

STEM CELL SUPPLEMENTS



9 RESEARCH PROPOSAL

1963 - NOW

No.1 pollen extract Global brand

"Research is the key to unlocking new knowledge and advancing our understanding of the world."

STEM CELL SUPPLEMENTS

Pollitin is a high quality natural extract. extracted from rye pollen under the production and research with technology The same standard as the production of drugs according to the requirements of the World Health Organization. therefore has been registered as "NUTRACEUTICAL" or "nutritional therapeutic nutrition" receiving the ORAC standard or the antioxidant concentration and the CAP-e Test or the ability to be absorbed into red blood cells at a very high level

The body receives almost 100% of the nutrients that are extracted from rye grass pollen. Sold to more than 50 countries on 6 continents around the world for more than 50 years, Swedish researchers have found that research studies. extracted from rye pollen contains Substances that are essential for the creation of new life in the plant family and are fundamental in the food chain. It is a natural anabolic steroid.

It has been proven by scientific laboratories that Contains a variety of nutrients including vitamins, minerals, phytosterols, carotenoids, flavonoids, nucleic acids, amino acids, substances necessary for the synthesis of RNA and DNA, antioxidant activity, enzymes, saturated fatty acids, precursors in the synthesis of prostaglandins.

So extracted from rye pollen Therefore, it is the ideal food for use in helping to make the body healthy and perfect holistic. Because there are nutrients that help to relieve fatigue, have antioxidants. The main culprit that causes many serious diseases to humans, contains important substances such as phytosterols that help boost immunity. keep the body healthy until able to cope with various illnesses caused by facing pollution and germs on a daily basis more effectively

IN SCIENCE WE TRUST



CELL REPAIRING

Research has confirmed that there are more than 300 types of nutrients, vitamins, minerals that are essential for the care of the body and cells.



NUTRASCEUTICAL

Contains important substances that have antioxidant properties. Thus helping to slow down aging and help your skin look better.



BODY IMMUNE DEFENCE

Research reports on efficacy that helps to inhibit prostatitis caused by hormones



PHARMACEUTICAL FOOD

Contains nucleic acids and other important substances that stimulates the body to create interferon to stimulate white blood cells to work more efficiently better deal with germs

GUARANTEED WORLD-CLASS PRODUCTION STANDARDS



POLLITIN - EXCLUSIVE STEM CELL SUPPLEMENTS

Our premium natural extracts originate from meticulously selected flower pollen found in "Rye." These extracts undergo a unique proprietary production process crafted by Graminex L.L.C. in Ohio, United States. This exclusive process encompasses every stage, from cultivation and harvesting to the creation of high-quality natural extracts, specifically G60 and G63, derived from GBX flower pollen particles. Graminex holds the sole rights to this process and maintains adherence to strict pharmaceutical production standards in alignment with the World Health Organization's requirements.

Our extracts are renowned for their world-class production standards, boasting ORAC certification for exceptionally high antioxidant concentration and CAP-e Test accreditation, which signifies outstanding absorption into red blood cells. Over more than five decades, we have consistently refined and improved our product's efficacy.

Registered as a "NUTRACEUTICAL" or "nutritional therapy," Pollitin addresses issues at the cellular level, offering antibacterial properties and reinforcing immunity. By delivering essential nutrients tailored to various bodily systems, it equips the body to effectively combat abnormal cells. Our dedication to research is exemplified by over 150 certifications from medical and pharmaceutical institutions.

Moreover, Pollitin is not only a national achievement but a global triumph, available in over 50 countries. Our exclusive patented production process sets us apart as the sole producer of this unique formulation globally, rendering it impossible for anyone else to replicate our success in extracting and utilizing these flower pollen particles.

Pollitin - สารอาหารบำบัดเซลล์

สารสกัดธรรมชาติคุณภาพสูง สกัดจากเกสรดอกไม้ จาก "ข้าวไรย์" ที่มีสูตรลับเฉพาะของ บริษัท (Graminex L.L.C.) ที่รัฐโอไฮโอ ประเทศสหรัฐอเมริกา ในการปลูก เก็บ และผลิตสกัดธรรมชาติคุณภาพสูง G60, G63 จากอณูละอองเกสรดอกไม้ GBX, Graminex® เอกสิทธิ์เฉพาะของบริษัท Graminex เท่านั้นที่ผลิตได้เพียงเจ้าเดียวในโลก ภายใต้การควบคุมมาตรฐานการผลิตตามข้อกำหนดขององค์การอนามัยโลก

จนเราได้รับการรับรองมาตรฐานการผลิตระดับโลก ระดับเดียวกับการผลิตยาเพราะ Pollitin ได้รับการทดสอบค่า ORAC หรือ ค่าระดับความเข้มข้นของสารต้านอนุมูลอิสระที่สูงมาก และ CAP-e Test หรือ ค่าความสามารถในการดูดซึมเข้าสู่เม็ดเลือดแดงในระดับที่สูงจนได้รับ

การขึ้นทะเบียนเป็น "NUTRACEUTICAL" หรือ "โภชนเภสัช สารอาหารบำบัดระดับเซลล์" ที่สามารถแก้ไขปัญห่าฟื้นฟูได้ลึกถึงระดับเซลล์ มีฤทธิ์ฆ่าเชื้อแบคทีเรีย และมีผลเสริมสร้างภูมิคุ้มกันตามเมื่อเซลล์ต่างๆ ได้รับสารอาหารที่เหมาะสมตามระบบต่างๆ ในร่างกาย ส่งผลให้ร่างกายสามารถต่อสู้กับ เซลล์ที่ผิดปกติภายในร่างกายได้ถึง 95% และยังคงได้รับการรับรองมาตรฐานการผลิตและประสิทธิภาพจากองค์กรต่างๆ มากมายระดับโลก รวมไปถึงยังได้รับรางวัลการันตีอีกมากมายจาก เอกสิทธิ์สูตรลับพิเศษเฉพาะของ Graminex ทำให้สินค้ามีคุณภาพและเกิดผลลัพธ์ที่ดีและน่าเชื่อถือ จนได้รับการยอมรับระดับสากลอีกด้วย

ตลอดระยะเวลากว่า 50 ปี เราได้มีการวิจัยพัฒนาประสิทธิภาพอย่างต่อเนื่อง มีการวิจัยจากสถาบันทางการแพทย์และเภสัชกรรมรับรองมากกว่า 150 การวิจัย เรามีความภูมิใจอย่างมากในการเป็นผู้ผลิตหนึ่งเดียวของโลกที่ได้ครอบครอง ถ้อยสิทธิ์ เอกสิทธิ์กระบวนการผลิตและสูตรเฉพาะ G60 และ G63 จากละอองเกสรดอกไม้ชนิด GBX ที่ไม่มีใครสามารถทำได้ ส่งผลให้ Pollitin เป็นที่ยอมรับจากคนจำนวนมากใน 6 ทวีป 50 ประเทศทั่วโลก และได้รับผลตอบแทนที่ดีจากผู้บริโภคในการซื้อซ้ำสินค้าอย่างต่อเนื่องมากกว่า 50 ปี

"Happy MPM: The exclusive importer and distributor of Pollitin in Thailand, Laos, Vietnam, Myanmar, and Malaysia for over two decades. our commitment to unparalleled reliability has touched the lives of over one billion consumers worldwide."



TOPPIC

Contents

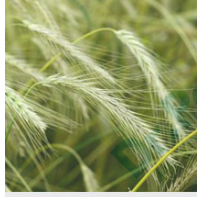
- 1. สารสกัดจากเกสรดอกไม้ CERNITIN GBX VS CERNITIN T60
- 2. งานวิจัยเกี่ยวกับเกสรดอกไม้ต่อโรคมะเร็ง
- 3. งานวิจัยเรื่องโรคหัวใจ
- 4. งานวิจัยเกี่ยวกับโรคเบาหวาน
- 5. งานวิจัยเกี่ยวเรื่องพืชสุราเรื้อรัง
- 6. งานวิจัยเกี่ยวกับภาวะโรคอ้วน
- 7. งานวิจัยเกี่ยวกับโรคตับ
- 8. งานวิจัยเกี่ยวกับโรคที่เกิดจากเชื้อไวรัสต่างๆ
- 9. งานวิจัยเกี่ยวกับการสืบพันธุ์
- 10. ผลการวิจัยเกี่ยวกับความผิดปกติของหญิงวัยหมดประจำเดือน
- 11. งานวิจัยเกี่ยวกับโรคภูมิแพ้
- 12. งานวิจัยเกี่ยวกับเกสรดอกไม้และผลกระทบบอื่นๆ
- 13. งานวิจัยเกี่ยวกับเกสรดอกไม้และผลกระทบท่อภูมิคุ้มกัน
- 14. งานวิจัยเกี่ยวกับเกสรดอกไม้และผลต่อตับ
- 15. งานวิจัยเกี่ยวกับเกสรดอกไม้และผลต่อการปรับตัวของกล้ามเนื้อ
- 16. งานวิจัยเกี่ยวกับเกสรดอกไม้และ Saw Palmetto
- 17. งานวิจัยเกี่ยวกับเกสรดอกไม้และผลกระทบท่อมลูกหมาก
- 18. งานวิจัยเกี่ยวกับกระเพาะปัสสาวะ
- 19. งานวิจัยเกี่ยวกับการต้านอนุมูลอิสระ
- 20. งานวิจัยเกี่ยวกับกล้ามเนื้อและข้อต่อ
- 21. การวิจัยเกี่ยวกับหลอดเลือดและไขมัน



