

Abstracts

The editorial assistants in consultation with the editors selected relevant abstracts from Medline as well as abstracts from the Pacific Kava Research Symposium, which was held at the Forum Secretariat, Suva, Fiji on the 6, & 7 November 2002. Abstracts were chosen based on its significance to health priority issues as well as its relevance to Pacific health providers.

Selected abstracts from Medline on Oral Health

Prevention of Betel Quid Chewers' Oral Cancer in the Asian-Pacific Area.

Chiba I.

Oral Diagnosis and Oral Medicine, Oral Patho-biological Science, Hokkaido University Graduate School of Dental Medicine, Sapporo 060-8586, Hokkaido, Japan. ic@den.hokudai.ac.jp Asian Pac J Cancer Prev. 2001;2(4):263-269.

"Betel quid chewers' oral cancer" is one of the most common malignancies in South and Southeast Asian countries. Oral premalignancies are also very common in betel quid chewers and about 10% of these undergo malignant transformation. Although education for cessation of the betel quid chewing habit is important, there are few adequate strategies and policies for primary prevention, health promotion and education related to oral cancer control, especially in rural areas. In addition to oral health education, it is also crucial to establish a data-management system as well as monitoring and evaluation systems for oral cancer prevention.

Dental disease prevention and people with special needs.

Glassman P, Miller C.

Advanced Education in General Dentistry Program, University of the Pacific School of Dentistry, San Francisco, CA 94115, USA. pglassman@sf.uop.edu, J Calif Dent Assoc. 2003 Feb;31(2):149-60.

People with special needs are the most underserved of the underserved in our society. They have more dental disease, more missing teeth, and more difficulty obtaining dental care than other segments of the population. Many individuals and groups, including the authors of this paper, have developed community-based systems to improve oral health for people with special needs. However, these systems have not been as successful as they might be because of lack of effective preventive protocols specifically designed for people with special needs. This paper reviews strategies for overcoming informational, physical, and behavioral barriers to oral health and presents a summary of the results of a conference titled "Practical Preventive Protocols for Prevention of Dental Disease in People with Special Needs in Community Settings." The rationale for using an Oral Health Care Plan is presented as well as a sample plan. These strategies and protocols are

designed to complement the system of supported community-based oral health care. The goal of this system is to help people with special needs enjoy a lifetime of oral health the same as other members of our society.

Changed oral conditions, between 1963 and 1999, in the population of the Tokelau atolls of the South Pacific.

Cutress TW.

Department of Pathology, Wellington School of Medicine, University of Otago, PO Box 7343, Wellington. N Z Dent J. 2001 Dec;97(430):132-6.

In 1999, an oral health survey was included in an assessment of the community oral health programme of the Tokelau Islands population. This provided a comparison with a similar survey in 1963. In a convenience sample of 386 children and adults, approximately 30 percent of the total population, the deciduous (number of df teeth) and permanent (number of DMF teeth) tooth scores across all age groupings were higher in 1999 compared with 1963. For 15- to 19-year-olds, the mean DMF scores were 8 and 1; and for 35- to 44-year-olds, the scores were 18 and 4 in 1999 and 1963 respectively. The prominent feature of the DMF scores for those over age 25 years was the numbers of missing (M) teeth. The mean number of M teeth at 20-24 years was 5 and 0, and at 35-44 years, 13 and 2 respectively in 1999 and 1963. Periodontal disease

was endemic in adults in both surveys. A serious decline in oral health has occurred over the past 35 years.

The sequential modular curriculum for oral health personnel: an evaluation of the Fijian experience after five years.

Tuisuva J, von Doussa R, Dimmer A, Smyth J, Davies G. *School of Oral Health, Fiji School of Medicine. Community Dent Health. 1999 Jun;16(2):97-101.*

In 1993 a new sequential modular curriculum was introduced for the training and education of oral health personnel in Pacific Island countries. The five-year model provided a multi-stage course with the opportunity to exist at the level of dental hygienist after two years, dental therapist or dental technologist after three years and dental surgeon after five years. After five years' experience the principles involved in the introduction of such a curriculum have been confirmed as educationally sound. The model may also be useful for introduction in other countries providing its structure and the details of individual modules are tailored to local social, cultural and demographic needs.

