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SHORT COMMUNICATION

Quality aspects of traditional and industrial Kava-extracts

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Summary

An aqueous decoction of *Piper methysticum* has been used since centuries of Pacific Island at social religious-ceremonial and social events without hepatotoxic side effects in contrast to the speculation on industrial Kava preparations. It was assumed that the traditional non-alcoholic drink contains a spectrum of other constituents compared to the acetonic and ethanolic extracts. The TLC-analysis demonstrates, however, that under qualitative aspects there is no difference between aqueous and acetonic and ethanolic extracts respectively.

Key words: Kava extracts, traditional, industrial quality, hepatotoxic risks

Introduction

Actual restrictions in the use of Kava-preparations wich were initiated on the base of a series of case reports by the German National Health Authorities are the reason for this wide spread prohibition of generally well accepted anxiolytic herbal medicine preparations. The official concerns about a possible toxicity of Kava extracts is somewhat unexpected since an aqueous decoction of *Piper methysticum* (i.e. Kava-Kava extracts) has been extensively used since centuries in a series of Pacific Islands by the native population at the occasion of social religious-ceremonial and social events (Hänsel and Woelk, 1994). There have been few reports on hepatotoxic side effects only after a relative high daily dose of kavapyrones. Methews et al. 1988 reported the increase of liver enzyme activity in the case of Kava-users and liver damage in Australian Aborigines after extensive Kava consumption. But they concluded from their findings that "there is no convincing evidence so far indicating direct kava toxicity to the liver when consumed using traditional methods. It is impossible to make any conclusion from the cases reported in Germany until more information is known about in details of individual cases".

It was postulated that these traditional aqueous extracts contained a spectrum of other constituents compared to the industrial acetonic and ethanolic extracts which are commercialized in the western countries (Möller 2002). In two publications by Lazar (1983) and Hänsel and Lazar (1985) it had been documented that industrial kava extracts prepared with organic solvents contained the same fingerprints of compounds as the traditional aqueous extracts which are consumed in much larger quantities and over longer time periods.
Based on these earlier findings the comparison of both, different organic extracts with an aqueous extract was carried out in oder to demonstrate that the hypothesis of increasing hazards by the ethanolic and acetonic extracts can no longer been postulated and seen as valid.

Fingerprint of Kava-Extracts

Comparison of aqueous, acetone, toluene and ethanol Kava extracts

In order to demonstrate possible significant differences between the classical aqueous decoction and extracts

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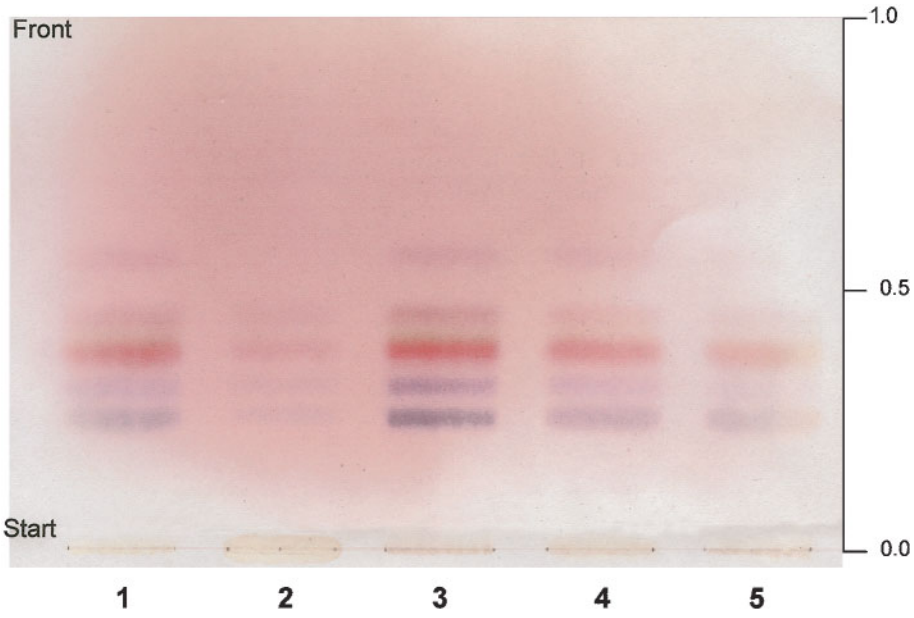

Fig. 1. TLC Comp. of different extracts; Line 1: acetone, Line 2: water, Line 3: toluene, Line 4: ethanol, Line 5: acetone. 20 µl of each extract was spottet. Detection: anisaldehyde-sulfuric acid reagent.

with organic solvents of different polarity, Kava-Kava (*Piperis methystici* rhizoma CAELO batch No: 23220242) was powdered (avarage particle size 0.5 mm). The herbal drug material had previously been analysed to contain 4.5% of total Kava lactones, calculated as Kavain according to DAC 1998. The powered Kava rhizome (0.60 g) was extracted with 10 ml of each acetone, ethanol, toluene and water under reflux in a boiling water bath. The resulting extracts were filtered and the final volume was added to 10.0 ml.

