

DEVELOPMENT OF ANTI-WRINKLE LOTION CONTAINING
ARTOCARPUS LAKOOCHA HEARTWOOD EXTRACT

Miss Manatchaya Wanawatanakun

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มนัชยา วนวัฒนากุล: การพัฒนาโลชั่นชะลอริ้วรอยที่มีส่วนผสมของสารสกัดจากแก่นมะหาด (DEVELOPMENT OF ANTI-WRINKLE LOTION CONTAINING *ARTOCARPUS LAKOOCHA* HEARTWOOD EXTRACT) อ. ที่ปรึกษา: รศ.ดร. ภาควงมิ เต็งอำนาจ, 213 หน้า.

การศึกษานี้มีวัตถุประสงค์เพื่อประเมินความคงตัวทางกายภาพและเคมีของของสารสกัดจากแก่นมะหาด (ปวกหาคัด) ภายใต้สภาวะต่างๆและเพื่อประเมินประสิทธิผลในการชะลอริ้วรอยในอาสาสมัครเพศหญิง จากการศึกษาความคงตัวเบื้องต้น พบว่าซีเตรบัพเฟอร์ พีเอช 5.5 สามารถช่วยชะลอการเปลี่ยนสีของสารละลายปวกหาคัดได้ อีกทั้งยังมีปริมาณสารออกซีเรสเวอราทรอลคงเหลือในปริมาณสูงที่สุด คือ 91.77 % และได้ทำการการศึกษาความคงตัวที่ 45 องศาเซลเซียส เป็นเวลา 12 สัปดาห์ พบว่าการเติมบิวทิลไฮดรอกซีอะนิโซล (บีเอชเอ) ความเข้มข้น 0.02% เพียงพอให้ความคงตัวทางเคมีที่ดี และ การศึกษาความคงตัวที่ 30 องศาเซลเซียส เป็นเวลา 24 สัปดาห์ พบว่าการเติมบีเอชเอความเข้มข้น 0.02%ร่วมกับโซเดียมเมตาไบซัลไฟต์ความเข้มข้น 0.02% สามารถชะลอการเปลี่ยนสีของสารละลายปวกหาคัด อีกทั้งยังมีออกซีเรสเวอราทรอลคงเหลือในปริมาณที่สูงเช่นกัน การศึกษาประสิทธิผลในการชะลอริ้วรอยในผิวหนังของอาสาสมัครเพศหญิงโดยการศึกษาวิจัยทางคลินิกแบบคู่ขนานโดยมีกลุ่มควบคุมในตนเองเป็นเวลา 8 สัปดาห์โดยให้อาสาสมัครจำนวน 86 คน ทาสารละลายปวกหาคัดความเข้มข้น 0.10%, 0.25%, สารละลายอิพิแกลโลแคทชินแกลเลตความเข้มข้น 0.10% และสารละลายวิตามินซีความเข้มข้น 0.10% ที่แก้มข้างขวา ส่วนแก้มข้างซ้ายทาสารละลายควบคุม คือ 20% โพรไพลีนไกลคอลในน้ำ เป็นเวลา 8 สัปดาห์ พบว่าสารละลายปวกหาคัดความเข้มข้น 0.10% มีผลชะลอริ้วรอยดีที่สุด โดยให้ผลจากการวัดความหยวบของผิวโดยเครื่อง Visioscan® เร็วที่สุดภายใน 2 สัปดาห์เมื่อเทียบกับกลุ่มควบคุมและคงอยู่จนสิ้นสุดการทดลองอย่างมีนัยสำคัญทางสถิติที่ระดับความเชื่อมั่นร้อยละ 95 รองลงมาคือสารละลายปวกหาคัดความเข้มข้น 0.25% ซึ่งมีค่าเท่ากับสารละลายอิพิแกลโลแคทชินแกลเลตความเข้มข้น 0.10% ส่วนสารละลายวิตามินซีความเข้มข้น 0.10% ให้ผลในการชะลอริ้วรอยน้อยที่สุด จึงเลือกสารละลายปวกหาคัดความเข้มข้น 0.10%และสารละลายอิพิแกลโลแคทชินแกลเลตความเข้มข้น 0.10%มาเตรียมเป็นโลชั่นเพื่อศึกษาผลในอาสาสมัครโดยใช้กระบวนการเดียวกัน โดยได้ทำการวัดความยืดหยุ่น, ความสามารถในการนำไฟฟ้า (ความชุ่มชื้น) และความขาวของผิวไปพร้อมกันด้วย พบว่าโลชั่นปวกหาคัดความเข้มข้น 0.10% มีประสิทธิผลในการชะลอริ้วรอยเร็วกว่าโลชั่นอิพิแกลโลแคทชินแกลเลตความเข้มข้น 0.10% โดยเริ่มเห็นผลที่สัปดาห์ที่ 6 เป็นต้นไป ในขณะที่โลชั่นอิพิแกลโลแคทชินแกลเลตเริ่มเห็นผลในสัปดาห์ที่ 8 ร้อยละของการชะลอริ้วรอยของโลชั่นปวกหาคัดอยู่ในช่วง 5.78 – 5.93% และพบว่าโลชั่นทั้งสองชนิดไม่มีผลเปลี่ยนแปลงความยืดหยุ่นของผิว แต่ประสิทธิผลในการทำให้ผิวขาวพบว่าโลชั่นปวกหาคัดมีผลทำให้ผิวขาวขึ้นมากกว่าโลชั่นอิพิแกลโลแคทชินแกลเลต และในส่วนของความชุ่มชื้นของผิวพบว่าเพิ่มขึ้นในโลชั่นทั้งสองชนิด เนื่องจากผลของเนื้อโลชั่น เมื่อพิจารณาจากคุณสมบัติของปวกหาคัดซึ่งมีหลากหลายดังที่กล่าวมาแล้วร่วมกับปวกหาคัดมีราคาไม่แพงและหาซื้อได้ง่าย ดังนั้นจึงมีความเป็นไปได้ที่นำสารสกัดจากแก่นมะหาดหรือปวกหาคัดมาใช้เป็นสารต้านออกซิเดชันและทำให้ผิวขาวที่ปลอดภัยและมีประสิทธิภาพในด้านเครื่องสำอางต่อไป