Caries prevalence in 12-year-old schoolchildren in New Caledonia.

Bourgeois D, Gaillard P, Doury J.

WHO Collaborating Centre for Research into Health Care Systems and Oral Health Sciences Education, Faculty of Dentistry, University of Lyon, France. Community Dent Health. 1996 Jun;13(2):93-5.

This study reports on the most recent epidemiological survey undertaken in New Caledonia, a French dependency in the South Pacific. Three hundred and twenty-five 12-year-old children were selected from schools using the World Health Organization pathfinder sampling methodology. The results showed a DMFT of 4.09. This places New Caledonia in the 'moderate' category on the World Health Organization scale of caries severity for 12-year-old children. Two oral health risk groups were identified: Melanesian and Wallisian children. Different approaches to promoting oral health in New Caledonia, taking into account local socio-cultural traditions, are proposed.

A new approach to the training and education of oral health personnel.

Davies GN, Atalifo SF, Tuisuva J, King T, Mucunabitu M, Nawawabalavu N, Singh V, Vukunisiga S. N Z Dent J. 1993 Oct;89(398):113-8.

An innovative curriculum has been designed for the Fiji School of Medicine to enable dental personnel to proceed through a sequence of educational modules on a career path leading from a dental assistant through other auxiliary grades to a dentist with a BDS degree. The courses for each grade are formulated to be relevant to the pattern of oral diseases in Fiji and the Pacific Islands; be designed in accordance with specified job-descriptions; have a strong community orientation, with emphasis on prevention and the promotion of oral health; permit exit and re-entry at each level; incorporate, where appropriate, the principle of problem-based learning; and incorporate procedures to ensure early establishment of clinical skills. Details of the first year and an outline of the structure of the course for the subsequent years are presented.

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Oral health in Tuvalu.

Speake JD, Malaki T. Community Dent Oral Epidemiol. 1982 Aug;10(4):173-7.

Current WHO methods were employed to estimate the prevalence of oral pathology, dentofacial anomalies, periodontal disease, caries and prosthetic status as well as treatment needs in Tuvalu, a newly emergent nation in the South Pacific. Fluorosis was endemic but other disorders of teeth, mucosa or bone were extremely rare and the presence of dentofacial anomalies was very low. Periodontal disease was "moderate" at 15 years of age but seemed to be a predisposing factor in caries from the late teens onward. Comparison with a survey 8 years previously indicated that caries rates had risen from "very low" to "low" at 12 years of age but treatment services had improved markedly. More than half of person in the 55-64 year age group required full maxillary and mandibular dentures whilst 10% already possessed them.

Dental beliefs, behaviors and health status among Pacific Asians Caucasians.

Kiyak HA. Community Dent Oral Epidemiol. 1981 Feb;9(1):10-4.

A sample of 50 Caucasians and 46 Pacific Asians were asked to describe their beliefs regarding the causes and consequences of dental disease. The relation among dental beliefs, behaviors and oral health status was examined for each ethnic group. Although Caucasians had more accurate knowledge, they reported fewer health behaviors and had poorer oral health than Asians. Asians knew little about dental disease, but were motivated to maintain their teeth by a concern for esthetics, social acceptance and pain. The findings indicate that important cultural differences exist in dental behaviors, and are related to knowledge and motives.

Oral health programme of the Western Pacific Region of the World Health Organization.

Sundram CJ. Int Dent J. 1979 Sep;29(3):201-7.

The development of the WHO Western Pacific Regional Oral Health Programme was briefly traced through two of the three multi-phased periods (from 1971-77) of WHO collaboration. The third period of development (1978-83) is by a planning exercise referred to as 'the regional oral health medium-term programme'. This exercise takes into account the problem areas at the end of the second period. Twelve quantifiable targets for achievement by 1983 are identified. Specific and general activities, approaches and strategies for achieving targets are briefly outlined. It is expected that the programmes for prevention of dental diseases will be intensified in the region during the current five-year period. There is also a growing tendency for consultants from developing countries and areas to be utilized in the region under the concept of Technical Cooperation among Developing Countries (TCDC). Systems will also be developed to monitor the progress in achieving targets in the region and changes instituted where necessary.