9

งานวิจัย เกสรดอกไม้ต่อ โรคการสืบพันธุ์

www.pollitin.com



FERTILITY SUPPORT

GRAMINEX Flower Pollen Extract

Efficacy of Cernilton administration for infertile males associated with asymptomatic pyospermia

Tetsuya Arai, Shin Horiuchi, Kenichiro Yoshida

Department of Urology, Dokkyo University School of Medicine

Introduction

The cases, that white blood cell is significantly higher in semen, accounts for 16 ~ 17% of male infertility patients. Interestingly, it was common that no bacterial finding is presented in these cases, using standardized bacterial test, PCR methods for Chlamydia trachomatis (C. trachomatis), and semi-quantitative analysis for Ureaplasma urealyticum (U. urealyticum). Although these cases are classified in nonbacterial chronic prostatitis, it has been generally recognized to be associated with male infertility.

In present study, we reported that administration of Cernilton reduce PMN-elastase activity and to improve seminal findings in semen for 17 male infertility patients with no bacterial finding in semen.

Materials and Methods

17 male infertility patients associated with nonbacterial asymptomatic pyospermia were treated with Cernilton 6 tablets daily over 12 weeks, and then sperm density, progressively motile sperm ratio, sperm motility and PMN-elastase activity in semen were measured.

Results

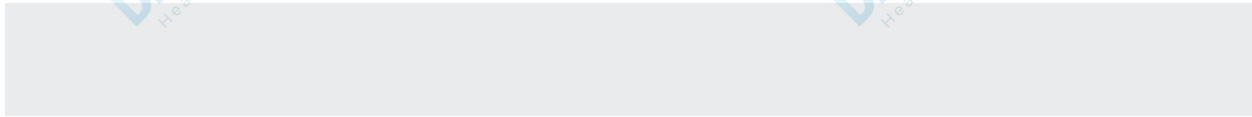
In all patients, progressively motile sperm ratio, sperm motility and PMN-elastase activity in seminal fluid were improved.

Conclusion

Administration of Cernilton is seemed to be effective in the treatment of infertile males associated with nonbacterial asymptomatic pyospermia

List of Patients

Number	Age	Sperm Density (x 10 ⁶ /ml)		% progressively motile sperm		Sperm motility			PMN—elastase activity (µg/ml)				
1	35	31	→	59	34	→	42	±	→	+	760	→	529
2	33	44	→	40	31	→	52	±	→	++	1770	→	640
3	40	22	→	24	40	→	48	±	→	+	2080	→	610
4	32	10	→	10	30	→	54	±	→	+	7130	→	1860
5	36	38	→	27	42	→	55	±	→	+	610	→	240
6	34	32	→	35	40	→	52	±	→	+	890	→	290
7	35	28	→	31	44	→	67	±	→	++	2270	→	114
8	36	67	→	49	41	→	62	±	→	++	1710	→	380
9	41	100	→	64	15	→	55	±	→	+	1910	→	780
10	32	32	→	30	32	→	36	±	→	+	1510	→	1090
11	36	57	→	60	20	→	48	±	→	+	1800	→	1020
12	28	38	→	32	24	→	30	±	→	++	2820	→	980
13	30	1.2	→	1.6	0	→	20	±	→	+	3970	→	1120
14	36	0.3	→	0.3	40	→	50	±	→	+	1710	→	940
15	32	0.6	→	0.5	21	→	34	±	→	+	5140	→	1200
16	34	38	→	30	0	→	23	±	→	+	4520	→	1070
17	41	0.7	→	0.5	34	→	38	±	→	++	1060	→	720



Dr. Pollitincells
Health Center

Dr. Pollitincells
Health Center

Dr. Pollitincells
Health Center

Dr. Pollitincells
Health Center



MENOPAUSE SUPPORT:

GRAMINEX Flower Pollen Extract

Findings on Female Menopausal Disorders through the “Pollen Extract G63” of Graminex Company

Hiromi Yokoyama Naofumi Suzuki Yoshimi Nishimura

(Kanda New Medical Clinic)

Female Menopausal Disorders occur at the onset of menopause, have as a characteristic of indeterminate complaints, interference even occurs with intercourse, and becomes a source of discord in partner relationships. A reduction of female hormones has been talked about as the cause. Here, we have examined the influence of pollen extract G63 on hormones and improvement of the associated indeterminate complaints.

Objective and Methods

Six females, four in menopause and two evidencing menopausal symptoms having menstrual period every 4~5 months, were studied for degree of improvement according to two hormones Estradiol and DHEAS and the consultation questionnaire. The period of the trial was from 1 to 3 months. The pollen extract used in the trial was produced by Graminex Company in Ohio, USA from the pollen of raw materials such as rye, corn, and timothy hay (referred to as *Phleum pratense* in Japan) which were cultivated without using agrochemicals or genetically modified varieties. The pollen which

has a double hull is not digested or absorbed even when ingested since it has strong resistance to acid and heat (cannot be destroyed even at 300°C). Graminex Company using a special technology is able to separately extract G60 (water soluble nutrition components) and GFX (lipid soluble components) and we received the product G63 which is a 20:1 combination G60 and GFX.

The dosage was 6 tablets per day; three tablets each taken after breakfast and dinner. One 250 mg tablet contains 62.5 mg of pollen extract.

(The daily quantity 375mg as pollen extract)

Our own medical questionnaire was prepared and the number of points evaluated. (Lower points indicate milder symptoms)

No.	Symptoms	None	Slightly Present	Medium Intensity	High Intensity
1	Heat sensitivity (burning sensation, hot flashes)	0	1	2	3
2	Chilling, numbness, edema of hands or feet	0	1	2	3
3	Perspiration	0	1	2	3
4	Tachycardia (rapid heartbeat)	0	1	2	3
5	Palpitation	0	1	2	3
6	Chest pains and breathlessness	0	1	2	3
7	Headaches	0	1	2	3

8	Feel heavy-headed	0	1	2	3
9	Insomnia	0	1	2	3
10	Depression	0	1	2	3
11	Irritability	0	1	2	3
12	Feeling of anxiety	0	1	2	3
13	Dizziness	0	1	2	3
14	Feel dizzy upon standing	0	1	2	3
15	Tinnitus (ringing in ears)	0	1	2	3
16	Stiff shoulders	0	1	2	3
17	Arthralgia in hands and feet	0	1	2	3
18	Lumbago	0	1	2	3
19	Numbness	0	1	2	3
20	Sensation like ants crawling on the skin	0	1	2	3

Results

Graminex Pollen Therapy Trials ... Female Menopausal Disorder

Name	Age	Examination day	Estradiol	DHEAS	Consultation questionnaire
O_T	48	-Before administration	Less than 10	65	17
		-After 2 months	Less than 10	83	21
Y_T	53	-Before administration	Less than 10	72	13
		-After 1 month	Less than 10	89	6
S_M	54	-Before administration	14	142	3
		-After 1 month	Less than 10	112	4
F_N	50	June 21, 2005	27 20	106 79	4 2
N_A	63	June 21, 2005	Less than 10	121	5
			Less than 10	123	2
K_H	48	June 22, 2005	24	65	15
			Less than 10	74	10

Conclusion

The increase in Estradiol was 0 for all subjects. DHEAS increased in 4 out of the 6 subjects and the average was 14.2%. Indeterminate complaints improved in 4 of the 6 subjects for a 54.1% degree of improvement.

Discussion

It can be considered that the improvement observed in indeterminate complaints was due to the amino acids, vitamins, and mineral components of the pollen extract which in the body assisted the promotion of metabolism. Additionally, there is evidence of rejuvenation with secretion of DHEAS which normally peaks

for persons in their twenties. Moreover, the DHEAS value is also used as an indicator of female sexual desire and it can be considered that sexual appetite was also increased and it can be assumed that increased DHEAS helps to remove interference to intercourse for menopausal females.

Safety

Among the findings, in particular there were no side-effects and the supplement can be administered with peace of mind.

