Original Article

Chemoprofiling of Homoeopathic drug *Holarrhena antidysenterica L.*

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Abstract

Background: Chemoprofiling of homoeopathic drug/tincture (HT) represents a comprehensive approach for evaluation of quality, purity, safety and efficacy of HT. This paper reflects the chemoprofiling of Homoeopathic drug *Holarrhena antidysentrica L.* **Objective:** The objective of this study is to standardise *Holarrhena antidysenterica* mother tincture by taking the samples from four different sources: Dr D. P. Rastogi, CRI (H) Noida (A) and three from market (labelled as B, C and D). **Materials and Methods:** The authentic sample of bark of *Holarrhena antidysenterica* supplied by the Centre of Medicinal Plants Research in Homoeopathy, Emerald, Tamil Nadu, India was used to prepare the mother tincture (as per the Homoeopathic Pharmacopoeia of India). The solvents used throughout the study, namely, ethanol, high-pressure liquid chromatography water, cyclohexane, chloromethane and diethylamine, were of analytical grade purity (MERCK Ltd.). Physicochemical properties, ultraviolet (UV) spectroscopy and high-performance thin-layer chromatography (HPTLC) chemoprofile of raw drug and mother tinctures were standardised and compared with market samples. **Results:** The present study reveals the moisture content (14.40%), total ash (4.65%), alcohol (18.0%), water extractive values (16.0%), total solids (1.47%), weight/ml (0.92 g) and alcohol content (60.6%). In UV spectroscopy, λ_{max} values were observed at 228 and 278 nm in HT. HPTLC analysis of in-house HT (A) and three market samples (B, C, D) was performed by using cyclohexane: chloromethane: diethylamine (7:3:1, v/v/v) as mobile phase. Under UV light (254, 366 nm) and in the presence of visualising agent Dragendroff, bands of active constituent were observed in all the four samples. However, excess amount of active constituents were found in in-house HT (a) rather than the market samples (B, C and D). **Conclusion:** The present physicochemical and phytochemical data may be considered as pharmacopoeia standards for the homoeopathic drug *Holarrhema antidysentrica L.*

Keywords: Drug standardisation, High-performance thin-layer chromatography, High-performance thin-layer chromatography fingerprint, Homoeopathic drug, Physicochemical, Ultraviolet

Introduction

Holarrhena antidysenterica L. of the family *Apocynaceae*[1] is also known as conessi bark in English, *kutaja* in Sanskrit, *kura* or *kurchi* in Hindi and found throughout many forests of India, in Travancore, Assam and Uttar Pradesh. *Holarrhena antidysentrica Linn. f* is a small deciduous tree, with brown bark. The bark contains a large number of alkaloids[2] such as conessine, holonamine, kuchine, kurchicine, holarrhimine and conimine.[3,4] It acts as a good astringent, anthelmintic, amoebicidal and has diuretic-like property. The bark and seeds have been used in the treatment of many diseases such as colic, dyspepsia, piles,[5] dysentery, diseases of spleen, diseases of the skin, diarrhoea, anaemia, epilepsy, stomach pain and cholera.[6] Kurchicin, an active principle of *Holarrhena antidysenterica*, is highly effective against causative microorganisms of diarrhoea and dysentery, especially amoebic types.[7] It has huge medicinal values due to the presence of a large number of alkaloids.[8] In Homoeopathy, *Holarrhena antidysentrica* is used for the complaints of both chronic and acute dysentery with large quantity of mucus,[9] excessive blood, colic pain, fever, piles, leprosy and skin diseases,[10] tenesmus, emaciation, loss of appetite and aversion of food colicky around the navel, aggravated by lying on the right side but better by lying on the left side. According to the Homoeopathic Pharmacopoeia of India, its bark is used for the preparation of mother tincture.

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Materials and Methods

The plant material *Holarrhena antidysenterica* was supplied by the Centre for Medicinal Plant Research in Homoeopathy, Nilgiris, Tamil Nadu. In-house mother tinctures were prepared from authentic materials and the other three mother tinctures were purchased from market.

