but le progrès scientifique, qui est en faveur de l'humanité et non pas d'une seule personne et il ne peut être réalisé qu'en collaboration entre scientifiques.
 - La recherche scientifique consiste en une démarche rationnelle, organisée et rigoureuse, pour étudier et comprendre

La recherche scientifique

- La recherche scientifique se déroule dans des lieux particuliers, qui offrent aux chercheurs les moyens d'exercer leur activité.
- La recherche dans le domaine des sciences humaines et sociales, l'activité de recherche peut se dérouler hors des murs du laboratoire.
- La recherche scientifique regroupe différents corps de métier : chercheurs ingénieurs, techniciens, administratifs...regroupés dans le cadre d'un laboratoire de recherche
- Les productions de la recherche sont diverses: il peut s'agir de publications, de brevets, de communications orales, posters (participation aux congrès scientifiques)...

Le protocole de la recherche scientifique (plan)

- Le protocole de la recherche scientifique est bien concerté après une meilleure recherche bibliographique (consultation des articles scientifiques)



- Les articles scientifiques sont sous formes de plusieurs types:

Article de recherche: présente des résultats originaux (plus de 5 pages, structure IMReD)

Article de synthèse (review): regroupe tout les travaux scientifiques publiés sur un sujet bien défini (n'est pas en structure IMReD, absence de la partie matériel et méthodes et discussion).

article rapide (short communication) : présente des résultats préliminaires. (2 à 5 pages, structure IMReD)



Contents lists available at ScienceDirect

Asian Pacific Journal of Tropical Medicine

Journal homepage: www.elsevier.com/locate/apjtm



Document heading doi:

Antioxidant and anti-glycation activities correlates with phenolic composition of tropical medicinal herbs

JS Ramkissoon¹, MF Mahomoodally^{1*}, N Ahmed², AH Subratty¹

¹Department of Health Sciences, Faculty of Science, University of Mauritius, Reduit, Mauritius

²School of Healthcare Science, Manchester Metropolitan University, Manchester, United Kingdom

ARTICLE INFO

Article history:

Received 10 October 2012

Received in revised form 15 November 2012

Accepted 15 December 2012

Available online 20 July 2013

Keywords:

Food plants
Anti-glycation
AGEs
Antioxidants
TPC
DPPH
FRAP

ABSTRACT

Objective: To determine the contribution of total phenolic content (TPC) in glycation inhibitory activity of common tropical medicinal food and spices with potential antioxidative properties. **Methods:** *In vitro* glucose-bovine serum albumin (BSA) assay was used. Ethanolic extracts of ten common household condiments/herbs (*Allium sativum*, *Zingiber officinale*, *Thymus vulgaris*, *Petroselinum crispum*, *Murraya koenigii* Spreng, *Mentha piperita* L., *Curcuma longa* L., *Allium cepa* L., *Allium fistulosum* and *Coriandrum sativum* L.) were evaluated for antioxidative activity by 2,2-diphenyl-2-picrylhydrazyl (DPPH), and ferric reducing antioxidant power (FRAP) and the TPC, flavonoid and tannins content were determined. **Results:** Findings showed good correlation between TPC/DPPH ($r = 0.8$), TPC/FRAP ($r = 0.8$), TPC/Anti-glycation ($r = 0.9$), DPPH/Anti-glycation ($r = 0.6$), FRAP/Anti-glycation ($r = 0.9$), Flavonoid/Anti-glycation ($r = 0.7$) and Tannins/Anti-glycation ($r = 0.8$) and relatively fair correlation for TPC/Flavonoids ($r = 0.5$) and TPC/Tannins ($r = 0.5$). Results imply that these plants are potential sources of natural antioxidants which have free radical scavenging activity and might be used for reducing oxidative stress. **Conclusions:** The positive glycation inhibitory and antioxidative activities of these tropical herbs suggest a possible role in targeting ageing, diabetic complications and oxidative stress related diseases.