8/23/2005



OTHER SUPPORT:

GRAMINEX Flower Pollen Extract

A new herbal combination, Etana, for enhancing erectile function: an efficacy and safety study in animals

N Qinna^{1,3}, H Taha², KZ Matalka¹ and AA Badwan³

¹Department of Pharmacology and Biomedical Sciences, Faculty of Pharmacy and Medical Sciences, Petra University, Amman, Jordan; ²Delass Natural Products, Naor, Jordan and ³Central Research Lab, The Jordanian Pharmaceutical Manufacturing CO. PLC (JPM), Naor, Jordan

We present herein a new herbal combination called Etana that is composed of five herbal extracts including *Panax quinquelotius* (Ginseng), *Eurycoma longifolia* (Tongkat Ali), *Epimedium grandiflorum* (Horny goat weed), *Centella asiatica* (Gotu Kola) and flower pollen extracts. Most of the above-mentioned extracts have been a long historical and traditional use for erectile dysfunction (ED). On the basis of the mechanism of action of each of the above, a combination is introduced to overcome several physiological or induced factors of ED. This study was conducted to show an enhancement of erectile function in male rats. The animals were observed for 3 h after each administration for penile erection, genital grooming and copulation mounting, and the penile erection index (PEI) was calculated. The maximum response was observed at the concentration of 7.5 mg kg⁻¹ of Etana. At a 7.5 mg kg⁻¹ single dose, the percentage of responding rats was 53 ± 7 with a PEI of 337 ± 72 compared with 17 ± 6 with a PEI of 30 ± 10 for control animals. This PEI was significantly (P<0.001) higher than each single component and than the sum of any two herbal components of Etana. When compared with sildenafil citrate, Etana induced more pronounced PEI than 0.36 mg kg⁻¹, but similar to 0.71 mg kg⁻¹ of sildenafil. Furthermore, full acute and sub-acute toxicity studies showed no toxic effects of Etana. In conclusion, this study describes a new and safe combination of herbal components that enhance erectile function in male rats. Clinical studies are warranted for evaluating Etana's significance in ED.

International Journal of Impotence Research (2009) **21**, 315-320; doi: 10.1038/ijir.2009.18; published online 4 June 2009

Keywords: Ginseng; Centella; Epimedium; Eurycoma; pollen; erectile dysfunction; Etana; herbal

Introduction

Erectile dysfunction (ED) affects 50% of men aged between 40 and 70 years and therefore is considered to be an important health problem.¹ As men age, several physiological or induced factors arise that contribute to ED, such as a decline in the testicular production of testosterone, vascular functionality, levels and responsiveness to vasoactive amines and neurotransmitters, diseases (for example, cardiovascular, hypertension, diabetes mellitus,

chronic prostatitis) and certain drugs.^{1, 2} A number of pharmacological agents are introduced to correct ED transiently, such as the orally consumed phosphodiesterase type 5 inhibitors, testosterone therapy, or vasoactive agents inserted intraurethraly or injected intracavernosally.¹⁻³

Some natural products such as *Panax quinquelotius*, *Eurycoma longifolia* and *Epimedium grandiflorum* have the ability to act as an aphrodisiac and to help restore ED. The

medicinal activity of *Panax quinquelotius* (Ginseng) has improved penile rigidity, libido and patient satisfaction in men with ED,^{4, 5} whereas using a *Eurycoma longifolia* extract (Tongkat Ali) and *Epimedium grandiflorum* (Horny Goat Weed) in animals increased sexual arousal, motivation and frequency of sexual activity.⁶⁻¹⁰ Furthermore, there are some natural products that could play a role in improving circulation to the prostate and penis such as *Centella asiatica* (Gotu Kola) and flower pollen.¹¹⁻¹³ Therefore, it was our hypothesis that the development of a herbal combination of the above five plant extracts, called Etana,¹⁴ could work on several age-induced causes of ED. On the basis of the mechanism of action of each component, this herbal combination could have an additive or synergistic effect to restore erectile function.

To introduce Etana as an enhancer of male erectile function, this study examines the efficacy of Etana in relation to each of its components, to its dose-response effect, in comparison to sildenafil as a known drug to restore erectile function and to different herbal combinations. In addition, acute and subacute toxicity studies of Etana were carried out to establish the safety of this herbal combination.

Materials and Methods

Herbal Extracts

Panax quinquelotius, *Eurycoma longifolia* and *Epimedium grandiflorum* extracts were purchased from Hongjiu Ginseng, the Active Ingredients Group and from the Chengdu Wagott Pharmaceutical Co., Chengdu, China, respectively. *Centella asiatica* (Gotu Kola) and flower pollen extracts were purchased from Graminex, USA and Ennagram, France, respectively. Sildenafil citrate was obtained from JPM, Jordan.

Etana preparation and method of analysis

Etana is a mixture of Ginseng extract (100 mg), Tongkat Ali extracts (200 mg), Epimedium

extract (50 mg), Gotu Kola extract (40 mg), and flower pollen extract (135 mg). The preparation was dissolved in distilled water and given to rats by oral gavage.

The method of analysis of Etana components is based on the HPLC method to assay a marker for each constituent (for example, icariin for *Epimedium grandiflorum* and malasiatic acid for *Centella asiatica*). The method is based on a solid stationary phase (C18 packed column), mobile phase, and separation by partition adsorption or ion exchange process. The gradient mixtures of acetonitrile: H₃PO₄ and the detection wavelengths were different for each component.

Animals

Male and female Wister rats (220-300 g) were obtained from the Yarmouk University animal house unit (Irbid, Jordan). The animals were housed at the animal facility in Petra University in a 12 h light or dark cycle at a constant temperature of 22° C. All animals were acclimatized for 10 days before the experiments with free access to a standard diet and drinking water. All animal experiments were carried out in compliance with relevant laws and institutional guidelines.

Sexual behavior and penile erection index

Each animal group consisted of 10 male rats weighing 200-300 g. Each test preparation was dissolved freshly in distilled water and doses were administered by oral gavage. Dosing of Etana was either as a single dose per day or as a triple dose per day, 3 h apart, to show any changes in the efficacy obtained from multiple administrations per day. Control animals were given the vehicle alone (distilled water). Rats were placed in glass cages, allowed free access to food and tap water and were observed for 3 h after each drug administration for penile erection, genital grooming and possible copulation mounting. The number of responding rats was recorded along with the number of sexual activity episodes (penile erection, genital

grooming or copulation mounting). Penile erection index (PEI) was calculated for each group by multiplying the percentage of active rats (responding rats) by the total number of activity episodes.¹⁵⁻¹⁷

Acute and subacute toxicity assessment

Acute toxicity for Etana was determined in rats (250-300 g) consisting of 10 rats per group (five males and five females). A single dose of 0, 7.5, 37.5, 75, 150, 225 and 300 mg kg⁻¹ (that is, 1 x to 40 x of the human recommended daily dose based on 70 kg b.w.) was given by oral gavage to each animal per group. The animals were observed closely for any toxic or abnormal behavior in the first 2 h after dosing and were kept under further observation for 2 weeks.

A subacute toxicity study for 28 days was carried out according to ICH guidelines. A single dose of 0, 7.5, 15 and 75 mg kg⁻¹ (that is, 1 x, 2 x, 10 x of the human recommended daily dose based on 70 kg b.w.) was given by oral gavage to each animal per group. Each test group consisted of five males and five females, and different sex animals were kept in separate cages to avoid pregnancy during the test period. Animals were monitored carefully and body weights were measured daily. At the end of 28 days, all animals were killed. Just before being killed, blood samples were taken from the jugular vein for a full blood and chemistry analysis. All internal organs were carefully removed, weighed and then fixed with 10% buffered formalin for histological examination.

Data analysis

All variables were analyzed using SPSS version 10 statistical package (SPSS Inc., Chicago, IL, USA) using different statistical tests. For sexual behavior and PEI analysis, Student's *t* test was carried out to compare the level of significance between groups. As for the toxicity study, statistics were generated for time interaction, gender effect and differences between each treatment group and the control group. The overall differences between the groups were

analyzed using one-way ANOVA. In some cases, Turkey's post test was carried out after ANOVA to show the differences between selected groups. For all of the statistical comparisons, the level of significant difference was defined as $P < 0.05$.

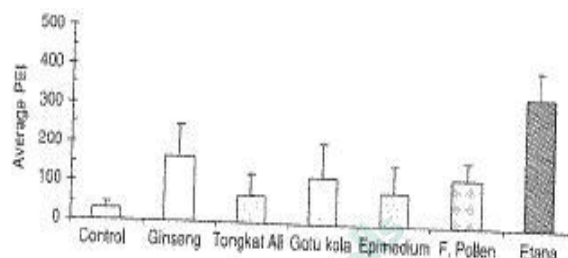


Figure 1. The PEI for different groups of rats administered either a single component of Etana, Etana or distilled water. The PEI was determined by multiplying the average scores reported during a 6-day treatment by the average percentage of responding rats. The rats were monitored for 3 h after a single administration. Each single group was administered the same amount (mg) as is present in Etana. Each bar point represents the mean of six experiments \pm s.d.