Chemical and reagents

All solvents used in this study were of analytical grade, and purified water was of high-pressure liquid chromatography grade. Post-chromatographic derivatisation of developed Thin-layer Chromatography (TLC) plates was done using Dragendroff's reagent. Dragendroff's reagent was prepared by dissolving 0.85 g-basis bismuth nitrate in 10-ml glacial acetic acid and 40-ml water under heating if necessary (Sol. A). Sol. B was prepared by dissolving 8-g potassium iodide in 30-ml water, and then stock solutions A + B solutions were mixed 1:1 (v/v) and 4-ml glacial acetic acid and 20-ml purified water were added.[11] Freshly prepared solution of 10% sodium nitrite was used for better visibility of high-performance TLC (HPTLC) plate.

Preparation of standard mother tincture

100 g of coarsely powdered bark was taken and 635-ml alcohol and 400-ml water were added to make 1000 ml of mother tincture using the percolation method (as per the Homoeopathic Pharmacopeia of India).[12]

Apparatus

CAMAG Spotting device – Linomat V automatic sample spotter; syringe: 10 µL (Switzerland); TLC chamber – Glass twin trough chamber (20 × 10); densitometer – TLC scanner 3 with visionCATS software; CAMAG; HPTLC plate – 20 cm × 10 cm, pre-coated silica gel 60F_{254} plate.

Physicochemical properties

Phytochemical analysis

Phytochemical tests were conducted from the bark of *Holarrhena antidysenterica* to identify the various phytochemicals present in the plant material. The various tests[13,14] are described below and observations are recorded in Table 1.

Test for flavonoids

Sulphuric acid (H_2SO_4 test): The test solution was treated with concentrated H_2SO_4. Formation of orange colour indicates the presence of flavonoids.

Tests for alkaloids

1. Dragendroff's test: To 2–3 ml of the filtrate, add a few drops of Dragendroff's reagent. Formation of orange brown precipitate indicates the presence of alkaloids
2. Mayer's test: To 2–3 ml of the filtrate, add a few drops of Mayer's reagent. Formation of cream precipitate indicates the presence of alkaloids.

Test for triterpenoids

Salkowski's test: To the test solution, add a few drops of concentrated sulphuric acid, shake well and allow to stand for some time. Red colour appears in the lower layer indicating the presence of sterols, and formation of yellow-coloured lower layer indicates the presence of triterpenoids.

Test for steroids

Salkowski's test: Chloroform solution of the extract when shaken with concentrated acid and on standing yields red colour.

Test for glycosides

Sodium hydroxide reagent: Dissolve a small amount of alcoholic extract in 1 ml water and add sodium hydroxide solution. A yellow colour indicates the presence of glycosides.

Test for saponins

Froth test- A pinch of the dried powdered plant material was added to 2–3 ml of distilled water. The mixture was shaken vigorously. Formation of foam indicates the presence of saponin.

Chemoprofiling by high-performance thin-layer chromatography analysis

Evaporate 25 ml of mother tincture on water bath to remove alcohol, basified with ammonia and extract with (3 × 20) ml of chloroform. Combine and concentrate chloroform layer to 2 ml. Carry out HPTLC of chloroform extract of mother tincture on silica gel 60 F_{254} pre-coated plate using cyclohexane: chloromethane: diethylamine (7:3:1 v/v) as mobile phase.[15,16]

The concentrated chloroform extracts (A, B, C and D) were used for the HPTLC study. The extracts were spotted in the form of band of width 8.0 mm with a microlitre syringe on pre-coated silica gel aluminium plate 60F_{254}, using a Linomat V sample applicator. A constant application rate of 3 and 5 µL was employed. The slit dimension was kept at 6.00 mm × 0.30 mm, and 20 mm/s scanning speed was employed. The mobile phase (10 ml) consisting of cyclohexane: chloromethane: diethylamine (7:3:1 v/v/v) was taken for HPTLC analysis. Linear ascending development was carried out in a 20 cm × 10 cm twin trough glass chamber (Camag, Switzerland) saturated with the mobile phase at room temperature for 25 min. The length of the chromatogram run was 8 cm and, subsequent to the development, the TLC plates were dried in a current of air with the help of hot air dryer in a wooden chamber with adequate ventilation. Densitometric scanning was performed at 254 nm and 366 nm by reflectance scanning and operated by visionCATS software resident in the system.