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MANATCHAYA WANAWATANAKUN: DEVELOPMENT OF ANTI-WRINKLE LOTION CONTAINING *ARTOCARPUS LAKOOCHA* HEARTWOOD EXTRACT. THESIS ADVISOR: ASSOC. PROF. PARKPOOM TENGAMNUAY, Ph.D., 213 pp.

The aims of this study were to assess the physicochemical stability of *Artocarpus lakoocha* heartwood extract (Puag-Haad) under various conditions and to evaluate its anti-wrinkle activity in female volunteers. Initial stability test revealed that citrate buffer pH 5.5 was able to maintain the original color and provided the highest content of oxyresveratrol of 91.77% in Puag-Haad solution. Addition of 0.02% butylated hydroxyanisole (BHA) alone could provide sufficient chemical stabilization at 45°C for 12 weeks. Stability was further enhanced by a combination of 0.02% BHA and 0.02% sodium metabisulfite, which could stabilize both the color and content of oxyresveratrol in Puag-Haad solution kept at 30 °C for 24 weeks. Eighty-six female volunteers subsequently participated in an 8-week parallel clinical trial with self-control to evaluate the anti-wrinkle efficacy of solutions containing Puag-Haad (0.10 and 0.25%) in comparison with 0.10% epigallocatechin gallate (EGCG) and 0.10% vitamin C. It was found that 0.10% Puag-Haad solution was the most effective, with the roughness values as measured by Visioscan® becoming significantly with 95% confidence interval lower than its self-control after only 2 weeks of application and remained significant until the end of the study. This was followed by 0.25% Puag-Haad and 0.10% EGCG solutions, which demonstrated similar anti-wrinkling efficacy, whereas 0.10% vitamin C was the least effective. Thus, 0.10% Puag-Haad and 0.10% EGCG were formulated into lotion for further clinical study using similar protocol. The skin elasticity, capacitance (hydration) and whitening extent were also measured. It was found that 0.10% Puag-Haad lotion gave faster anti-wrinkle efficacy than 0.10% EGCG lotion, with the roughness values becoming significantly lower than its self-control after 6 weeks as compared to 8 weeks for EGCG. The extent of wrinkle improvement by Puag-Haad lotion was 5.78 - 5.93%. Both the Puag-Haad and EGCG lotions did not improve the skin elasticity but Puag-Haad lotion had an added benefit of skin whitening activity. Skin hydration also improved in both lotions due to the moisturizing effect of the lotion base. Considering its multi-functional activities, the inexpensive and easily available *A. lakoocha* extract or Puag-Haad has a very promising potential for use as a safe and effective anti-wrinkle/skin whitening ingredient in cosmetic preparations.

Department :Pharmacy.....

Student's Signature: *Manatchaya Wanawatana-kun*

Field of Study : ...Pharmaceutics.....

Advisor's Signature: *Parkpoom Tengamnuay*

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LISTS OF ABBREVIATIONS

%	=	percentage
°C	=	degree Celsius
µg	=	microgram
µl	=	microlitre
ANOVA	=	analysis of variance
BHA	=	butylated hydroxyanisole
C.V.	=	coefficient of variation
cps	=	centipoises
e.g.	=	exempli gratia, for example
EDTA	=	ethylenediaminetetraacetic acid
EGCG	=	epigallocatechin gallate
<i>et al.</i>	=	et alii, and other
g	=	gram
H ₂ O ₂	=	hydrogen peroxide
hr	=	hour
mg	=	milligram
min	=	minute
ml	=	milliliter
mm	=	millimeter
n	=	sample size
nm	=	nanometer
No.	=	number
PG	=	propylene glycol
pH	=	the negative logarithm of the hydrogen ion concentration
R ²	=	coefficient of determination
SC	=	subcutaneous
SD	=	standard deviation
UV	=	ultraviolet
v/v	=	volume by volume
w/v	=	weight by volume
wk	=	week