Results

Etana versus each single component on male rat sexual behavior

The PEI after the administration of each single component of Etana in comparison with Etana is presented in Figure 1. In all treated animals, PEI increased significantly ($P < 0.001$) when compared with control animals. In addition, Etana-treated rats showed significantly higher ($P < 0.001$) PEI than did each single Etana component-treated rats (Figure 1). In addition, the PEI of Etana is higher than the sum of any two herbal components. Furthermore, the number of responding rats after a single administration of Etana was significantly higher ($P < 0.001$) than each single Etana component-treated rat.

Dose response of Etana on male rat sexual behavior

The dose response of Etana showed a significantly higher ($P < 0.001$) PEI at a dose of 7.5 mg kg⁻¹ of Etana when compared with 2.5, 15 mg kg⁻¹ and controls (Figure 2). In addition,

when Etana was administered thrice a day, 3 h apart to the same rats, the PEI was significantly higher ($P < 0.001$) at 7.5 mg kg^{-1} dose when compared with that in the other doses and control, and the cumulative PEI did not change after the second or third dose to the same rats (Figure 2).

Efficacy and safety in animals

N Qinna *et al*

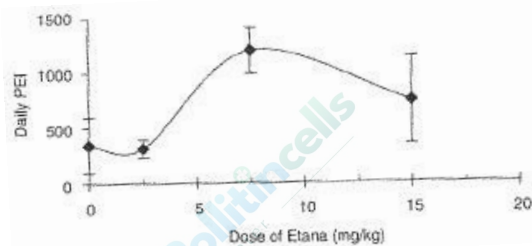


Figure 2. The PEI for different groups of rats administered different doses of Etana. Etana was administered thrice a day, and PEI was determined by multiplying the average scores reported during a 3-day treatment by the average percentage of responding rats. Each bar point represents the mean of three experiments \pm s.d.

Etana versus Sildenafil on rat sexual behavior

In this set of experiments, the effect of Etana 7.5 mg kg^{-1} was compared with the effect of two therapeutic doses (0.36 and 0.71 mg kg^{-1} , based on 70 Kg b.w.) of sildenafil citrate. The PEI after Etana (7.5 mg kg^{-1}) administration as a single or triple dose per day was similar to that of 0.71 mg kg^{-1} of sildenafil and was significantly higher ($P < 0.001$) than that of 0.36 mg kg^{-1} of sildenafil and the control group (Figure 3).

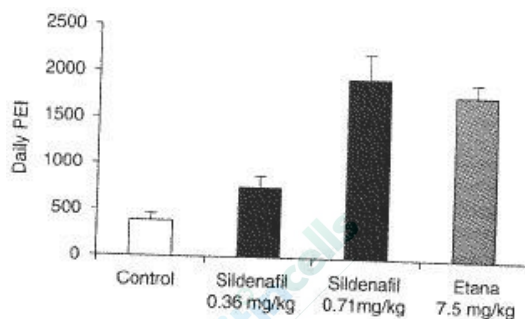


Figure 3. The PEI for different groups of rats administered two doses of sildenafil and Etana. Doses were administered thrice a day, 3 h apart, and PEI was determined by

multiplying the average scores reported during a 3-day treatment by the average percentage of responding rats. Each bar point represents the mean of three experiments \pm s.d.

Etana versus a different mixture of herbal components on male rat sexual behavior

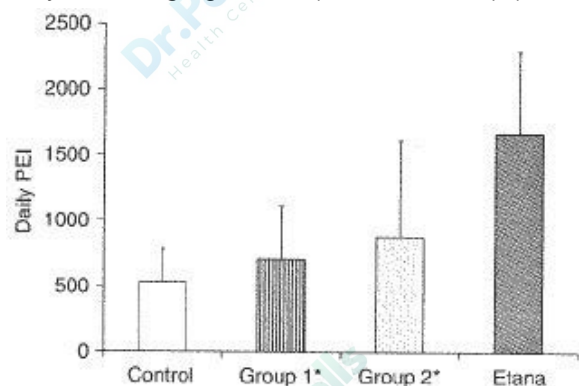
The PEI after administration of different mixture components, group 1 (*Centella asiatica*, *Eurycoma longifolia*, *Epimedium grandiflorum*, flower pollen extract and *Gingko*) and group 2 (*Ginseng*, *Eurycoma longifolia* and *Epimedium grandiflorum*), is shown in Figure 4. The cumulative PEI and the percentage of responding rats after the administration of Etana thrice a day were significantly higher ($P > 0.001$) than the PEI and percentage of responding rats of group 1 and 2 (Figure 4). In group 1, *Gingko* was added instead of *Ginseng* because of its known function as an aphrodisiac. A single administration of *Gingko* (0.86 mg kg^{-1}) showed PEI and percentage of responding rats at 80 and 22%, respectively.

Acute and subacute toxicity of Etana

No deaths occurred after the administration of any of the single doses tested (7.5 - 300 mg kg^{-1}). After a 28-day administration of 7.5 , 15 or 75 mg kg^{-1} (that is, 1 x, 2 x, 10 x of the effective dose), no deaths occurred, and the body weight did not show any significant changes in male or female rats. In addition, the weights of the internal organs did not show any changes after a 28-day administration of any of the doses tested.

The chemistry results after a 28-day administration of 1 x, 2 x, and 10 x dose of Etana showed no significant differences in triglycerides, ALT, AST, ALP, sodium, creatinine, calcium and phosphorus. However, a significant reduction in cholesterol, urea and potassium levels ($P < 0.03$ - 0.001) was observed (Table 1). The reduction of cholesterol was dose dependent ($P < 0.001$) as the percent reduction was 20, 26 and 34% for 7.5 , 15 and 75 mg kg^{-1} , respectively, whereas the reduction of urea was dose dependent (15% for all doses; $P < 0.03$) and the reduction of potassium was seen only at the

75 mg kg⁻¹ dose (10%; P<0.015). On the other hand, the glucose level increased significantly only at 75 mg kg⁻¹ dose (68%, P<0.025) (Table



1).

Figure 4. The PEI for different groups of rats administered different combinations: *Centella asiatica*, *Eurycoma longifolia*, *Epimedium grandiflorum*, flower pollen extract and Ginkgo for group 1: and Ginseng, *Eurycoma longifolia* and *Epimedium grandiflorum* for group 2 and Etana. Doses were administered thrice a day, 3 h apart, and PEI was determined by multiplying the average scores reported during a 3-day treatment by the average percentage of responding rats. Each single group was administered the same amount (mg) as is present in Etana. Each bar point represents the mean of three experiments ± s.d.

The hematological changes after a 28-day administration of 7.5, 15 and 75 mg kg⁻¹ dose of Etana showed a significant increase in the percentage of lymphocytes, and a significant decrease in the percentage of neutrophils in peripheral blood at the doses of 15 and 75 mg kg⁻¹ (P<0.05-0.001) (Table 1). However, the absolute number of the above cells in peripheral blood did not change because there was an apparent reduction in the total leukocytes count.

Discussion

This study describes a new and safe combination of herbal components that

enhances erectile function in male rats. Most of the single constituents of Etana have been widely used for enhancing erectile function, and scientific evidence was reported to explain the mechanism of each component. The idea was to show the additive or synergistic effect of such combination. The results indicate that Etana showed a significantly higher percentage of responding rats and PEI. Furthermore, the Etana efficacy was dose dependent, showing higher activity at either single dose or triple dose of 7.5 mg kg⁻¹ per day, and can be administered for a long period of time without any toxic effect.