Dental education in the developing countries and the role of WHO.

Bezroukov V. Int Dent J. 1977 Mar;27(1):18-24.

The present picture of Dental Manpower in the world is reviewed. The Dentist/Population ratio in 1972 in each of the WHO regions was as follows: African Region 1:96,391, American Region 1:2892, Eastern Mediterranean Region 1:26,188, European Region 1:2948, South East Asia Region 1:81,606, Western Pacific Region 1:4533. There was wide variation of this ratio between individual countries within each region. The present approach to the dental education of all types of dental personnel in the

developing countries is described. The activity of WHO in organizing seminars and conference on the needs of the regions in relation to types of dental personnel and their training is discussed. Attention is drawn to the strong recommendation of WHO to plan the dental health manpower training in close conformity with a country's Oral Health needs. The importance of integration of the training programmes for the various categories of dental personnel is stressed.

Response to unethical behavior in oral health care.

Peltier B.

School of Dentistry, University of the Pacific, San Francisco, CA, USA. bpeltier@uop.edu, *J Am Coll Dent.* 1998 Fall;65(3):19-23.

By establishing appropriate "rules for discussion," it was possible for a diverse group of professionals involved in oral health care to reach agreement on several aspects of defining, confronting, and preventing unethical behavior. A set of specific recommendations is offered, centered in the perspective that patient well-being is paramount.

Oral health and personnel needs in the Pacific.

Finau SA.

Community Health Services, South Pacific Commission, Noumea, New Caledonia. *Aust Dent J.* 1996 Feb;41(1):53-8.

A regional review of oral health in the Pacific showed the major problems to be dental caries, periodontal diseases, poor dental health service management and lack of appropriate dental personnel. A strategy for training appropriate dentists to manage oral health services in the Pacific was suggested. Such a strategy must include training of ancillary and auxiliary dental health workers guided by dentists with clinical and managerial competencies. The training programme for dentists must be career-ladder, problem-based, and community-oriented with competency-based learning of a spiral of tasks with increasing sophistication. The curriculum content must contain about 50 percent on public health and clinical aspects, respectively.

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Selected Abstracts from Pacific Kava Symposium (2002)

Chemical Differences Between the Water Extracts of Kava (*Piper Methysticum*) and Kava Pills

Dr Mani Naiker, Ranjani Devi, Sadaquat Ali and Subramaniam Sotheeswaran, Chemistry Department, University of the South Pacific, Laucala Campus, Suva, Fiji. Peter Winterhalter, Technische Universität Braunschweig, D-38106, Braunschweig, Germany.

Traditionally, the water extract of kava has been used in the South Pacific for centuries as a traditional and social drink. In the last century, kava became a popular remedy for stress and anxiety in many Western countries including Germany, USA and Australia. The sales of different forms of kava capsules boomed during the late 1990s. The kava boom of the 1990s declined in early 2000 as a result of alleged association between the use of kava and liver damage¹.

As concerned scientists from the University of the South Pacific, we collaborated with a German scientist in a comparative chemical analysis of the water extracts of kava and kava capsules. We analysed three kava capsules: kavosporal forte containing 32 % of kavalactones (sold in Germany); standardised kava extract containing 55 % kavalactones (sold in the USA) and kava-55 containing 55 % kavalactones (sold in Canada). We detected high concentrations of kavalactones in all the samples.

On the other hand, the water extract of kava drunk in the South Pacific had only a small (6-8%) percentage of kavalactones but it also contained a glucose polymer (30%) confirming the findings in an earlier publication² and also the kava glycosides previously reported by our group³. The kava glycosides appear to be the precursors of the biologically active kavalactones. This paper reviews the results of our previous work on the occurrence of kavalactone precursors in kava and also discusses the results of the analysis of kava capsules, which contained many additives added during the manufacture of the capsules.

There is a conspicuous difference in the kavalactone content of kava pills and the water extracts traditionally used in the South Pacific. Our finding raises the question

of the efficacy of kava pill consumption, which caused isolated cases of liver disease, and confirms the importance of testing the various kava pills in the market for liver diseases in animals.