1. Introduction

Diabetes mellitus is a very common chronic disease which is associated with oxidative stress and non-enzymatic protein glycation^[1]. The formation of advanced glycation endproducts (AGEs) is accelerated in hyperglycaemic

antioxidant activity associated with type 2 diabetes may be a primary factor in the vascular disease that diabetics often develop^[6]. Antioxidants protect against glycation-derived free radicals and have been proposed as therapeutic agents^[7]. Diabetes can be treated more effectively by the synergistic effect of compounds offering antioxidant and anti-glycation properties than targeting each individually^[8].

aromatic rings), but also molecules with one phenol ring, such as phenolic acids and phenolic alcohols^[12]. Phenolic compounds are a much diversified group of phytochemicals that are widely distributed in plants, such as fruits, vegetables, tea, olive oil, and tobacco^[13]. Recently, the identification and development of phenolic compounds or extracts from different plants considered powerful antioxidants *in vitro* has become a major area of health- and medical-related research^[11]. Nowadays, there is a growing interest in substances exhibiting antioxidant properties, which are supplied to human organisms as food components or as specific preventive pharmaceuticals^[14]. Many researchers have suggested that polyphenols may play an important role in preventing obesity^[15], coronary heart disease^[16], colon cancer^[17], gastrointestinal disorders^[18] and can also reduce the risk of diabetes^[12]. Therefore, the process of AGEs formation may be retarded by antioxidative agents by preventing further oxidation of Amadori product and metal-catalyzed glucose oxidation. In this regard, several natural compounds known to possess antioxidative property, such as curcumin, and flavonoid-rich extracts, have been shown to prevent AGEs formation *in vitro* and *in vivo*^[19]. Plant-based foods can improve glucose metabolism as well as enhance the overall health of diabetic patients^[20]. In addition to the increasingly well-studied benefits of fruits and vegetables, many common household spices can

glycation potential demonstrated both a linear correlation and also no correlation in other cases^[26]. The main purpose of this study was to compare the anti-glycation abilities to the TPC and antioxidant properties of ten common food plants of the Mauritian diet. This work is an attempt to find a link between common household spices and type 2 diabetes. Common household spices including *Allium sativum*, *Zingiber officinale*, *Thymus vulgaris*, *Petroselinum crispum*, *Murraya koenigii* Spreng, *Mentha piperita* L., *Curcuma longa* L., *Allium cepa* L., *Allium fistulosum* and *Coriandrum sativum* L. were researched so that any link found could lead to practical home-based recommendations for dietary modifications as strategic therapeutic treatment for diabetes.

2. Materials and methods

2.1. Chemicals

Bovine serum albumin (BSA; Fraction V, fatty acid free, low endotoxin), D-glucose, sodium azide, phosphate buffered saline, aminoguanidine, urea, trichloroacetic acid (TCA), Folin-Ciocalteu's phenol reagent, 2,2-diphenyl-1-picrylhydrazyl (DPPH), ascorbic acid, gallic acid, anhydrous sodium carbonate, ethanol, methanol 100%, iron(III) chloride 6-hydrate, potassium ferricyanide, potassium dihydrogen

Le protocol de la recherche scientifique (plan)

3. Results

3.1. In vitro anti-glycation activity of extracts

The positive control aminoguanidine inhibited formation of fluorescent AGEs ($P < 0.05$) by 75.9% as shown in Figure 1. In vitro glycation assays demonstrated that the ten extracts (garlic, ginger, thyme, parsley, curry leaves, pepper mint, turmeric, onion, green onion scallion and coriander) exerted marked inhibition of fluorescent AGEs formation as depicted in Figure 1. When glycation was monitored over 2 weeks the percentage inhibition was found to be: garlic (26.1%), ginger (25.7%), thyme (42.3%), parsley (41.2%), curry leaves (40.9%), pepper mint (39.8%), turmeric (39.3%), onion (11.9%), scallion (27.9%) and coriander (38.8%).