Ultraviolet spectrophotometric studies

With spectrophotometer set at range 190–1100 nm, samples and standard were put in cuvettes. Before analysis, cuvettes were washed with ethanol, analysis was performed on Specord 200 plus spectrophotometer Analytical Jena AG, Konrad-Zuse-Str.1, 07745 Jena, Germany and Analytical Jena WinAspect software was used for the ultraviolet (UV) analysis.

Samples (in-house mother tincture used for UV analysis) were prepared by mixing 1 part of mother tincture and 99 parts of

absolute alcohol (1:99) and filtered through membrane filter prior to UV analysis.

Results

Physicochemical studies

The determined data under the physicochemical study for the raw drug are summarised in Table 2. Mother tincture preparation and its standardisation are summarised in Tables 3 and 4, respectively. Qualitative phytochemical test loss on drying revealed the presence of water in the plant and also some volatile organic matter. Results of physicochemical studies are summarised in Tables 1-4.

High-performance thin-layer chromatography (fingerprinting)

Holarrhena antidysenterica in-house mother tincture was prepared in the laboratory and labelled as A and other three mother tinctures purchased from the market were labelled as B, C and D. The profile of chromatographic separation was scanned at 254 nm and 366 nm wavelength. At 254 nm, five spots appeared in in-house mother tincture (A) at R_f 0.20, 0.35, 0.44, 0.73 and 0.87; five spots appeared in market sample (B) at R_f 0.21, 0.33, 0.46, 0.72 and 0.86; four spots appeared in sample (C) at R_f 0.34, 0.43, 0.74 and 0.88 and four spots appeared in sample (D) at R_f 0.36, 0.42, 0.71 and 0.86 (all brown) [Figure 1]. While chromatogram scanned at 366 nm showed six spots in in-house mother tincture (A) at R_f 0.21, 0.31, 0.53, 0.59 0.73 and 0.89, five spots appeared in market sample (B) at R_f 0.32, 0.51, 0.58, 0.72 and 0.88; five spots appeared in sample (C) at R_f 0.31, 0.54, 0.60, 0.72 and 0.90 and six spots appeared in sample (D) at R_f 0.20, 0.31, 0.55, 0.59, 0.74 and 0.89 (all blue) [Figure 2], chromatogram after spray Dragendroff's reagent and then 10% sodium nitrite showed five spots in in-house mother tincture (A) at R_f 0.28, 0.38, 0.43, 0.47 and 0.63; five spots appeared in market sample (B) at R_f 0.27, 0.37, 0.43, 0.48 and 0.61; three spots appeared in sample (C) at R_f 0.39, 0.42, 0.62 and five spots appeared in sample (D) at R_f 0.28, 0.37, 0.42, 0.46 and 0.61 (all orange) [Figure 3].

It is evident from the data that these are characteristics for the studied drug, which will help in the identification and authentication of the mother tincture. The HPTLC chemoprofiling of in-house mother tincture (A) and market sample (B, C and D) was almost similar. However, excess amount of active constituents were found in in-house homoeopathic drug/tincture (A) rather than the market samples (B, C and D). These may be considered as valuable standards in pharmacopoeia and act as vital fingerprint parameters to ensure the reliability and reproducibility of the drug.

Ultraviolet spectrophotometeric studies

UV absorption spectra (λ_{max}) of in-house mother tincture of *Holarrhena antidysenterica* were found at 228 nm and 278 nm [Figure 4].

Table 1: Phytochemical test

Name of phytochemicals	Results
Flavonoids (H_2SO_4 test)	Positive
Alkaloid	
Mayer's test	Positive
Dragendroff's test	Positive
Triterpenoid (Salkowski's test)	Positive
Steroid (Salkowski's test)	Positive
Glycosides (sodium hydroxide reagent test)	Positive
Saponins (foam test)	Positive

H_2SO_4: Sulphuric acid

Table 2: Standardisation of raw drug

Parameters	Quantitative values (%)
Loss on drying at 105°C	Not more than 14.4 w/w
Total ash value	Not more than 4.65 w/w
Acid-insoluble ash	Not more than 1.84 w/w
Water-soluble ash	Not more than 2.11 w/w
Alcohol-soluble extractive value	Not less than 18.0 w/w
Water-soluble extractive value	Not less than 16.0 w/w

