

Peruvian plants canchalagua (*Schkuhria pinnata* (Lam.) Kuntze), hercampuri (*Gentianella alborosea* (Gilg.) Fabris), and corpus way (*Gentianella bicolor* (Wedd.) J. Pringle) prove to be effective in the treatment of acne

Las plantas peruanas «canchalagua» *Schkuhria pinnata* (Lam.) Kuntze, «hercampuri» *Gentianella alborosea* (Gilg.) Fabris y «corpus way» *Gentianella bicolor* (Wedd.) J. Pringle eficaces en el tratamiento del acné

Rainer W. Bussmann

Department of Geography and the Environment, The University of Texas at Austin, 1 University Station A3100, Austin, TX 78712-1098, U.S.A. rbussmann@mail.utexas.edu

Douglas Sharon

San Diego Museum of Man, 1350 El Prado, San Diego, CA 94804, USA. dk_sharon@sbcglobal.net

Doris Díaz P.

Clínica Anticona, Laboratorio Clínico, Prolongación Unión 2390, Trujillo, PERÚ. dorial_3@yahoo.es

Yasmin Barocio

University of California at Berkeley, Berkeley, CA 94720

Abstract

The present study was aimed to investigate the activity of plants traditionally used in Northern Peru against acne. Various bacteria, especially *Propionibacterium acnes* have been identified as triggering this condition. The normal control of acne in western medicine often causes side effects like skin irritations. Peru has a rich variety of plants that are proven to have antibacterial and anti-inflammatory properties. The study found that Canchalagua (*Schkuhria pinnata* (Lam.) Kuntze), Hercampuri (*Gentianella alborosea* (Gilg.) Fabris), and Corpus Way (*Gentianella bicolor* (Wedd.) J. Pringle) had promising antibacterial properties and efficiency against acne.

Key words: Acne vulgaris, herbal medicine, traditional medicine, medicinal plants, skin disorders

Resumen

El actual estudio estuvo dirigido para investigar la actividad de las plantas tradicionalmente usadas contra el acné en el norte del Perú. Se han identificado las varias bacterias, especialmente *Propionibacterium acnes* como uno de sus agentes acusantes. El tratamiento del acné en medicina occidental causa a menudo efectos secundarios como irritaciones a la piel. Perú tiene una variedad de plantas que demuestran tener propiedades antibacterianas y antiinflamatorias. El estudio encontró que la canchalagua (*Schkuhria pinnata* (Lam.) Kuntze), hercampuri (*Gentianella alborosea* (Gilg.) Fabris) y corpus way (*Gentianella bicolor* (Wedd.) J. Pringle) poseen propiedades antibacterianas prometedoras contra el acné.

Palabras claves: Acne vulgaris, medicina herbal, medicina tradicional, plantas medicinales, irritaciones de la piel

Introduction

Acne vulgaris is a condition that affects skin areas containing large oil glands of people of all races and ages (Leydon, 1997). It is most common in adolescents and young adults. An estimated 80 percent of all people between the ages of 11 and 30 have acne outbreaks at some point (Holding, 2004). *Propionibacterium acnes* often involved in the condition, proliferates rapidly especially during puberty (Hamnerius, 1996). *P. acnes* leads mostly to inflammatory acne, while other bacteria like *Staphylococcus epidermis* usually cause superficial infections (Burkhart *et al*, 1999). For most people, acne tends to go away by the time they reach their thirties; however, some people in their forties and fifties continue to have this skin problem.

Topical over the counter (OTC) medicines are available in many forms, such as gels, lotions, creams, soaps, or pads. OTC acne medications containing benzyl peroxide, resorcinol, salicylic acid, and sulfur may cause side effects such as skin irritation, burning, or redness, which however often get better or disappear with continued use of the medicine (NIAMS, 2006). In addition, antibiotics are employed in acne treatment, but increasing resistance especially in a dermatologic setting has been observed (Swanson, 2003).

Alternative treatments against acne, involving traditionally used medicinal plants have mostly been reported from Asia (Chomnawag *et al.*, 2005; 2007). Medicinal plants as used in Northern Peru often have antimicrobial and anti-inflammatory properties that can be proven to treat many illnesses such as acne. An ethnobotanical study of medicinal plants marketed in Northern Peru reported 510 plant species being used for medicinal purposes. Two thousand four hundred ninety-nine different uses were registered for the 510 species encountered and two hundred seventy-eight different medical conditions were recorded (Bussmann & Sharon, 2006a). Also, an ethnobotanical study in southern Ecuador reports the traditional used of 210 plant species for the treatment of medical ailments (Bussmann & Sharon, 2006b).

In the present study the medicinal properties of Northern Peruvian plants were examined for their role in the treatment of acne. From the inventory the three most common plants were identified and tested in bioassays.