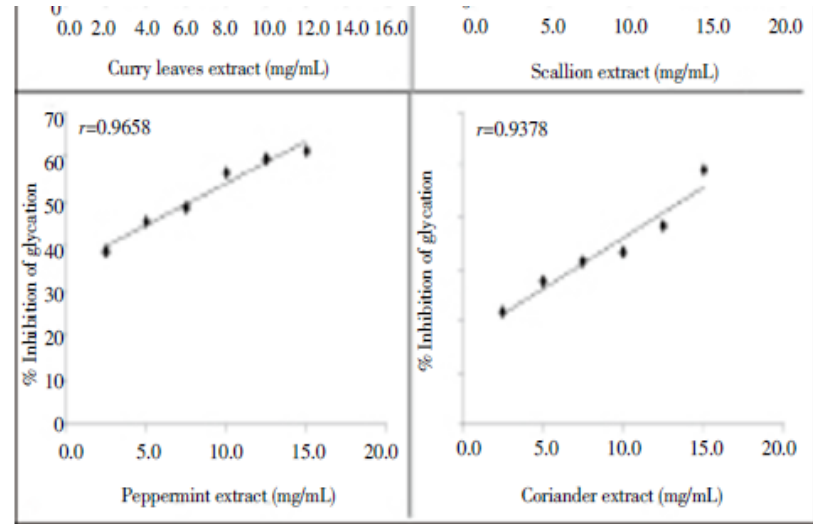
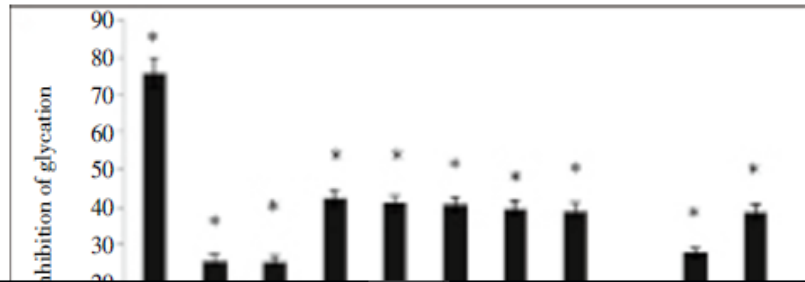


Figure 2. Inhibition of fluorescent AGEs by graded concentrations of curry leaves, scallion, peppermint and coriander.

Fluorescent AGEs formed by glycation of BSA (1 mg/mL) by 200 mM glucose in the presence of 2.5–15.0 mg/mL extract at 37 °C for two weeks. Results are presented as mean \pm SD ($n=3$).

3.3. DPPH-radical-scavenging capacity of extracts of different herbs and spices

Free radical scavenging capacity of the extracts was

Activate Windows
Go to Settings to activate

Le protocol de la recherche scientifique (plan)

Comparison of tannins content to anti-glycation capacity revealed a positive correlation of $r = 0.8$ for onion, curry leaves, garlic and ginger (Figure 5E). Peppermint and turmeric showed low glycation inhibitory activity with low tannins content while coriander, scallion and parsley showed relatively high glycation inhibition with low tannins content and thyme showed relatively high inhibition of glycation with high tannins content (Figure 5D).

4. Discussion

In the present study we evaluated the anti-glycating effect of ethanolic extracts of various plant-based foods of the Mauritian diet. Nine out of the ten plants investigated showed significant inhibitory potential against *in vitro* protein glycation. Prominent among them were thyme, parsley, curry leaves, turmeric, pepper mint and coriander which inhibited *in vitro* fluorescent AGE formation to 38%–42% at 10 mg/mL concentration. However, their respective anti-glycating activity was relatively less than that of aminoguanidine. The mechanism of anti-glycation activity of the extracts was not explored; however, the relationships between TPC, antioxidative properties and

further oxidation of glycated proteins and metal-catalyzed oxidation of glucose that leads to the formation of AGEs^[34]. Our study demonstrated that the anti-glycation activity of the extracts was correlated with their antioxidant properties. The results suggest that the antioxidant and anti-glycation properties of food plants could be explained, at least in part, by the synergistic effect of phenolic compounds present in the extracts. Recently other compounds having antioxidant power have been reported to exhibit anti-glycation activity^[1]. However, the anti-glycation potency seems to correlate only partially with the antioxidative property. Therefore, to investigate the antioxidant activity of compound(s), choosing an adequate assay based on the compound(s) of interest is critical^[17]. These findings lead the authors to conclude that other mechanisms must be involved in the anti-glycation activity of these extracts. More specific studies are needed to address that question. Nonetheless, anti-glycation activities were positively correlated with TPC, DPPH radical scavenging activity and FRAP potential. Flavonoids, particularly the quercetin (as a flavonol) has been associated with a reduced incidence of heart disease in diabetes mellitus^[22]. The scavenging of free radicals derived from glycation may play an important role in this phenomenon. This mechanism may help to provide a protective effect against hyperglycaemia mediated