Table 3: Formulation of mother tincture (percolation technique used)

Drug strength	1/10
Preparation	
Holarrhena antidysenterica coarse powder	100 g
Strong alcohol	400 ml
Purified water	635 ml

Table 4: Standardisation of mother tincture

Parameters	Observations
Organoleptic properties	
Appearance	Clear liquid
Colour	Yellowish
Odour	Characteristic
Physicochemical tests	
Sediments	Nil
Weight per ml	0.9207 g
Total solid (%)	1.47 w/w
Alcohol content (%)	60.6 v/v
pH	5.41
λ_{max} (nm)	228, 278

λ_{max}: Wavelength of maximum absorption

Discussion

Physicochemical analysis

Physicochemical and Phytochemical analysis using various reagents showed the presence of secondary metabolites such as tannins, phenolic compounds, alkaloids and flavonoid. Physicochemical constants, namely, ash, extracted values and other parameters can be used as a reliable aid to check the identity, purity and strength. HPTLC chemoprofiling is done

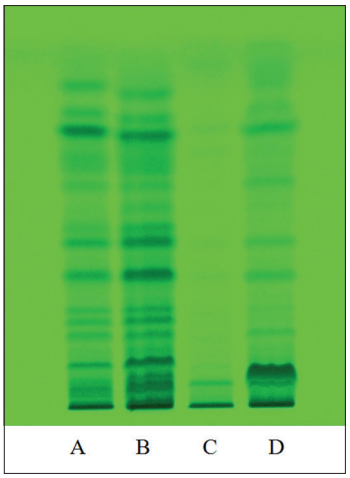

Figure 1: High-performance thin-layer chromatography fingerprints of chloroform extract of *Holarrhena antidysentrica* at 254 nm. Track A in-house sample; Track B, C, D market samples

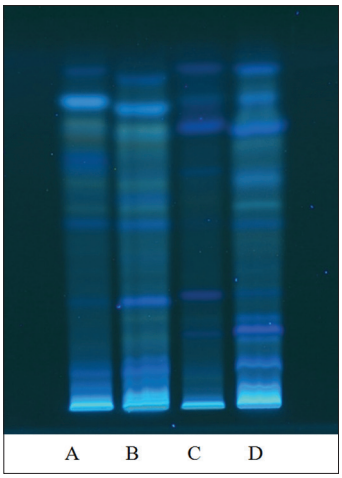

Figure 2: High-performance thin-layer chromatography fingerprints of chloroform extract of *Holarrhena antidysentrica* at 366 nm. Track A in-house sample; Track B, C, D market samples

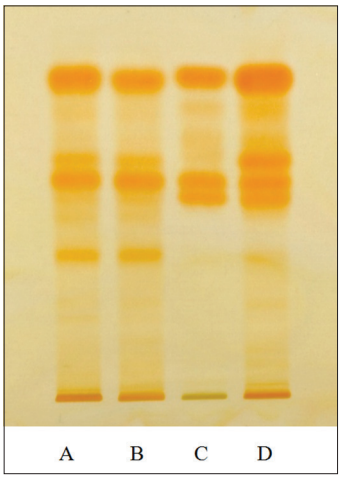

Figure 3: High-performance thin-layer chromatography fingerprints of chloroform extract of *Holarrhena antidysenterica* after derivatisation with Dragendroff's reagent. Track A in-house sample; Track B, C, D market samples

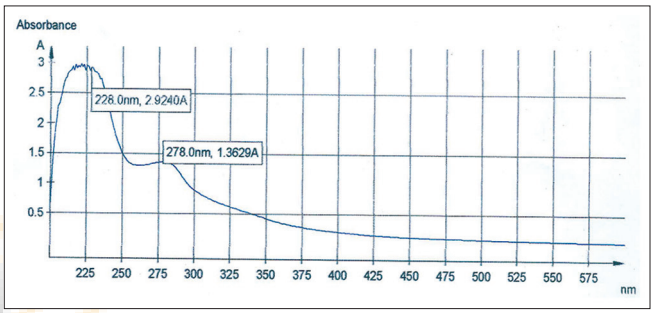

Figure 4: Ultraviolet absorption spectra (λ_{max}) of extract from homoeopathic drug/tincture of Holarrhena antidysentrica

as an important tool for the authentication of herbal drugs and formulations. The results obtained from the study could be utilised for scientific validation and formulating standards for the quality assurance of the drug. In HPTLC chemoprofiling, the developed chromatogram and R_f values of bands will be specific for the drug with the selected solvent system. UV spectroscopic study exhibits prominent peaks, which serve as characteristic standards.