Perspectives on the Ethnobotanical, Phytochemical, Pharmacological and Toxicological Characteristics of Kava (*Piper methysticum*)

Dr Asifo O. Ajuyah, School of Agriculture, The University of the South Pacific, Alafua Campus, Samoa. Sotheeswaran, S., School of Pure and Applied Sciences, The University of the South Pacific, Suva, Fiji; George Li., Herbal Medicines Research Centre, Faculty of Pharmacy, The University of Sydney, Sydney, NSW 2006, Australia; Jan Pryor., Fiji School of Medicine, Suva, Fiji; Ebenebe, A. C., School of Agriculture, The University of the South Pacific, Alafua Campus, Samoa; Jeong Sim., Herbal Medicines Research Centre, Faculty of Pharmacy, The University of Sydney, Sydney, NSW 2006, Australia;

The legend on the origin of Kava (*Piper methysticum*) varies from country to country in the South Pacific region. However the use of the plant and plant products is similar across all countries as a traditional non-intoxicating beverage and

perennial herbal medicinal plant, which contains a group of biologically active compounds called kavalactones.

The kavalactones are the active ingredients that determine the psychoactive and therapeutic properties of kava. Consequently they are responsible for the traditional, economical, recreational, medicinal, and pharmacological role of kava as an important social and cash crop in the region.

Traditionally kava is prepared as a beverage by grinding, pounding or mastication of fresh or dry kava roots and subsequently mixed with water or coconut milk prior to consumption. However, in Europe and North America kava is sold in a variety of forms e.g. as capsules, tablets, tinctures, kava-leaf-products, teas and dried roots. Where it is used as a relaxant and to treat insomnia, anxiety, stress and muscle spasms.

In recent years kava has become associated with potentiating liver damage and in two extremes case death as a result of which, with only anecdotal evidences the kava export industry in the region rose from boom in 1998/1999 to doom in 2002. This paper is therefore a literature review on the current perspectives of the ethnobotanical, phytochemical, pharmacological and toxicological characteristics of kava (*Piper methysticum*).

A Review of the Toxicity of Kava in Humans

Dr Joji Malani, Senior Lecturer, Professor Robert Moulds, School of Medical Science, Fiji School of Medicine, Suva, Fiji.

Kava has been used for centuries by Pacific Islanders, but predominantly in a "ritualized" manner. More recently, it has been used in a more widespread manner, and many people now consume it in much larger quantities than has been the case in the past. Because of its long use, it can reasonably be assumed that, when used in the traditional way, it does not have frequent or obvious toxicity. However, long term toxicity, eg carcinogenicity, can be difficult to recognize, and even short term toxicity associated with a change in the method or volume of intake can take time to be recognized. It is therefore important to continue to look carefully for possible toxicity caused by kava and not assume that it lacks toxicity because of its traditional use.

We have reviewed the literature concerning possible toxicity of kava in humans. This includes an assessment of the cases reported to regulatory agencies that have resulted in recent regulatory action, although these cases were not associated with kava taken in its traditional form. We are also assessing the liver function of a series of heavy kava drinkers to better document whether or not abnormal liver function is associated with heavy kava use. The results of this assessment, together with the review of the literature, will be presented at the meeting.

Short-term effect of Sakau (Kava) on Blood Pressure

Dr Iris Lavinia Wainiqolo; Arun Deo, Sitaleki A. Finau, SPHPC, Fiji School of Medicine, Suva, Fiji.

Kava is a Pacific beverage under attack for alleged disease generation. However Kava have been used as a health promoting agent throughout the Pacific for centuries. Therefore its necessary to examine the effect of kava and its contextual role on specific risk factors and physiological processes in order to address these allegations.

This paper reports the effects of Sakau (Kava) on blood pressure of participants in 1978 at Pohnpei, Federated States of Micronesia. This was a convenient sample of 74 indigenous and expatriate participants at an evening sakau party while preparing for an epidemiological survey on modernity and non-communicable diseases in Pohnpei. The blood pressure shortly before and after Sakau consumption were recorded using a random-zero sphygmomanometer. The blood pressure was also recorded the morning after the Sakau party.

The results from this 'natural experiment' situation will be discussed from pharmacological and socio-contextual standpoint.