Le protocol de la recherche scientifique (plan)

as valuable adjuvants, promoting the health of the aged and diabetics. Hence the cumulative effect of antioxidant and anti-glycating activities might contribute to effective action. The beneficial effects of dietary agents observed *in vivo*[3] provide an indication of their potential use for the management of diabetic complications. Nutritional intervention has been shown to have an important role in the management of diabetes and its complications. Current dietary strategies are centered on nutrients, energy restriction, and antioxidant and hypoglycaemic effects[33] but are not focused sufficiently on the anti-glycating activity by dietary components. Food-derived and exogenous AGEs have not received adequate recognition as risk factor for diabetic complications[41-44]. Therefore, effective restriction of those dietary components and/or modulation of food-derived AGE by blending those foods with the diet sources having anti-glycating potential should be considered for the optimal management of AGE-mediated pathologies[22], particularly for those who are at risk of developing diabetic complications.

Nonetheless, the major question that needs to be addressed is whether TPC and antioxidant potential of food plants are predictive of the ability to inhibit protein glycation. It is known that Flavonoids and other constituents in plants inhibit protein glycation. However, the top dietary sources

functioning as anti-cancer agents. Moderately spicing our food can thus bring some beneficial health effects.

Conflict of interest statement

We declare that we have no conflict of interest.

Acknowledgements

We are grateful to the University of Mauritius and the Tertiary Education Commission, Mauritius for financial support.

References

- [1] Wu CH, Huang SM, Yen GC. Silymarin: A novel antioxidant with antiglycation and antiinflammatory properties *in vitro* and *in vivo*. *Antioxidant and Redox Signaling* 2011; **14**:353–366.
- [2] Kelble A. Spices and type 2 diabetes. *Nut & Fd Sci* 2005;**35**(2):81–87.
- [3] Saraswat M, Reddy PY, Muthenna P, Reddy GB. Prevention of non-enzymic glycation of proteins by dietary agents: prospects for alleviating diabetic complications. *Brit J of Nut* 2009; **101**:1714–1721.

Le protocol de la recherche scientifique (plan)

Article de synthèse (review): regroupe tout les travaux scientifiques publiés sur un sujet bien défini



REVIEW ARTICLE

Phytochemical screening and Extraction: A Review

ABSTRACT

Plants are a source of large amount of drugs comprising to different groups such as antispasmodics, emetics, anti-cancer, antimicrobials etc. A large number of the plants are claimed to possess the antibiotic properties in the traditional system and are also used extensively by the tribal people worldwide. It is now believed that nature has given the cure of every disease in one way or another. Plants have been known to relieve various diseases in Ayurveda. Therefore the researchers today are emphasizing on evaluation and

Prashant Tiwari*, Bimlesh Kumar, Mandeep Kaur, Gurpreet Kaur, Harleen Kaur

Department of Pharmaceutical Sciences, Lovely School of Pharmaceutical Sciences, Phagwara, Punjab

Le protocol de la recherche scientifique (plan)


Article de synthèse (review): regroupe tout les travaux scientifiques publiés sur un sujet bien défini

Zoom avant (Ctrl+Plus)

ARTICLE IN PRESS


Journal of Ethnopharmacology ■ (■■■■) ■■■-■■■

Contents lists available at ScienceDirect

 **ELSEVIER**

Journal of Ethnopharmacology

journal homepage: www.elsevier.com/locate/jep



Review

Citrullus colocynthis (L.) Schrad (bitter apple fruit): A review of its phytochemistry, pharmacology, traditional uses and nutritional potential

Abdullah I. Hussain^{a,b,*}, Hassaan A. Rathore^b, Munavvar Z.A. Sattar^b, Shahzad A.S. Chatha^a, Satyajit D. Sarker^c, Anwar H. Gilani^{d,e,**}

^a Department of Applied Chemistry & Biochemistry, Government College University, Faisalabad, Pakistan
^b School of Pharmaceutical Sciences, University Sains Malaysia, Penang, Malaysia
^c Medicinal Chemistry and Natural Products Research Group, School of Pharmacy and Biomolecular Sciences, Faculty of Science, Liverpool John Moores University, James Parsons Building, Byrom Street, Liverpool L3 3AF, England, UK
^d Department of Biological and Biomedical Sciences, Aga Khan University Medical College, Karachi 74800, Pakistan
^e Department of Pharmacy, College of Health Sciences, Mekelle University, PO Box 1871, Mekelle, Ethiopia