Conclusion

The present physicochemical and phytochemical study of *Holarrhena antidysenterica L.* reveals that its bark is rich in phytoconstituents. In UV spectroscopy, λmax values of active constituents of Holarrhena antidysenterica L. were observed at 228 and 278 nm in HT. HPTLC Chemo profiling study shows bands of active constituent were observed in all the four samples, in-house HT (A) and three market samples (B, C and D). However, excess amount of active constituents were found in in-house HT (A) rather than the market samples (B, C and D) [Figures 1-3]. Hence, the present physicochemical, phytochemical and Chemoprofiling fingerprinting data of *Holarrhena antidysenterica L.* may be considered as pharmacopoeia standards for the aforesaid drug.

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Nil.

Conflicts of interest

None declared.

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होम्योपैथिक औषधि होलेरिना एंटीडाइसेंट्रिका लिन. एफ की कीमोप्रोफाइलिंग

सार

उद्देश्यः वर्तमान अध्ययन का उद्देश्य भौतिक रासायनिक अध्ययन और तुलनात्मक विश्लेषण हेतु चार अलग–अलग स्त्रोतों से ली गई होलेरिना एंटीडाइसेंट्रिका मदर टिंचर का मानकीकरण करना है, डॉ. डी. पी. रस्तोगी, सीआरआई (होम्यो.), नोएडा को (ए) और बाजार से प्राप्त तीन को (बी, सी और डी) के रूप में लेबल किया गया ताकि वर्तमान भौतिक रासायनिक और पादप रासायनिक डेटा को पूर्वोक्त औषधि के लिए फार्माकोपियोअल मानकों के रूप में माने जाए।

सामग्री और विधिः

होम्योपैथी में औषधीय पादप अनुसंधान केन्द्र, एमराल्ड, तमिलनाडु, भारत द्वारा होलेरिना एंटीडाइसेंट्रिका की छाल के प्रामाणिक नमूनों की आपूर्ति की गई। मदर टिंचर को भारतीय होम्योपैथिक फार्माकोपिया के अनुसार तैयार किया गया। अध्ययन के लिए विलायक अर्थात इथेनॉल, एचपीएलसी जल, साइक्लोहेक्सेन, क्लोरोमिथेन, डायथाइलैमाइन आदि विश्लेषणात्मक ग्रेड शुद्धता (मर्क लिमिटेड) के थे।

परिणामः वर्तमान अध्ययन से पता चलता है, आर्द्रता की मात्रा (14.40 प्रतिशत), कुल भस्म (4.65 प्रतिशत), एल्कोहल (18.0 प्रतिशत), जल सारत्व मूल्य (16.0 प्रतिशत), कुल ठोस पदार्थ (1.47 प्रतिशत), डब्लूटी/एमएल (0.92 ग्राम) और एल्कोहल मात्रा (60.6 प्रतिशत) थी। होम्योपैथिक टिंचर पर की गई यूवी स्पेक्ट्रोस्कोपी में मेक्स 228 और 278 एनएम देखा गया। आन्तरिक होम्योपैथिक टिचंर (ए) और बाजार चरण के रूप में साइक्लोहेक्सेनः क्लोरोमेटेनः डायथाइलैमाइन (7:3:1, वी/वी/वी) का उपयोग करके किया गया। यूवी प्रकाश (254, 366 एनएम) और विजुअलाइजिंग एजेंट ड्रैगेंड्रॉफ की उपस्थिति में, सभी चार नमूनों में सक्रिय घटक के बैंड देखे गए। हालाँकि सक्रिय घटकों की अधिक मात्रा बाजार के नमूनों (बी, सी और डी) के बजाय आंतरिक होम्योपैथिक टिंचर में पाई गई।