The Two Worlds of Kava

Dr Nancy J. Pollock, Acting Director of Development Studies, Victoria University, Wellington NEW ZEALAND.

Kava has both social power and health efficacies. It has been used in the Pacific as a major symbol of links between the ancestors and the living, the land and its productions, and of structured social relationships and well-being. It thus has strong powers of identity maintenance. In the non-Pacific world it has been used by individuals in the form of a herbal medication to relieve anxiety, induce relaxation and produce "Kava Calm" - as one brand is labeled.

The distinction between these two worlds is bridged by trade in the plant material. Pacific producers, mainly in Vanuatu, Fiji, Pohnpei and Tonga have been encouraged by the interest of European pharmaceutical companies, so that kava has become a major cash crop for them. But the German pharmaceutical ban on kava sales, based on claims of toxic harm to 38 patients in Europe has brought a swift end to those sales, with disastrous results for the livelihoods of the Pacific producers.

This paper will raise questions that link those two worlds of Kava, and require answers. Why are European women suffering ill effects when it was mainly Pacific men who have drunk kava for many years without apparent liver damage? What are the tolerances of acetone and other kava extraction processes on the human body? And, should Kava be labeled a drug to facilitate resumption of sales?

Socio-economic dimension of current kava problem

Mr Frank King, Chairman, Kava Traders, VANUATU

A.1. Overview: A discourse on how kava came to be under the microscope through commercial mismanagement and poor exploitation of a valuable resource.

A.2. Looking at the economic impact: A short overview of the economic importance of kava to the rural community in Vanuatu, Fiji, Samoa and Tonga.

A.3. Taxonomy of cultivars - organs: An insight into how the morass into which the kava industry has walked has been exacerbated for want of a standard nomenclature of plant organs and a formalised cultivar taxonomy.

B.1. The lowest common denominator: Before the fraternity of scientists assemble a rescue package for *Piper Methysticum*, due deference must be given the implementation of recommendations by the subsistence farmers who are the growers. This is not to say that subsistence farmers are intellectually impaired, but that the science fraternity should be aware of the practicalities when making proposed changes to the status quo. One of the main issues to be addressed in this connection, is that subsistence farmers are under no imperative to earn an income. Despite the latent monetary value of the crop in the ground, subsistence farmers will only respond to changes which are harmonious with their own aims and ambitions. Some of the myriad issues that need to be taken into account include: transportation, infrastructure, communications, quarantine, enforcement of regulations, financial incentives, the conflict between tradition and the modern economic realities, public and political will. In each case it will be necessary to accommodate the lowest common denominator if any regionally viable initiatives are going to have any worth while and long term benefits for the kava producing regions of the South Pacific

B.2. The farmer's point of view: An insight into the farmer's ambitions and desires from the perspective of a subsistence farmer.

The exporter's point of view: Looking at the hourglass effect that is represented by the role of regional exporters and the exporter's ability to be an effective spearhead for desirable changes to the kava industry on both the short and longer term.

The region's point of view: Some opinions concerning the legitimacy of non-traditional, commercial kava plantings outside Vanuatu, Fiji, Samoa and Tonga who may benefit by hitch hiking on regional initiatives. In other words it seems to be prudent to gear the rehabilitation of kava to the benefit of the traditional farmers rather than expend a lot of energy and resources simply to benefit business

interests who seek to invest in kava plantings for personal gain outside the region.

The consumer's point of view: Some commercial initiatives to instil a new breath of consumer confidence in kava. Also, some processes whereby kava may be protected from unfair attack and enjoy some stability as a commodity in the world herbal markets.

C.1. A summation of the current problems faced by the kava industry.

C.2. A practical look at kava as a commercially viable, herbal commodity.

C.3. Some steps that can be taken today in order prevent kava becoming once again the victim of its own success sometime in the future; including recommended legislation, industry standards linked to science based product monographs, trade practices, and self funding institutional support.

Kava Production In Tonga

Dr Siosua M. Halavatau, Mr. Taniela Hoponoa, Ministry of Agriculture, TONGA

Kava has traditionally played significant social roles in Tongan society. The accession of a king to the throne, conferring of nobles and spokesmen, and ordination of priests must have kava ceremonies. Many young men also get to know their brides through the kava ring. It has also become a means of raising funds, and all villages in the country have paid kava drinking clubs. In a night a kava club can raise up to a couple of thousand dollars.