ARTICLE INFO

Article history:
Received 28 December 2013
Received in revised form
2 June 2014
Accepted 3 June 2014

Keywords:

ABSTRACT

Ethnopharmacological relevance: *Citrullus colocynthis* (L.) Schrad is a valuable cucurbit plant, widely distributed in the desert areas of the world. *Citrullus colocynthis* fruits are usually recognized for its wide range of medicinal uses as well as pharmaceutical and nutraceutical potential. This review aims to appraise the published information on the ethnobotanical knowledge, phytochemistry, ethnopharmacology, nutraceutical potential and safety studies of *Citrullus colocynthis* (bitter apple) fruit, with critical analysis on the gaps and potential for future studies.

Material and methods: A literature survey was performed by searching the scientific databases including

Le protocole de la recherche scientifique (plan)

Article de synthèse (review): regroupe tout les travaux scientifiques publiés sur un sujet bien défini



ELSEVIER

International Journal of Antimicrobial Agents 26 (2005) 343–356

INTERNATIONAL JOURNAL OF
**Antimicrobial
Agents**

www.ischemo.org

Review

Antimicrobial activity of flavonoids

T.P. Tim Cushnie, Andrew J. Lamb*

School of Pharmacy, The Robert Gordon University, Schoolhill, Aberdeen AB10 1FR, UK

Abstract

Flavonoids are ubiquitous in photosynthesising cells and are commonly found in fruit, vegetables, nuts, seeds, stems, flowers, tea, wine, propolis and honey. For centuries, preparations containing these compounds as the principal physiologically active constituents have been used to treat human diseases. Increasingly, this class of natural products is becoming the subject of anti-infective research, and many groups have isolated and identified the structures of flavonoids possessing antifungal, antiviral and antibacterial activity. Moreover, several groups

Le protocole de la recherche scientifique (plan)

Article de synthèse (review): regroupe tout les travaux scientifiques publiés sur un sujet bien défini

660

Asian Pac J Trop Dis 2016; 6(8): 660-667

HOSTED BY



ELSEVIER

Contents lists available at [ScienceDirect](#)

Asian Pacific Journal of Tropical Disease

journal homepage: www.elsevier.com/locate/apjtd



Review article

doi: 10.1016/S2222-1808(16)61106-4

©2016 by the Asian Pacific Journal of Tropical Disease. All rights reserved.

In vitro and *in vivo* protocols of antimicrobial bioassay of medicinal herbal extracts: A review

Najeeb Ullah¹, Abida Parveen¹, Rahat Bano¹, Iqra Zulfiqar¹, Mukharma Maryam¹, Sadia Jabeen¹, Amna Liaqat¹, Sohail Ahmad^{2*}

¹Department of Biochemistry, Bahauddin Zakariya University, Multan-60800, Punjab, Pakistan

²Department of Chemistry, Qurtuba University of Science and Information Technology Peshawar, Peshawar 25120, Pakistan

ARTICLE INFO

ABSTRACT

Article history:
Received 8 Mar 2016

Antimicrobial susceptibility testing against pathogenic microorganisms is the most significant task of clinical microbiology laboratory. The present study was therefore designed to review

Le protocol de la recherche scientifique (plan)

Article de recherche: présente des résultats originaux

Hindawi Publishing Corporation
The Scientific World Journal
Volume 2014, Article ID 874824, 6 pages
<http://dx.doi.org/10.1155/2014/874824>



Research Article

Protective Role of Catechin and Quercetin in Sodium Benzoate-Induced Lipid Peroxidation and the Antioxidant System in Human Erythrocytes *In Vitro*

Gamze Yetuk, Dilek Pandir, and Hatice Bas

Department of Biology, Faculty of Arts and Science, Bozok University, 66100 Divanli Yolu/Yozgat, Turkey

Le protocol de la recherche scientifique (plan)

Article de recherche: présente des résultats originaux

Potential *in vitro* Protective Effect of Quercetin, Catechin, Caffeic Acid and Phytic Acid against Ethanol-Induced Oxidative Stress in SK-Hep-1 Cells