To confirm our hypothesis with regard to the efficacy of Etana combination versus other possibilities, it was compared with two other combinations. The choice of the two other combinations was based on the known mechanism of each component. Group 1 was a mixture of *Centella asiatica*, *Eurycoma longifolia*, *Epimedium grandiflorum*, pollen extract and Ginkgo versus Ginseng, *Eurycoma longifolia* and *Epimedium grandiflorum* (group 2) and Etana (*Ginseng*, *Eurycoma longifolia*, *Epimedium grandiflorum*, and *Centella asiatica* and flower pollen). Group 1 components are similar to Etana except that it contains Ginkgo instead of Ginseng. Ginkgo has also been used for aphrodisiac effects but it has a different mechanism of action from Ginseng.¹⁸ Group 2 does not contain flower pollen and *Centella asiatica*. On the basis of the above, one of the mechanisms of action of Etana as a herbal combination to enhance blood flow is consistent with the synergistic effects observed by combining the individual components.¹¹⁻¹³

Table 1. The significant hematological and biochemical findings of rats treated with different doses of Etana for 28 days

Group	Cholesterol (mg dl ⁻¹)	Urea (mg dl ⁻¹)	Potassium (mmol ⁻¹)	Glucose (mg dl ⁻¹)	Lymphocytes %	Neutrophils %
Control	58 ± 2	37 ± 2	6.5 ± 0.2	55 ± 9	73 ± 3	13 ± 2
7.5 mg kg ⁻¹	46 ± 5*	31 ± 2*	6.7 ± 0.2	56 ± 5	70 ± 3	14 ± 2
15 mg kg ⁻¹	41 ± 3**	32 ± 2*	6.8 ± 0.3	75 ± 3	80 ± 2*	8 ± 1*
75 mg kg ⁻¹	38 ± 2**	33 ± 1*	5.8 ± 0.2*	92 ± 12*	87 ± 2*	5 ± 1*

*P<0.05 when compared with the control group, **P<0.001 when compared with the control group.

On the basis of the published scientific evidence of each Etana component, the mechanism of action of Etana can be fourfold. First, it has been shown that ginsenosides, which are extracted from Panax ginseng, increased the plasma levels of FSH, LH, testosterone (total and free forms) and spermatozoa concentration and motility.⁴ This suggests that ginsenosides act on the hypothalamus and or pituitary to increase plasma FSH and LH, thus activating testes to increase testosterone levels and spermatozoa formation.^{4, 19} Second, it was found that *Eurycoma longifolia* enhanced the testosterone effect by increasing the sexual performance of inexperienced castrated male rats.⁶ Third, it has been shown that ginsenosides and icariin, isolated from *Epimedium grandiflorum*, promoted the release of nitric oxide (NO) from corpus cavernosum.^{10, 20} The release of NO induces the relaxation of the smooth muscle and thus enhances erection. In addition, ginsenosides and icariin were found to increase intracavernosal pressure.^{10, 20} Furthermore, icariin was found to be a cGMP-specific phosphodiesterase 5 inhibitor *in vitro*,²⁴ but not *in vivo*, after oral dosing for 4 weeks.¹⁰ In this study, however, the dose response of Etana showed a bell-shaped curve (Figure 2), suggesting a phosphodiesterase inhibition. Fourth, the addition of flower pollen extract and *Centella asiatica* improves blood circulation to the prostate and penis, thereby enhancing the level of the other components (or their effects) of Etana to reach the genital tract.¹¹⁻¹³ Furthermore, it is known that one of the major problems that could result in ED is chronic prostatitis.^{2, 13} Both *Centella asiatica* (Gotu Kola) and flower pollen have antioxidative activities that are important to reduce male infertility and help in managing chronic prostatitis.^{11, 13}

In addition to enhancing erectile function, Etana has other benefits. It lowered the serum cholesterol level after 28 days of oral dosing in a dose-dependent manner. This cholesterol-lowering effect is mainly due to Panax ginseng and flower pollen.²¹⁻²³

It has been shown that Panax ginseng lowers cholesterol and triglyceride levels by activating lipoprotein lipase in hyperlipidemic rats.²² In this study, however, the rats were normal and 28 days of Etana administration did not cause any significant change in the triglyceride levels.

This paper describes a new combination of herbal extracts that enhances erectile function and is safe after a long day of use. In addition, this herbal combination could also help in reducing the serum cholesterol level and in managing chronic inflammation of the prostate.¹¹⁻¹³ Clinical studies are warranted for evaluating Etana's significance in ED and in men with chronic prostatitis.

Conflict of Interest

The authors declare no conflict of interest.

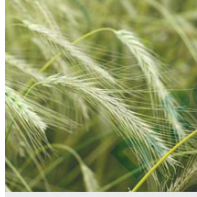
Acknowledgements

This work was funded by The Jordanian Pharmaceutical Manufacturing Co. PLC (JPM), Naor, Jordan.

References

1. McVary KT. Erectile dysfunction. *New Eng J Med*. 2007; 357: 2472-2481.
2. Rosen RC, Link CL, O'Leary MP, Giuliano F, Aiyer LP, Mollon P. Lower urinary tract symptoms and sexual health: the role of gender, lifestyle and medical comorbidities. *BJU Int* 2009; 103: Suppl 3: 42-47.
3. Feifer A, Carrier S. Pharmacotherapy for erectile dysfunction. *Expert Opin Investig Drugs* 2008; 14: 679-690.
4. Salvati G, Genovesi G, Marcellini L, Paolini P, De Nuccio I, Pape M *et al*. Effects of Panax Ginseng C. A Meyer saponins on male fertility. *Panminerva Med* 1996; 38: 249-254.
5. De Andrade E, de Mesquita AA, Claro Jde A, de Andrade PM, Ortiz V, Paranhos M *et al*. Study of the efficacy of Korean Red Ginseng in the treatment of erectile dysfunction. *Sian J Andol* 2007; 9: 241-244.
6. Ang HH, Cheang HS, Yusof AP. Effects of *Eurycoma longifolia* Jack (Tongkat Ali) on the initiation of sexual performance in inexperienced castrated male rats. *Exp Anim* 2000; 49: 35-38.

7. Ang HH, Lee KL. Effect of *Eurycoma longifolia* Jack on orientation activities in middle aged male rats. *Fundam Clin Pharmacol* 2002; 16: 479-483.
8. Ang HH, Lee KL, Kiyoshi M. *Eurycoma longifolia* Jack enhances sexual motivation in middle-aged male mice. *J Basic Clin Physiol Pharmacol* 2003; 14: 301-308.
9. Gu Y, Meng G. Preparation conditions for decoction of *Epimedium grandiflorum* Morr. *Zhongguo Zhong Yao Za Zhi* 1990; 15: 412-413, 446.
10. Liu WJ, Xin ZC, Xin H, Yaun YM, Tian L, Guo YL. Effects of icariin on erectile dysfunction and expression of nitric oxide synthasae isoforms in castrated rats. *Asian J Andol* 2005; 7: 381-388.
11. Brinkhaus B, Linder M, Schuppan D, Hahn EG. Chemical, pharmacological and clinical profile of the East Asian medical plant *Centella asiatica*. *Phytomedicine* 2000; 7: 427-428.
12. Pointel JP, Boccalon H, Cloarec M, Ledevhat C, Joubert M. venous insufficiency of the lower limbs. *Angiology* 1986; 37: 420-421.
13. Chen HJ, Wang ZP, Chen YR, Qin DS, Fu SJ, Ma BL. Effects of pollen extract EA-10, P⁵ on chronic prostatitis or infertility with chronic prostatitis. *Acta Pharmacol Sin* 2002; 23: 1035-1039.
14. Badwan A, Taha H, Qinna N. Multi-component herbal composition for the treatment of male erectile dysfunction. Patent Pending Appl #. EP200700011673, Publ: 08/06/2008; International Classes A61K36/258; A61K36/185; A61K36/296; A61K36/25; A61P15/10.
15. Benassi-Benelli A, Ferrari F, Quarantotti BP. Penile erection induced by apomorphine and N-nopropyl-norapomorphine in rats. *Arch Int Pharmacodyn* 1979; 242: 241-247.
16. El-Thaher TS, Matalka KZ, Taha HA, Badwan AA. *Ferula harmonis* 'zallouh' and enhancing erectile function in rats: efficacy and toxicity study. *Int J Impot Res* 2001; 13: 247-251.
17. El-Thaher TS, Khatib S, Saleem M, Shnoudeh A, Badwan AA. A novel compound JPM8: *in vivo* penile activity promotion in rats, effect on the relaxation and cGMP/cAMP accumulation in isolated rabbit corpora cavernosa. *Int J Impot Res* 2002; 14: 453-461.
18. McKay D. Nutrients and botanicals for erectile dysfunction: examining the evidence. *Altern Med Rev* 2004; 9: 4-16.
19. Chen X, Lee TJF. Ginsenosides-induced nitric oxide-mediated relaxation of the rabbit corpus cavernosum. *Br J Pharmacol* 1995; 115: 15-18.
20. Choi YD, Rha KH, Choi HK. *In vitro* and *in vivo* experimental effect of Korean red ginseng on erection. *J Urol* 1999; 162: 1508-1511.
21. Ji W, Gong BQ. Hypolipidemic effects and mechanisms of Panax notoginseng on lipid profile in hyperlipidemic rats. *J Ethnopharmacol* 2007; 113: 318-324.
22. Wójcicki Jm Samochowiec L., Bartlomowicz B, Kinek A, Jaworska M, Gawrońska-Szklarz B. Effect of pollen extract on the development of experimental atherosclerosis in rabbits. *Atherosclerosis* 1986; 62: 39-45.
23. Xin ZC, Kim EK, Lin WJ, Tian L, Yuan YM, Fu J. Effects of icariin on cGMP-specific PDE5 and cAMP-specific PDE4 activities. *Asian Andol* 2003; 5: 15-18.