निष्कर्षः उपरोक्त मापदंडों का उपयोग गुणवत्ता नियत्रंण और औषधि की पहचान के लिए किया जा सकता है।

Chimioprofilage du médicament homéopathique *Holarrhena antidysenterica Linn.f*

RÉSUMÉ :

Objectif: Le but de la présente étude est de standardiser la teinture mère *Holarrhena antidysenterica* provenant de quatre sources différentes, du Dr D. P. Rastogi, CRI (H) Noida étiquetée (A) et trois teintures mères provenant du marché (étiquetées B, C et D)] en vue d'études physicochimiques et d'analyses comparatives, de sorte que les données physicochimiques et phytochimiques actuelles soient considérées comme des normes de pharmacopée pour ledit médicament.

Matériels et méthodes: Des échantillons authentiques d'écorce de l'*Holarrhena antidysenterica* ont été fournis par le Centre de recherche sur les plantes médicinales en homéopathie (Centre of Medicinal Plants Research in Homoeopathy), Emerald, Tamil Nadu, Inde. La teinture mère a été préparée conformément à la Pharmacopée homéopathique de l'Inde. Les solvants destinés à l'étude, à savoir l'éthanol, l'eau HPLC, le cyclohexane, le chlorométhane et la diéthylamine avaient la pureté de qualité analytique (MERCK Ltd.).

Résultat: La présente étude révèle la teneur en humidité (14,40%), les cendres totales (4,65%), l'alcool (18,0%), la valeur extractive de l'eau (16,0%), les matières solides totales (1,47%), le poids/ml (0,92 g) et la teneur en alcool 60,6%) en spectroscopie UV λmax. observés à 228 & 278 nm en HT. Les analyses HPTLC de HT (A) interne et de trois échantillons provenant du marché (B, C, D) ont été réalisées en utilisant du cyclohexane, du chlorométhane et de la diéthylamine suivant le ratio 7:3:1, v/v/v comme phase mobile. Sous lumière UV (254, 366 nm) et en présence de l'agent de visualisation de Dragendroff, des bandes de principes actifs ont été observées pour les quatre échantillons. Cependant, des quantités excessives de principes actifs ont été trouvées dans les échantillons internes HT (A) plutôt que dans les échantillons provenant du marché (B, C et D).

Conclusions: Les paramètres ci-dessus peuvent être utilisés comme contrôle de qualité et pour l'identification du médicament.

Quimoprofilamiento del medicamento homeopático *Holarrhena antidysenterica Linn*.f

Resumen

Fundamento: El quimioprofilamento de un fármaco/tintura homeopática (TH) representa un enfoque integral para la evaluación de la calidad, pureza, seguridad y eficacia de la TH. Conforme al concepto de fitoequivalencia, la TH completa puede considerarse como el compuesto activo, porque los diferentes constituyentes actúan juntos y son responsables de su efecto terapéutico.

Holarrhena antidysentericaLinn.f.se conoce como Kurchi (corteza) en inglés, pertenece a la familia Apocynaceaey se encuentra en muchos bosques de la India, en Travancore, Assam y Uttar Pradesh. La corteza de la planta contiene alrededor de 30 alcaloides como regolarrenine-A, B, C, D, E y F; pubescina, noroladieno, pubescimina, curchinina, curchinidina, holarrifina, holadieno, curchiidina, curchamida, curcholessina, kurchessina, conessina, conessimileeisoconessimina, y los componentes esteroideoskurchinicinyholadisona. El contenido total en alcaloides del kurchi indio es del 0,22 – 4,2 %. Se distribuye por toda la Indica, en especial en los bosques húmedos y tropicales del Himalaya. La cortea del tronco de *Holarrhena antidysenterica*tiene profundas aplicaciones en homeopatía.

Objetivos: El objetivo del presente estudio es estandarizar las tinturas madre de *Holarrhena antidysenterica*tomando cuatro fuentes diferentes[una del Dr. D.P. Rastogi, CRI (H) Noida (A) y tres comercializadas (etiquetadas como B, C y D)]para efectuar investigaciones fisioquímicas y análisis comparativos para la autentificación del medicamento. Por tanto, los presentes datos físico-químicos y fitoquímicos han de considerarse como estándar farmacopéico para el medicamento arriba mencionado.