Ki-Mo Lee^{1,2}, Hyung-Sik Kang², Chul-Ho Yun^{2,*} and Hahn-Shik Kwak^{1,*}

¹Department of Biomedical Science & Biotechnology, Pai-Chai University, Daejeon 302-735,

²School of Biological Sciences and Technology, Chonnam National University, Gwangju 500-757, Republic of Korea

Abstract

Phytochemicals have been known to exhibit potent antioxidant activity. This study examined cytoprotective effects of phytochemicals including quercetin, catechin, caffeic acid, and phytic acid against oxidative damage in SK-Hep-1 cells induced by the oxidative and non-oxidative metabolism of ethanol. Exposure of the cells to excess ethanol resulted in a significant increase in cytotoxicity, reactive oxygen species (ROS) production, lipid hydroperoxide (LPO), and antioxidant enzyme activity. Excess ethanol also caused a reduction in mitochondrial membrane potential (MMP) and the quantity of reduced glutathione (GSH). Co-treatment of cells with ethanol and quercetin, catechin, caffeic acid and phytic acid significantly inhibited oxidative ethanol metabolism-induced

Le protocol de la recherche scientifique (plan)

Article de recherche: présente des résultats originaux

476

Biol. Pharm. Bull. 38, 476–481 (2015)

Vol. 38, No. 3

Regular Article

Structure-Dependent Inhibitory Effects of Green Tea Catechins on Insulin Secretion from Pancreatic β -Cells

Yukiko K. Kaneko, Miki Takii, Yumiko Kojima, Hiroko Yokosawa, and Tomohisa Ishikawa*

Department of Pharmacology, Graduate School of Pharmaceutical Sciences, University of Shizuoka; 52-1 Yada, Suruga-ku, Shizuoka 422-8526, Japan.

Received November 17, 2014; accepted January 6, 2015

The effects of green tea catechins on glucose-stimulated insulin secretion (GSIS) were investigated in the β -cell line INS-1D. Epigallocatechin gallate (EGCG) at $10\mu\text{M}$ or galliccatechin gallate (GCG) at $30\mu\text{M}$ caused significant inhibitory effects on GSIS, and each of these at $100\mu\text{M}$ almost abolished it. In contrast, epicatechin (EC) or catechin (CA) had no effect on GSIS at concentrations up to $100\mu\text{M}$. We thus investigated the structure–activity relationship by using epigallocatechin (EGC) and galliccatechin (GC) containing a trihydroxyl group in the B-ring, and epicatechin gallate (ECG) and catechin gallate (CG) containing the gallate moiety. EGC, GC, and ECG caused an inhibition of GSIS, although significant effects were obtained only at $100\mu\text{M}$. At this concentration, EGC almost abolished GSIS, whereas GC and ECG partially inhibited it. In contrast, CG did not affect GSIS at concentrations up to $100\mu\text{M}$. EGCG also abolished the insulin secretion induced by tolbutamide, an ATP-sensitive K^+ channel blocker, and partially inhibited that induced by 30mM K^+ . Moreover, EGCG, but not EC, inhibited the oscillation of intracellular Ca^{2+} concentration

Le protocol de la recherche scientifique (plan)

Article rapide (*short communication*) : présente des résultats préliminaires.

Aquaculture International 5, 277–282

SHORT COMMUNICATION

The pathogenicity of a baculo-like virus isolated from diseased penaeid shrimp obtained from China for cultured penaeid species in Hawaii

Y. Lu¹, L.M. Tapay¹, P.C. Loh^{1*}, R.B. Gose² and J.A. Brock²

¹Department of Microbiology, University of Hawaii, Honolulu, HI 96822, USA and ²Aquaculture Development Program, State of Hawaii, Honolulu, HI 96822, USA

KEYWORDS: Baculo-like virus, Pathogenicity, Penaeid shrimp

In 1993, the production of cultivated *Penaeus chinensis* (also known as *P. orientalis*) in China dropped dramatically owing to mass mortality due to unidentified causes. The disease was acute and lethal, taking only 2–3 days from onset to 100% mortality of the affected *P. chinensis* population. Also dramatically affected by the disease was *P. japonicus* (pink shrimp) cultured in China. The causative agent(s) of the

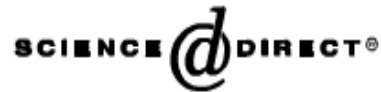
Le protocol de la recherche scientifique (plan)

Article rapide (*short communication*) : présente des résultats préliminaires.