Kava as a crop contributes significantly to the economy of the country. The production in 1998 was estimated at more than 1000 tons. Kava is mostly consumed locally. However, in the late 1990s because of pharmaceutical opportunities, kava's contribution to the economy rose rapidly and became the second export crop in 1998, fetching over \$2 millions. Kava planting also increased with the current acreage estimated at over 4000 acres. The carcinogenic effects of kava raised by European countries has not affected the planting of kava in Tonga. The Ministry of Health in Tonga has indicated that it does not have records of kava health related problems. Excessive kava drinkers, however sometimes have rough skins (scaly), a problem attributed by many to phosphorus inactivation by kava.

There are very little information regarding traditional medicinal use of kava. Interviewing elderly citizens indicated that there had been medicinal use of kava for things like difficulty in urination, colds, headaches and general ailments.

Because of the potential of kava as an export crop, the Ministry of Agriculture and Forestry has a research-

Despite the latent monetary value of the crop in the ground, subsistence farmers will only respond to changes which are harmonious with their own aims and ambitions.

extension program looking at production techniques including tissue cultures and potting seedlings, pest and disease control, and marketing.

Anticancer Activity Studies on Kava (*Piper Methisticum*) Extracts

Professor Subramaniam Sotheeswaran, Department of Chemistry, School of Pure and Applied Sciences, The University of the South Pacific, Suva, Fiji. Hirota Fujiki - Saitama Cancer Center Research Institute, Ina-Machi, Kitaadachi-Gun, Saitama-ken 362, Japan. A.A. Leslie Gunatilaka - Southwest Center for Natural Products Research, The University of Arizona, Tucson, Arizona 85706-6800, USA

In 1984, at the Fourth Symposium on Epidemiology and Cancer Registries in the Pacific Basin held in Kona, Hawaii, USA, Henderson¹ reported unusually low rates of many cancers in Fiji, the most notable being lung and colorectal cancers. He also reported that the Fijian Melanesian and Indian populations consume large quantities of green vegetables containing vitamin A precursors.

It is also well known that apart from consuming large quantities of green vegetables, the adult populations of Fiji's popular drink are *kava*. It was therefore decided that the anticancer activity study of *kava* extracts would be timely.

As a part of a study² of green tea as a cancer preventive in humans a paper was presented reviewing the work on the screening of tea polyphenols as possible preventive agents, inhibition of tumour promotion by (-) epigallocatechin gallate (EGCG), the main constituent of green tea, and anticancer activity in various organs of rodents

as a result of drinking EGCG and green tea extract. This work was extended² to include *kava* and it was found that the methanol fraction of *kava* inhibited tumor necrosis factor α (TNF α) release from mouse BALB/3T3 cells induced by okadaic acid, a tumour promoter, as potently as green tea did. This indicated that *kava* or *yaqona* has the preventive activity for humans as strong as that of green tea. It should be noted that tumour promoters like okadaic acid, induced TNF- α mRNA expression in the cells and TNF- α release into medium from the cells. In another study³, the significance of TNF- α release in carcinogenesis was confirmed by structurally different inhibitors of tumour promotion. Although TNF- α is one of the inflammatory cytokines⁴, TNF- α in the tissues is assumed to play a pivotal role in the process of human carcinogenesis.

The anticancer activity was also tested by another bioassay route⁵. For this study it was assumed that DNA is the principal target for many clinical antitumour agents. This is because tumour cells have defects in their ability to repair damage to DNA as compared with normal cells. Besides agents with selective toxicity towards DNA-repair-deficient-cells might be potential anticancer agents.

Genetically engineered yeast was used in this study as probes to detect agents which interact with DNA, because of its closer genetic and biochemical resemblance to mammalian cells. Wheat flour based *kava* lactones showed moderate preferential anticancer activity in this mechanism based yeast assay. Results also showed that the extract contained a DNA-modifying agent and not a general antifungal agent.

Health effects of kava use in Aboriginal kava users in Arnhem Land (Northern Territory) Australia: summary of results of recent studies.