Materiales y métodos: Las muestras auténtica de la corteza de *Holarrhena antidysenterica*fueron suministradas por el *Centre of Medicinal Plants Research in Homoeopathy*, Emerald, Tamil Nadu, India. El material vegetal auténtico se utilizó para preparar la tintura madre (co forme a la Farmacopea Homeopática de India). Todos los disolventes para el estudio, a saber, etanol, agua HPLC, ciclohexano, clorometano y dietilamina tenían pureza de grado analítico (MERCK Ltd.,).

Resultados: Se estandarizaron las propiedades físico-químicas, la espectroscopia UV y el quimioprofilamiento del medicamento crudos y las tinturas madre, y se compararon con las muestras de mercado.

Conclusiones: El presente estudio revela el contenido húmedo (14,40 %), las cenizas totales (4,65 %), alcoholes (18,0 %), valores de extracción de agua (16,0 %), sólidos totales (1,47 %), peso/ml (0,92 g) y contenido en alcohol (60.6 %). En la espectroscopiaUV,λmax. se observó en228 y 278 nmen la TH. El análisis por HPTLC (Cromatografía de alto rendimiento en capa fina) de la muestra de TH propia (A) y de las tres de mercado (B, C, D) se efectuó utilizando ciclohexano: clorometano: dietilamina(7:3:1, v/v/v) como fase móvil. Bajo luz UV (254, 366 nm) y en presencia del agente de visualización Dragendroff, se observaron bandas del constituyente activo en las cuatro muestras. Sin embargo, se observó que la cantidad de constituyentes activos en la TH propia (A) excedía las muestras de mercado (B, C y D).

Chemoprofilierung des homöopathischen Arzneimittels *Holarrhena antidysenterica Lin*.f.

ABSTRAKT:

Hintergrund: Chemoprofiling homöopathischer Arzneien/Tinkturen (HT) ist eine umfassende Zugangsweise zur evaluierung von Qualität, Reinheit, Sicherheit und Wirksamkeit von HT. Nach dem phytoequivalenten Konzept können die gesamten HT als aktive Kombination gesehen werden, da die verschiedenen Bestandteile gemeinsam für den therapeutischen Effekt verantwortlich sind.

Holarrhena antidysenterica Lin.f. als Kurchirinde bekannt, gehört zur Familie der Apocynaceae und kommt in den Wäldern Indiens in Travancore, Assam und Uttar Pradesh vor. Die Rinde enthält etwa 30 Alkaloide, Der Gesamtalkaloidgehalt der indischen Kurchi beträgt 0.22–4.2%. Kurchi kommt in ganz Indien vor, besonders in den feuchten Wäldern und im tropischen Himalaya. Die Rinde des Stammes von Holarrhena antidysenterica wird intensiv in der Homöopathie verwendet.

Ziel: Ziel der vorliegenden Studie ist die Standardisierung der *Holarrhena antidysenterica* Urtinktur von vier verschiedenenHerstellern: Dr. D.P. Rastogi, CRI (H) Noida, gekennzeichnet mit (A) und drei aus dem Handel (gekennzeichnet mit B, C und D)] für physiochemische Studien und vergleichende Analysen zur Authentifizierung des Arzneimittels.Damit können die derzeitigen physikalisch-chemischen und phytochemischen Daten als Standards für Pharmacopöen für das oben genannte Arzneimittel gelten.

Material und Methoden: Die authentischen Rindenproben von *Holarrhena antidysenterica* wurden vom "Centre of Medicinal Plants Research in Homoeopathy", Emerald, Tamil Nadu, Indien, zur Verfügung gestellt. Die Urtinktur wurde nach dem indischen homöopathischen Arzneibuch hergestellt. Die Lösungsmittel für die Studie: Ethanol, HPLC-Wasser, Cyclohexan, Chlormethan, Diethylamin waren von analytischem Reinheitsgrad (MERCK Ltd.,).