FERTILITY SUPPORT

GRAMINEX Flower Pollen Extract

Efficacy of Cernilton administration for infertile males associated with asymptomatic pyospermia

Tetsuya Arai, Shin Horiuchi, Kenichiro Yoshida

Department of Urology, Dokkyo University School of Medicine

Introduction

The cases, that white blood cell is significantly higher in semen, accounts for 16 ~ 17% of male infertility patients. Interestingly, it was common that no bacterial finding is presented in these cases, using standardized bacterial test, PCR methods for Chlamydia trachomatis (C. trachomatis), and semi-quantitative analysis for Ureaplasma urealyticum (U. urealyticum). Although these cases are classified in nonbacterial chronic prostatitis, it has been generally recognized to be associated with male infertility.

In present study, we reported that administration of Cernilton reduce PMN-elastase activity and to improve seminal findings in semen for 17 male infertility patients with no bacterial finding in semen.

Materials and Methods

17 male infertility patients associated with nonbacterial asymptomatic pyospermia were treated with Cernilton 6 tablets daily over 12 weeks, and then sperm density, progressively motile sperm ratio, sperm motility and PMN-elastase activity in semen were measured.

Results

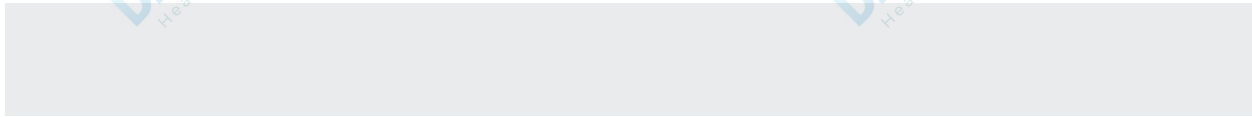
In all patients, progressively motile sperm ratio, sperm motility and PMN-elastase activity in seminal fluid were improved.

Conclusion

Administration of Cernilton is seemed to be effective in the treatment of infertile males associated with nonbacterial asymptomatic pyospermia

List of Patients

Number	Age	Sperm Density (x 10 ⁶ /ml)		% progressively motile sperm		Sperm motility			PMN—elastase activity (µg/ml)				
1	35	31	→	59	34	→	42	±	→	+	760	→	529
2	33	44	→	40	31	→	52	±	→	++	1770	→	640
3	40	22	→	24	40	→	48	±	→	+	2080	→	610
4	32	10	→	10	30	→	54	±	→	+	7130	→	1860
5	36	38	→	27	42	→	55	±	→	+	610	→	240
6	34	32	→	35	40	→	52	±	→	+	890	→	290
7	35	28	→	31	44	→	67	±	→	++	2270	→	114
8	36	67	→	49	41	→	62	±	→	++	1710	→	380
9	41	100	→	64	15	→	55	±	→	+	1910	→	780
10	32	32	→	30	32	→	36	±	→	+	1510	→	1090
11	36	57	→	60	20	→	48	±	→	+	1800	→	1020
12	28	38	→	32	24	→	30	±	→	++	2820	→	980
13	30	1.2	→	1.6	0	→	20	±	→	+	3970	→	1120
14	36	0.3	→	0.3	40	→	50	±	→	+	1710	→	940
15	32	0.6	→	0.5	21	→	34	±	→	+	5140	→	1200
16	34	38	→	30	0	→	23	±	→	+	4520	→	1070
17	41	0.7	→	0.5	34	→	38	±	→	++	1060	→	720



Dr. Pollitincells
Health Center

Dr. Pollitincells
Health Center

Dr. Pollitincells
Health Center

Dr. Pollitincells
Health Center



MENOPAUSE SUPPORT:

GRAMINEX Flower Pollen Extract

Findings on Female Menopausal Disorders through the “Pollen Extract G63” of Graminex Company

Hiroimi Yokoyama Naofumi Suzuki Yoshimi Nishimura

(Kanda New Medical Clinic)

Female Menopausal Disorders occur at the onset of menopause, have as a characteristic of indeterminate complaints, interference even occurs with intercourse, and becomes a source of discord in partner relationships. A reduction of female hormones has been talked about as the cause. Here, we have examined the influence of pollen extract G63 on hormones and improvement of the associated indeterminate complaints.

Objective and Methods

Six females, four in menopause and two evidencing menopausal symptoms having menstrual period every 4-5 months, were studied for degree of improvement according to two hormones Estradiol and DHEAS and the consultation questionnaire. The period of the trial was from 1 to 3 months. The pollen extract used in the trial was produced by Graminex Company in Ohio, USA from the pollen of raw materials such as rye, corn, and timothy hay (referred to as *Phleum pratense* in Japan) which were cultivated without using agrochemicals or genetically modified varieties. The pollen which

has a double hull is not digested or absorbed even when ingested since it has strong resistance to acid and heat (cannot be destroyed even at 300°C). Graminex Company using a special technology is able to separately extract G60 (water soluble nutrition components) and GFX (lipid soluble components) and we received the product G63 which is a 20:1 combination G60 and GFX.

The dosage was 6 tablets per day; three tablets each taken after breakfast and dinner. One 250 mg tablet contains 62.5 mg of pollen extract.

(The daily quantity 375mg as pollen extract)

Our own medical questionnaire was prepared and the number of points evaluated. (Lower points indicate milder symptoms)

No.	Symptoms	None	Slightly Present	Medium Intensity	High Intensity
1	Heat sensitivity (burning sensation, hot flashes)	0	1	2	3
2	Chilling, numbness, edema of hands or feet	0	1	2	3
3	Perspiration	0	1	2	3
4	Tachycardia (rapid heartbeat)	0	1	2	3
5	Palpitation	0	1	2	3
6	Chest pains and breathlessness	0	1	2	3
7	Headaches	0	1	2	3

8	Feel heavy-headed	0	1	2	3
9	Insomnia	0	1	2	3
10	Depression	0	1	2	3
11	Irritability	0	1	2	3
12	Feeling of anxiety	0	1	2	3
13	Dizziness	0	1	2	3
14	Feel dizzy upon standing	0	1	2	3
15	Tinnitus (ringing in ears)	0	1	2	3
16	Stiff shoulders	0	1	2	3
17	Arthralgia in hands and feet	0	1	2	3
18	Lumbago	0	1	2	3
19	Numbness	0	1	2	3
20	Sensation like ants crawling on the skin	0	1	2	3

Results

Graminex Pollen Therapy Trials ... Female Menopausal Disorder

Name	Age	Examination day	Estradiol	DHEAS	Consultation questionnaire
O_T	48	-Before administration	Less than 10	65	17
		-After 2 months	Less than 10	83	21
Y_T	53	-Before administration	Less than 10	72	13
		-After 1 month	Less than 10	89	6
S_M	54	-Before administration	14	142	3
		-After 1 month	Less than 10	112	4
F_N	50	June 21, 2005	27 20	106 79	4 2
N_A	63	June 21, 2005	Less than 10	121	5
			Less than 10	123	2
K_H	48	June 22, 2005	24	65	15
			Less than 10	74	10

Conclusion

The increase in Estradiol was 0 for all subjects. DHEAS increased in 4 out of the 6 subjects and the average was 14.2%. Indeterminate complaints improved in 4 of the 6 subjects for a 54.1% degree of improvement.

Discussion

It can be considered that the improvement observed in indeterminate complaints was due to the amino acids, vitamins, and mineral components of the pollen extract which in the body assisted the promotion of metabolism. Additionally, there is evidence of rejuvenation with secretion of DHEAS which normally peaks

for persons in their twenties. Moreover, the DHEAS value is also used as an indicator of female sexual desire and it can be considered that sexual appetite was also increased and it can be assumed that increased DHEAS helps to remove interference to intercourse for menopausal females.

Safety

Among the findings, in particular there were no side-effects and the supplement can be administered with peace of mind.