Thin layer chromatography

TLC was carried out according to DAC (2.2.27) on Aluminiumoxide 60 plates R-DAC. The solvent system was composed of hexane-ethylacetate, 70:30. Chromatographic development was done two times in the same direction (2 × 10 cm). The TLC plate was heated to 100–105 °C; the colours were recorded under day light.

The TLC-plate (Fig. 1) shows four major bands with a dark red zone corresponding to Kavain in the lower third (DAC 1998). This major Kavain-zone is present in all extracts of different polarity with, however, a weaker representation in the aqueous compared to the organic extracts. This clearly demonstrates that under qualitative aspects the different extracts are indeed comparable. The extraction with less polar solvents is, however, more efficient in dissolving the therapeutically effective Kavapyrones.

Discussion

According to the traditionally documented procedures in the areas where Kava decoctiones have been utilized for many years, the common aqueous extract is prepared from fresh decorticated Kava roots in a ratio of 1 part herbal drug and 10 parts of water. From this extract it was calculated that 10 g of purified Kava root contains approximatly 72 mg Kavapyrones. Calculated on a daily intake of 300 ml decoction, this would represent in total approximately 210 mg Kavapyrones as the active principle (Lazar, 1983; Hänsel and Lazar, 1985). In comparison, in the respective ethanolic extract only 68.3 to 119.2 mg and in the acetonic extract 68.5 mg per single dose are taken up by the patient. Consequently, the daily dose of these is much lower compared to the aqueous extract (Lazar, 1983; Hänsel and Lazar, 1985). Apparently the distribution of the individual Kava pyrones in the different extracts is about equal, wich was obvious from the early findings by Hänsel and Lazar (1985).

After a careful re-examination of the individual casuistics with hepatototxic events, only in case the direct association of liver failure after re-exposition can be assumed, and in eight cases out of 27 a possible connection can be envisaged (Teschke, 2002; Schmidt and Nahrstedt 2002, Teschke et al. 2003). As a consequence, the members of the Goverment Commission E 2002 refused to accept the decision of the BfArM to

ban all Kava preparations in Germany and to follow the respective recommendation of the expert Teschke (2002).

References

Bundesinstitiut für Arzneimittel und Medizinprodukte (BfArM): http://www.bfarm.de/de/Arzneimittel/am_sicher/stufenpl/Besch-Kava-Final.pdf

Hänsel R, Lazar J (1985) Kavapyrone. Dtsch Apoth Ztg 125: 2056–2058

Hänsel R, Woelk K (1994) Arzneimitteltherapie heute. Phytopharmaka Vol 6, Spektrum Kava Kava. Aesopus, Basel

Kommission E (2002) Erklärung zum Widerruf von Kava-Extrakten. Ärztezeitschrift für Naturheilverfahren 43: 545

Lazar J (1983) Beitrag zur chemischen Zusammensetzung des Kava Trankes. Dissertation, Freie Universität Berlin

Mathews JD, Riley MD, Fejo L, Munoz E, Milns NR, Gardner ID, Powers JR, Canygulpa E, Cununuwawuy BJ (1988) Effects of the heavy usage of kava on physical health: summary of a pilot survey in an Aboriginal community. Med J Aust 148: 548–555

Möller H (2002) Anwortschreiben des Bundesministeriums für Gesundheit zur Kava-Kava-Thematik. Ärztezeitschrift für Naturheilverfahren 43: 664–665

Schmidt M, Nahrstedt A (2002) Ist Kava lebertoxisch? Dtsch Apoth Ztg 127: 1006–1020

Teschke R (2002) Hepatotoxizität durch Kava-Kava. Deutsches Ärzteblatt 99: A3411–3418

Teschke R, Gauss W, Loew D (2003) Kava extracts: safety and risks including rare hepatotoxicity. Phytomedicine 10: 440–446

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