Materials and Methods

Inventory of plants used for acne treatment

To obtain a complete inventory of plants used for the treatment of acne, herbalists at the Mayorista market in Trujillo, Peru were interviewed. The herbalists were asked three questions:

From information gathered (botanical name of plant, local name of plant in Peru, plants mentioned by each vendor, and plant administration/use) the three most common plants mentioned were tested using a bioassay and by self-administration.

Bioassays

To test for antimicrobial and anti-inflammatory properties, bioassays were conducted. No strain of *P. acnis* was available in for testing in Peru, and thus to test antibacterial properties bacterial strands of *Escherichia-coli* and *Staphylococcus aureus* from patients' urinary and throat samples were used.

The plants collected were dried and, ground and extracts in water and ethanol were prepared. To extract using ethanol, 50g of dry plant material were completely submerged in 500ml of ethanol for seven days. For the water extract, 50g of plant material was submerged in 500ml of water for 24 hours. The antibacterial activity of the plants was determined by using an agar diffusion method. Bacterial cultures were grown on a 5% sheep red blood agar and inoculated into Mueller-Hinton Agar for testing. The organisms were then suspended in 10 ml of distilled water and their concentrations equilibrated to a 0.5 McFarland standard. Using a sterile cotton swab, each sample was transferred onto the Mueller-Hinton Agar. Six millimeter paper disks were saturated with each plant extract and applied to the agar surface. Disks with Amikacin and distilled water were applied

as controls. Plates were then incubated overnight at 37°C. After 24 hours, zones of inhibition that might appear around the disks were observed and recorded via photography (Koneman *et al.*, 1997).

Human consumption of most popular plants prescribed by herbalists

To get an additional indication that the herbs were indeed helping to reduce the appearance of acne, the co-authors consumed the remedy recommended by the herbalists for 15 days. The three most common plants were mixed together and two tablespoons of the mixture boiled in 1l of water boiled for 2-3 minutes. One liter a day of the remedy was consumed daily for a total treatment time of 15 days.

Results and Discussion

Inventory

After interviewing 15 herbalists at the Mayorista Market in Trujillo, Peru, 24 plants were recorded for their use in the treatment of acne. The plants recorded were: Canchalagua, Corpus Way, Hercampuri, Amarro, Flor de Arenilla, Hoja de Guanabana, Lancetilla, Ortiga Blanca, Sanguinaria, Palo Sangre, Ajenco, Hierba de la Vibora, Calahuala, Sumaran, Carqueja, Chicoria, Diente de Leon, Agrasejo, Hoja de Granadilla, Tomillo, Cola de Caballo, Pasuchaca, Linaza, and Berros (Table 1).

Of the 24 plants, Canchalagua (*Schkuhria pinnata* (Lam.) Kuntze), Hercampuri (*Gentianella alborosea* (Gilg.) Fabris), and Corpus Way (*Gentianella bicolor* (Wedd.) J. Pringle) were targeted as the most effective in the treatment of acne.

Hercampuri is an herb that is traditionally used to: regulate metabolism, reduce cholesterol, detoxify blood, regulate blood pressure, regulate circulation and act as a hepato-protector. Canchalagua is an herb that is known to: eliminate toxins in organism, relieve diabetes and acne, facilitate digestion, purify the blood, and clean the skin. Corpus Way is known to act on the liver blood and lower cholesterol (Bussmann & Sharon, 2006a).

Bioassays

The bioassay for Hercampuri and Canchalagua showed strong inhibition of *Staphylococcus aureus*. This indicates that Hercampuri and Canchalagua have antimicrobial properties. Hercampuri and Canchalagua may indeed be able to reduce the amount of *P. acnes* present in skin follicles and may help reduce the inflammatory response caused by the bacterium.

Conclusions

While herbal activity against *P. acnes* could not directly be tested, if could be shown that Canchalagua, Hercampuri, and Corpus Way have strong antibacterial activities against *S. aureus*, which might explain their efficacy in traditional acne treatment. Similar conclusions resulted from previous studies for Asian medicinal plants (Chomnawang *et al.*, 2005, 2007; Munekazu *et al.*, 1996). The mechanisms of action are however still unknown.

While the self-consume of the traditional remedy does by no means represent a valid study (with no control group, and no blinding), the skin conditions of the co-authors did improve during the experiment, which gives further indication of the efficacy of the plants employed.

The active compounds of *Schkuhria pinnata*, *Gentianella alborosea*, and *Gentianella bicolor* could be of further interest for development of an alternative treatment for acne.