Mr Alan Clough, Senior Research Officer, Menzies School of Health Research, and PhD student, Northern Territory University

Kava has been used since 1982 in a number of Aboriginal communities in Arnhem Land. This paper summarises results of recent studies that investigated some health effects of kava use in this population.

In Arnhem Land *kava* is consumed as an infusion of dried powdered *kava* in water. People tend to consume *kava* at a steady tempo in cups containing about 100ml, consuming on average 37g of *kava* powder containing around 3800mg of *kava* lactones in 670ml of water (c.55g/L) in an hour. Heaviest *kava* users may consume as much as 900g of *kava* powder equivalent to around 93000mg of lactones in a week.

In the Aboriginal population of eastern Arnhem Land in 1999, 46% of males and 18% of females were using *kava*. Up to 61% of males and 39% of females in this region

have used *kava* at some time in their lives. Tobacco, alcohol and cannabis are also used. Heaviest *kava* users are known to drink *kava* continuously through the night and up to the next

morning. Around 52% of *kava* users had a history of drinking in this manner.

Studies of the risk amongst *kava* users of hospital admission for ischaemic heart disease (IHD) and pneumonia in eastern Arnhem Land have been conducted. A tendency (not statistically significant) for an association with admissions for IHD amongst *kava* users as well as a tendency for an association with admission for pneumonia suggests that *kava*'s effects should continue to be monitored closely. However, we cannot confidently assert that *kava* consumption alone is a risk factor for IHD or pneumonia in this population.

While *kava* has been implicated in sudden cardiac deaths, no clear association was found. However, in people with compromised cardiac output as may be the case in many Aboriginal *kava* drinkers, an additional risk of such events should not be discounted.

In one community in eastern Arnhem Land a study was conducted in March 2000. Male *kava* users who did not use alcohol more frequently showed dermopathy characteristic of heavy use, and a lower body mass index.

Interviewing elderly citizens indicated that there had been medicinal use of kava for things like difficulty in urination, colds, headaches and general ailments.

They had increased levels of liver enzymes (GGT and ALP) and blood lymphocytes were decreased. No evidence of proteinuria was found. Kava users and non-users were functionally equivalent on neurocognitive tests. There was no evidence for long-term neurological damage in kava users. However, possible toxicity and withdrawal seizures in heavy kava users were recorded in the wider population. Liver enzymes return to normal upon

ceasing or reducing consumption as was found in previous studies. While there is currently no evidence for long-term liver damage in regular kava users in Arnhem Land, this requires further assessment over longer periods particularly in heavy users.

Evaluation of the Literature on Kava, 1986-2002

Yadhu N. Singh, PhD. College of Pharmacy, South Dakota State University, Brookings, SD 57007, U.S.A.

Since the first recorded reports on kava from the 17th century, a relatively large body of literature on this substance has accumulated. Various research bibliographies on kava have been produced (e.g., Marshall, 1974; Singh, 1986), but since limited scientific research had been conducted by this time, the documents listed

were, apart from chemical studies, more of historical and ethnographic interest. The pace of research in the past 20 years, on all aspects, but with scientific studies in particular, on kava and kavalactones has considerably quickened. Extensive reference to the studies can now be found in a number of publications (e.g., Singh, 1992; Lebot et al., 1997; Singh and Singh, 2002). These studies, which have used both classical and modern

techniques, deal with the mechanisms of action of kava extracts, both individual natural and synthetic kavalactones, toxicity studies, clinical trials, botanical and agronomic studies, including pests and diseases of the crop, ethnobotany and origins of the plant and commercial aspects. A number of books, monographs and books chapters dealing with broad overview of kava and its uses have also appeared. This paper will review the literature on kava which was published in the past 20 years. An evaluation will be made of the state of scientific knowledge on the subject including a preliminary assessment of some possible avenues of research that need to be addressed to provide a fuller understanding of the scientific profile of this herbal substance and the recent controversy on its alleged hepatic toxicity.

While there is currently no evidence for long-term liver damage in regular kava users in Arnhem Land, this requires further assessment over longer periods particularly in heavy users.

If merely "feeling good" could decide, drunkenness would be
supremely valid human experience
(*William James in Varieties of Religious Experience*)