Ergebnis: Die vorliegende Studie zeigt den Feuchtigkeitsgehalt (14,40%), Gesamtasche (4,65%), Alkohol (18,0%), Wasserextraktionswert (16,0%), Gesamtfeststoffe (1,47%), Gewicht / ml (0,92 g) und Alkohol Gehalt (60,6%),UV-Spektroskopie λmax. bei 228 & 278 nm in HT. Die HPTLC-Analyse von der eigenen HT (A) und den drei Handelsproben (B, C, D) wurden unter Verwendung von Cyclohexan: Chlormethan: Diethylamin (7: 3: 1, v / v / v) als mobile Phase durchgeführt. Unter UV-Licht (254, 366 nm) und in Gegenwart des Dragendorffs Reagens als Sichtmittel wurden in allen vier Proben aktive Banden beobachtet. In der hauseigenen HT (A) wurde ein Überschuss an aktiven Bestandteilen gefunden, jedoch nicht in denHandelsstichproben (B, C und D).

Schlussfolgerungen: Die obigen Parameter können als Qualitätskontrolle und zur Identifizierung des Arzneimittels verwendet werden.

順勢療法療劑止瀉木（*HolarrhenaantidysentericaLinn.f*）的化學特徵分析

摘要：

背景：順勢療法藥物／酊劑（HT）的化學特徵分析即是綜合評價HT的品質、純度、安全性和有效性。根據植物等效性概念，完整的HT可以被視作活性化合物，因為多種成分共同產生作用，構成其治療效果。

止瀉木（*HolarrhenaantidysentericaLinn.f.*）的英文通用名是Kurchi（bark），屬於夾竹桃科（Apocynaceae），它遍佈印度的許多森林，在特拉凡哥爾（Travancore）、阿薩姆邦（Assam）和北方邦（Uttar Pradesh）。這植物樹皮含有大約30種生物鹼，例如regholarrhenine-A、B、C、D、E和F；pubescine、norholadiene、pubescimine、kurchinin、kurchinine、kurchinidine、holarrifine、 holarridine、kurchiidine、kurchamide、kurcholessine、kurchessine、conessine、cones-simile和isoconessimine，以及類固醇複合物kurchinicin和holadyson。印度止瀉木的總生物鹼含量為0.22～4.2%。它分佈在整個印度，尤其在潮濕森林和喜馬拉雅山熱帶區。止瀉木（*Holarrhenaantidysenterica*）的樹皮在順勢療法中有著廣泛應用。

目標：本研究目的是通過四個不同來源 [一個來自諾伊達（Noida）的D.P.Rastogi醫生順勢療法中央究研學院（Dr. D.P. Rastogi Central Research Institute of Homoeopathy）（標記為A）和3個來自市場（標記為B、C和D）]去標準化止瀉木（*Holarrhenaantidysenterica*）的母酊，作生理化學研究和藥物鑒定的對比分析。因此，現有的生理化學及植物化學數據可作為上述藥物的藥典標準。

材料和方法：由印度坦米爾納德邦（Tamil Nadu）藍寶石村的順勢療法藥用植物研究中心提供可靠的止瀉木（*Holarrhenaantidysenterica*）樹皮樣本。使用可靠的植物材料製備母酊（根據《印度順勢療法藥典》）。

研究中一直使用的溶劑，即是乙醇、高效液相色譜（HPLC）水、環己烷、氯甲烷、二乙胺都達到分析級純度（MERCK有限公司）。

結果：對原藥物和母酊的生理化學性質、紫外光譜和高效薄層色譜的化學特徵進行了標準化，並與市場樣品進行了比較。

結論：現有研究顯示：含水量（14.40%）、總灰量（4.65%）、酒精量（18.0%）、水提取值（16.0%）、總固體含量（1.47%）、每毫升重量（0.92g）和含醇量（60.6%）。在紫外光譜術中，觀察到HT的最大吸光率波長（λmax）為228和278納米（nm）。內部HT（標記A）和三個市場樣本（標記B、C、D）的高效薄層色譜分析都使用了環己烷：氯甲烷：二乙胺（7:3:1，v/v/v）為流動相。在紫外光（254, 366nm）之下，並加入德雷根道爾夫（Dragendorff）顯影劑，在所有四個樣本中都觀察到活性成分的光譜帶。然而，在內部HT（標記A）中，而非市場樣本（標記B、C和D）中，發現過量的活性成分。