Acknowledgements

The authors gratefully acknowledge the financial support of the fieldwork through MIRT (Minority International Research and Training) and MHIRT (Minority Health Disparity International Research and Training), a grant from the National Institutes of Health (Fund: 54112B MHIRT Program, Grant: G0000613), administered by the Fogarty International Center for Advanced Studies in Washington, D.C. Thanks also go to Dr. Noe Anticona for allowing research at Clinica Anticona.

Literature cited

- Burkhart, C.G., Burkhart, C.N. & Lehmann, P.F.** 1995. Acne: a review of immunologic and microbiologic factors. *Journal of Postgraduate Medicine* 75, 328–331.
- Bussmann, R.W. & Sharon, D.** 2006a. Traditional plant use in Northern Peru: Tracking two thousand years of health culture. *Journal of Ethnobiology and Ethnomedicine* 2, 47. <http://www.ethnobiomed.com/content/2/1/47>.
- Bussmann, R.W. & Sharon, D.** 2006b. Traditional plant use in Southern Ecuador. *Journal of Ethnobiology and Ethnomedicine* 2, 44. <http://www.ethnobiomed.com/content/2/1/44>
- Chomnawang, M.T., Surassmo, S., Nukoolkarn, V. & Gritsanapan, W.** 2005. Antimicrobial effects of Thai medicinal plants against acne-inducing bacteria. *Journal of Ethnopharmacology* 101, 330-333.
- Chomnawang, M.T., Surassmo, S., Nukoolkarn, V. & Gritsanapan, W.** 2007. Effect of *Garcinia mangostana* on inflammation caused by *Propionibacterium acnes*. *Fitoterapia* 78, 401-408.
- Hamnerius, N.** 1996. Acne-aetiology and pathogenesis. *Treatment of Acne* 32, 29–38.
- Holding, C.** 2004. Acne bug's nasty secrets spotted. *NewScientists.com*. 19:00.
- Koneman, E.W., Allen, S.D., Janda, W.M., Schreckenber, P.C. & Wien, W.C.** 1997. *Color Atlas of Diagnostic Microbiology*. Lippincott, pp. 785-881.
- Leydon, J.J.** 1997. Therapy for *Acne vulgaris*. *New England Journal of Medicine* 1156–1162.
- Munekazu, I., Hideki, T., Toshiyuki, T., Fujio, A., Yasuko, K., Ryoyu, S. & Ken-Ichi, M.** 1996. Antibacterial activity of xanthenes from guttiferaceous plants against methicillin-resistant *Staphylococcus aureus*. *Journal of Pharmacy and Pharmacology* 48, 861–865.
- National Institute of Arthritis and Musculoskeletal and Skin Disease (NIAMS).** 2006. NIH Publication No. 06-4998. 2006. www.niams.nih.gov
- Swanson, I.K.** 2003. Antibiotic resistance of *Propionibacterium acnes* in *Acnes vulgaris*. *Dermatology Nursing* 5, 359–361.

Table 1. Plants used against acne in Northern Peru (sorted according to importance)

Scientific Name	Local Name
<i>Schkuhria pinnata</i> (Lam.) Kuntze	Canchalagua
<i>Gentianella bicolor</i> (Wedd.) J. Pringle	Corpus Way
<i>Gentianella alborosea</i> (Gilg.) Fabris	Hercampuri
<i>Chuquiragua weberbaueri</i> Tovar	Amarro
<i>Tiquilia paronychoides</i> (Phil.) Rich	Flor de Arena
<i>Ammona muricata</i> L.	Hoja de Guanabana
<i>Cuphea strigulosa</i> H.B.K.	Lancetilla
<i>Urtica magellanica</i> A. Jussieu ex Poiret	Ortiga Blaca
<i>Alternanthera halmifolia</i> (Lam.) Standley & Pittier	Sanguinaria
<i>Brosimum rubescens</i> Taubert	Palo Sangre
<i>Ambrosia peruviana</i> Willd.	Ajenco
<i>Zornia reticulata</i> Sm.	Hierba de la Vibora
<i>Polypodium crassifolium</i> L.	Calahuala
<i>Gentianella graminea</i> (H.B.K.) Fabris	Sumaran
<i>Baccharis genistelloides</i> (Lam.) Pers.	Carqueja
<i>Picosia longifolia</i> D. Don	Chicoria
<i>Taraxacum officinale</i> Wiggers	Diente de Leon
<i>Cestrum auriculatum</i> L'Herit	Agrasejo
<i>Passiflora ligularis</i> Jus.	Hoja de Granadilla
<i>Thymus vulgaris</i> L.	Tomillo
<i>Equisetum bogotense</i> (H.B.K.) Kunth	Cola de Caballo
<i>Geranium ayavacense</i> Willd ex H.B.K.	Pasuchaca
<i>Linum sativum</i> L.	Linaza
<i>Rorippa nasturtium-aquaticum</i> (L.) Hayek	Berros