8/23/2005



OTHER SUPPORT:

GRAMINEX Flower Pollen Extract

A new herbal combination, Etana, for enhancing erectile function: an efficacy and safety study in animals

N Qinna^{1,3}, H Taha², KZ Matalka¹ and AA Badwan³

¹Department of Pharmacology and Biomedical Sciences, Faculty of Pharmacy and Medical Sciences, Petra University, Amman, Jordan; ²Delass Natural Products, Naor, Jordan and ³Central Research Lab, The Jordanian Pharmaceutical Manufacturing CO. PLC (JPM), Naor, Jordan

We present herein a new herbal combination called Etana that is composed of five herbal extracts including *Panax quinquelotius* (Ginseng), *Eurycoma longifolia* (Tongkat Ali), *Epimedium grandiflorum* (Horny goat weed), *Centella asiatica* (Gotu Kola) and flower pollen extracts. Most of the above-mentioned extracts have been a long historical and traditional use for erectile dysfunction (ED). On the basis of the mechanism of action of each of the above, a combination is introduced to overcome several physiological or induced factors of ED. This study was conducted to show an enhancement of erectile function in male rats. The animals were observed for 3 h after each administration for penile erection, genital grooming and copulation mounting, and the penile erection index (PEI) was calculated. The maximum response was observed at the concentration of 7.5 mg kg⁻¹ of Etana. At a 7.5 mg kg⁻¹ single dose, the percentage of responding rats was 53 ± 7 with a PEI of 337 ± 72 compared with 17 ± 6 with a PEI of 30 ± 10 for control animals. This PEI was significantly (P<0.001) higher than each single component and than the sum of any two herbal components of Etana. When compared with sildenafil citrate, Etana induced more pronounced PEI than 0.36 mg kg⁻¹, but similar to 0.71 mg kg⁻¹ of sildenafil. Furthermore, full acute and sub-acute toxicity studies showed no toxic effects of Etana. In conclusion, this study describes a new and safe combination of herbal components that enhance erectile function in male rats. Clinical studies are warranted for evaluating Etana's significance in ED.

International Journal of Impotence Research (2009) **21**, 315-320; doi: 10.1038/ijir.2009.18; published online 4 June 2009

Keywords: Ginseng; Centella; Epimedium; Eurycoma; pollen; erectile dysfunction; Etana; herbal

Introduction

Erectile dysfunction (ED) affects 50% of men aged between 40 and 70 years and therefore is considered to be an important health problem.¹ As men age, several physiological or induced factors arise that contribute to ED, such as a decline in the testicular production of testosterone, vascular functionality, levels and responsiveness to vasoactive amines and neurotransmitters, diseases (for example, cardiovascular, hypertension, diabetes mellitus,

chronic prostatitis) and certain drugs.^{1, 2} A number of pharmacological agents are introduced to correct ED transiently, such as the orally consumed phosphodiesterase type 5 inhibitors, testosterone therapy, or vasoactive agents inserted intraurethraly or injected intracavernosally.¹⁻³

Some natural products such as *Panax quinquelotius*, *Eurycoma longifolia* and *Epimedium grandiflorum* have the ability to act as an aphrodisiac and to help restore ED. The

medicinal activity of *Panax quinquelotius* (Ginseng) has improved penile rigidity, libido and patient satisfaction in men with ED,^{4, 5} whereas using a *Eurycoma longifolia* extract (Tongkat Ali) and *Epimedium grandiflorum* (Horny Goat Weed) in animals increased sexual arousal, motivation and frequency of sexual activity.⁶⁻¹⁰ Furthermore, there are some natural products that could play a role in improving circulation to the prostate and penis such as *Centella asiatica* (Gotu Kola) and flower pollen.¹¹⁻¹³ Therefore, it was our hypothesis that the development of a herbal combination of the above five plant extracts, called Etana,¹⁴ could work on several age-induced causes of ED. On the basis of the mechanism of action of each component, this herbal combination could have an additive or synergistic effect to restore erectile function.

To introduce Etana as an enhancer of male erectile function, this study examines the efficacy of Etana in relation to each of its components, to its dose-response effect, in comparison to sildenafil as a known drug to restore erectile function and to different herbal combinations. In addition, acute and subacute toxicity studies of Etana were carried out to establish the safety of this herbal combination.

Materials and Methods

Herbal Extracts

Panax quinquelotius, *Eurycoma longifolia* and *Epimedium grandiflorum* extracts were purchased from Hongjiu Ginseng, the Active Ingredients Group and from the Chengdu Wagott Pharmaceutical Co., Chengdu, China, respectively. *Centella asiatica* (Gotu Kola) and flower pollen extracts were purchased from Graminex, USA and Ennagram, France, respectively. Sildenafil citrate was obtained from JPM, Jordan.

Etana preparation and method of analysis

Etana is a mixture of Ginseng extract (100 mg), Tongkat Ali extracts (200 mg), Epimedium

extract (50 mg), Gotu Kola extract (40 mg), and flower pollen extract (135 mg). The preparation was dissolved in distilled water and given to rats by oral gavage.

The method of analysis of Etana components is based on the HPLC method to assay a marker for each constituent (for example, icariin for *Epimedium grandiflorum* and malasiatic acid for *Centella asiatica*). The method is based on a solid stationary phase (C18 packed column), mobile phase, and separation by partition adsorption or ion exchange process. The gradient mixtures of acetonitrile: H₃PO₄ and the detection wavelengths were different for each component.

Animals

Male and female Wister rats (220-300 g) were obtained from the Yarmouk University animal house unit (Irbid, Jordan). The animals were housed at the animal facility in Petra University in a 12 h light or dark cycle at a constant temperature of 22° C. All animals were acclimatized for 10 days before the experiments with free access to a standard diet and drinking water. All animal experiments were carried out in compliance with relevant laws and institutional guidelines.

Sexual behavior and penile erection index

Each animal group consisted of 10 male rats weighing 200-300 g. Each test preparation was dissolved freshly in distilled water and doses were administered by oral gavage. Dosing of Etana was either as a single dose per day or as a triple dose per day, 3 h apart, to show any changes in the efficacy obtained from multiple administrations per day. Control animals were given the vehicle alone (distilled water). Rats were placed in glass cages, allowed free access to food and tap water and were observed for 3 h after each drug administration for penile erection, genital grooming and possible copulation mounting. The number of responding rats was recorded along with the number of sexual activity episodes (penile erection, genital

grooming or copulation mounting). Penile erection index (PEI) was calculated for each group by multiplying the percentage of active rats (responding rats) by the total number of activity episodes.¹⁵⁻¹⁷

Acute and subacute toxicity assessment

Acute toxicity for Etana was determined in rats (250-300 g) consisting of 10 rats per group (five males and five females). A single dose of 0, 7.5, 37.5, 75, 150, 225 and 300 mg kg⁻¹ (that is, 1 x to 40 x of the human recommended daily dose based on 70 kg b.w.) was given by oral gavage to each animal per group. The animals were observed closely for any toxic or abnormal behavior in the first 2 h after dosing and were kept under further observation for 2 weeks.

A subacute toxicity study for 28 days was carried out according to ICH guidelines. A single dose of 0, 7.5, 15 and 75 mg kg⁻¹ (that is, 1 x, 2 x, 10 x of the human recommended daily dose based on 70 kg b.w.) was given by oral gavage to each animal per group. Each test group consisted of five males and five females, and different sex animals were kept in separate cages to avoid pregnancy during the test period. Animals were monitored carefully and body weights were measured daily. At the end of 28 days, all animals were killed. Just before being killed, blood samples were taken from the jugular vein for a full blood and chemistry analysis. All internal organs were carefully removed, weighed and then fixed with 10% buffered formalin for histological examination.

Data analysis

All variables were analyzed using SPSS version 10 statistical package (SPSS Inc., Chicago, IL, USA) using different statistical tests. For sexual behavior and PEI analysis, Student's *t* test was carried out to compare the level of significance between groups. As for the toxicity study, statistics were generated for time interaction, gender effect and differences between each treatment group and the control group. The overall differences between the groups were

analyzed using one-way ANOVA. In some cases, Turkey's post test was carried out after ANOVA to show the differences between selected groups. For all of the statistical comparisons, the level of significant difference was defined as $P < 0.05$.

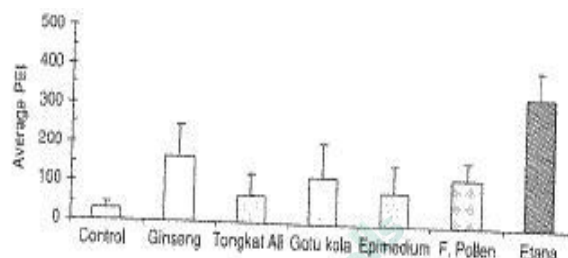


Figure 1. The PEI for different groups of rats administered either a single component of Etana, Etana or distilled water. The PEI was determined by multiplying the average scores reported during a 6-day treatment by the average percentage of responding rats. The rats were monitored for 3 h after a single administration. Each single group was administered the same amount (mg) as is present in Etana. Each bar point represents the mean of six experiments \pm s.d.