ELSEVIER

Available online at www.sciencedirect.com



Journal of Invertebrate Pathology 89 (2005) 176–178

Journal of
INVERTEBRATE
PATHOLOGY

www.elsevier.com/locate/yjipa

Short communication

Ascosphaera aggregata contamination on alfalfa leafcutting bees in a loose cell incubation system

R.R. James^{*}, T.L. Pitts-Singer

USDA-ARS Bee Biology and Systematics Laboratory, Department of Biology, Utah State University, Logan, UT 84322-5310, USA

Received 26 October 2004; accepted 25 February 2005

Available online 7 April 2005

Abstract

Le protocole de la recherche scientifique (plan)

Article rapide (*short communication*) : présente des résultats préliminaires.

Veterinary Record 2011;168:131 doi:10.1136/vr.c6281

Research

Short Communication

Short Communications

Short Communications

Prevalence of obesity in a population of horses in the UK

H. M. Stephenson, M. J. Green, S. L. Freeman

OBESITY predisposes to important conditions in horses, such as laminitis and equine metabolic syndrome (Treiber and others 2006). Wyse and others (2006) reported a prevalence of obesity of 45 per cent in pleasure riding horses in Scotland, but the prevalence of obesity in the wider UK horse population is currently unknown. This study assessed the prevalence of obesity in a selected population of leisure horses. The relationships between the estimated body condition score of the horses, owners' perceptions of body condition and owners' attitudes towards equine obesity were investigated.

Clients were selected from the client database of an equine veterinary practice. The inclusion criteria were that the client was situated in Leicestershire or Nottinghamshire, had joined the practice in the past five years, and was not a professional horse owner. Professional owners were defined as owners of breeding, livery or riding stables, or those competing at a professional level. A questionnaire, body condition scoring sheet and explanatory letter were sent to all eligible clients during August and September 2006. All the owners were invited to an evening of seminars at the conclusion of the study, discussing obesity and related health problems, and the outcomes of the study.

The questionnaire consisted of closed, multiple choice questions concerning the type, management and feeding of the horse. The owners were asked to score the body condition of their horse, using a scoring sheet (Anon 2010). Descriptive data analysis was conducted by plotting the condition scores against feeding and exercise management to evaluate trends.

A total of 506 questionnaires were distributed, of which 160 (31.6 per cent) were returned. Table 1 shows the distribution of body

TABLE 1: Body condition score of 158 horses, as assessed by their owners (0 Very poor, 5 Very fat)

Body condition score*	Number (%) of horses
0-1.5	3 (1.9)
2-2.5	22 (13.9)
3-3.5	105 (66.5)
4-4.5	28 (17.7)
5	0 (0)

* Anon (2010)

the horses had had lameness (excluding laminitis), and 11.3 per cent had had laminitis in the past three years. No significant associations between lameness and body condition score were identified.

On the basis of the results from this initial questionnaire, conventional sample size estimates identified that a sample of 14 horses would be needed to make a comparison between owner-scored and researcher-scored horses (assuming a detectable difference in mean body condition score of ≥ 0.5 , power = 0.80 and significance $P=0.05$). Having given informed consent, 15 clients were randomly selected (www.random.org) for a visit and interview, scheduled during September and October, during which the researcher body condition scored the horse, and asked the owner five structured questions regarding the horse's weight control and diet. The researcher was blinded to the owner's body condition scoring of the horse. The body condition scores assigned by the owner and the researcher were compared using the kappa statistic (Minitab v15).

None of the 15 clients that were visited had body condition scored their horse previously, although 12 of them reported using other methods of weight assessment. For these 15 horses, the mean (median) condition score assigned by the researcher was 3.3 (4), significantly higher than the score assigned by the owners 3.1 (5) (Kruskal-Wallis test, $P=0.03$). Eight of the owners who were visited had scored their horse at least one grade lower than the researcher. There was poor agreement between the body condition scores assigned by the owner and the researcher ($\kappa=0.04$).

In this study, the questionnaire completed by the owners reported the prevalence of overweight horses as 20.6 per cent, which is