Results

Etana versus each single component on male rat sexual behavior

The PEI after the administration of each single component of Etana in comparison with Etana is presented in Figure 1. In all treated animals, PEI increased significantly ($P < 0.001$) when compared with control animals. In addition, Etana-treated rats showed significantly higher ($P < 0.001$) PEI than did each single Etana component-treated rats (Figure 1). In addition, the PEI of Etana is higher than the sum of any two herbal components. Furthermore, the number of responding rats after a single administration of Etana was significantly higher ($P < 0.001$) than each single Etana component-treated rat.

Dose response of Etana on male rat sexual behavior

The dose response of Etana showed a significantly higher ($P < 0.001$) PEI at a dose of 7.5 mg kg⁻¹ of Etana when compared with 2.5, 15 mg kg⁻¹ and controls (Figure 2). In addition,

when Etana was administered thrice a day, 3 h apart to the same rats, the PEI was significantly higher ($P < 0.001$) at 7.5 mg kg^{-1} dose when compared with that in the other doses and control, and the cumulative PEI did not change after the second or third dose to the same rats (Figure 2).

Efficacy and safety in animals

N Qinna *et al*

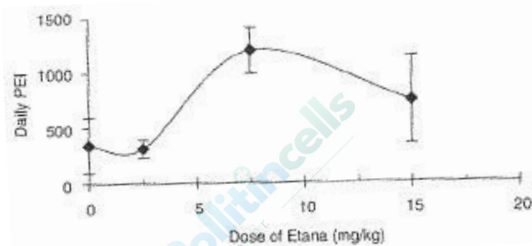


Figure 2. The PEI for different groups of rats administered different doses of Etana. Etana was administered thrice a day, and PEI was determined by multiplying the average scores reported during a 3-day treatment by the average percentage of responding rats. Each bar point represents the mean of three experiments \pm s.d.

Etana versus Sildenafil on rat sexual behavior

In this set of experiments, the effect of Etana 7.5 mg kg^{-1} was compared with the effect of two therapeutic doses (0.36 and 0.71 mg kg^{-1} , based on 70 Kg b.w.) of sildenafil citrate. The PEI after Etana (7.5 mg kg^{-1}) administration as a single or triple dose per day was similar to that of 0.71 mg kg^{-1} of sildenafil and was significantly higher ($P < 0.001$) than that of 0.36 mg kg^{-1} of sildenafil and the control group (Figure 3).

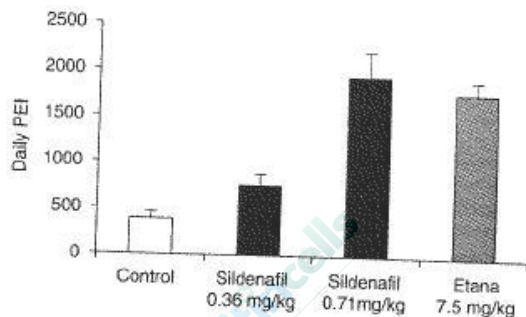


Figure 3. The PEI for different groups of rats administered two doses of sildenafil and Etana. Doses were administered thrice a day, 3 h apart, and PEI was determined by

multiplying the average scores reported during a 3-day treatment by the average percentage of responding rats. Each bar point represents the mean of three experiments \pm s.d.

Etana versus a different mixture of herbal components on male rat sexual behavior

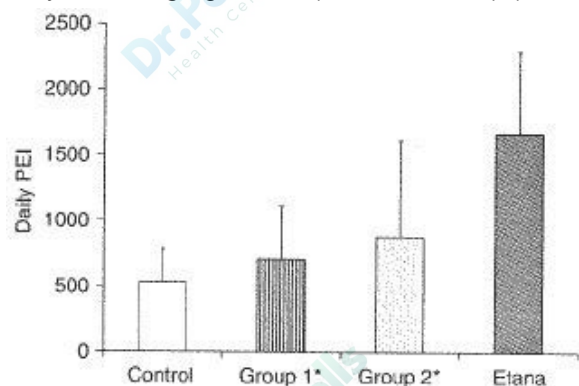
The PEI after administration of different mixture components, group 1 (*Centella asiatica*, *Eurycoma longifolia*, *Epimedium grandiflorum*, flower pollen extract and *Gingko*) and group 2 (*Ginseng*, *Eurycoma longifolia* and *Epimedium grandiflorum*), is shown in Figure 4. The cumulative PEI and the percentage of responding rats after the administration of Etana thrice a day were significantly higher ($P > 0.001$) than the PEI and percentage of responding rats of group 1 and 2 (Figure 4). In group 1, *Gingko* was added instead of *Ginseng* because of its known function as an aphrodisiac. A single administration of *Gingko* (0.86 mg kg^{-1}) showed PEI and percentage of responding rats at 80 and 22%, respectively.

Acute and subacute toxicity of Etana

No deaths occurred after the administration of any of the single doses tested (7.5 - 300 mg kg^{-1}). After a 28-day administration of 7.5 , 15 or 75 mg kg^{-1} (that is, 1 x, 2 x, 10 x of the effective dose), no deaths occurred, and the body weight did not show any significant changes in male or female rats. In addition, the weights of the internal organs did not show any changes after a 28-day administration of any of the doses tested.

The chemistry results after a 28-day administration of 1 x, 2 x, and 10 x dose of Etana showed no significant differences in triglycerides, ALT, AST, ALP, sodium, creatinine, calcium and phosphorus. However, a significant reduction in cholesterol, urea and potassium levels ($P < 0.03$ - 0.001) was observed (Table 1). The reduction of cholesterol was dose dependent ($P < 0.001$) as the percent reduction was 20, 26 and 34% for 7.5 , 15 and 75 mg kg^{-1} , respectively, whereas the reduction of urea was dose dependent (15% for all doses; $P < 0.03$) and the reduction of potassium was seen only at the

75 mg kg⁻¹ dose (10%; P<0.015). On the other hand, the glucose level increased significantly only at 75 mg kg⁻¹ dose (68%, P<0.025) (Table



1).

Figure 4. The PEI for different groups of rats administered different combinations: *Centella asiatica*, *Eurycoma longifolia*, *Epimedium grandiflorum*, flower pollen extract and Ginkgo for group 1: and Ginseng, *Eurycoma longifolia* and *Epimedium grandiflorum* for group 2 and Etana. Doses were administered thrice a day, 3 h apart, and PEI was determined by multiplying the average scores reported during a 3-day treatment by the average percentage of responding rats. Each single group was administered the same amount (mg) as is present in Etana. Each bar point represents the mean of three experiments ± s.d.

The hematological changes after a 28-day administration of 7.5, 15 and 75 mg kg⁻¹ dose of Etana showed a significant increase in the percentage of lymphocytes, and a significant decrease in the percentage of neutrophils in peripheral blood at the doses of 15 and 75 mg kg⁻¹ (P<0.05-0.001) (Table 1). However, the absolute number of the above cells in peripheral blood did not change because there was an apparent reduction in the total leukocytes count.

Discussion

This study describes a new and safe combination of herbal components that

enhances erectile function in male rats. Most of the single constituents of Etana have been widely used for enhancing erectile function, and scientific evidence was reported to explain the mechanism of each component. The idea was to show the additive or synergistic effect of such combination. The results indicate that Etana showed a significantly higher percentage of responding rats and PEI. Furthermore, the Etana efficacy was dose dependent, showing higher activity at either single dose or triple dose of 7.5 mg kg⁻¹ per day, and can be administered for a long period of time without any toxic effect.

To confirm our hypothesis with regard to the efficacy of Etana combination versus other possibilities, it was compared with two other combinations. The choice of the two other combinations was based on the known mechanism of each component. Group 1 was a mixture of *Centella asiatica*, *Eurycoma longifolia*, *Epimedium grandiflorum*, pollen extract and Ginkgo versus Ginseng, *Eurycoma longifolia* and *Epimedium grandiflorum* (group 2) and Etana (*Ginseng*, *Eurycoma longifolia*, *Epimedium grandiflorum*, and *Centella asiatica* and flower pollen). Group 1 components are similar to Etana except that it contains Ginkgo instead of Ginseng. Ginkgo has also been used for aphrodisiac effects but it has a different mechanism of action from Ginseng.¹⁸ Group 2 does not contain flower pollen and *Centella asiatica*. On the basis of the above, one of the mechanisms of action of Etana as a herbal combination to enhance blood flow is consistent with the synergistic effects observed by combining the individual components.¹¹⁻¹³

Table 1. The significant hematological and biochemical findings of rats treated with different doses of Etana for 28 days

Group	Cholesterol (mg dl ⁻¹)	Urea (mg dl ⁻¹)	Potassium (mmol ⁻¹)	Glucose (mg dl ⁻¹)	Lymphocytes %	Neutrophils %
Control	58 ± 2	37 ± 2	6.5 ± 0.2	55 ± 9	73 ± 3	13 ± 2
7.5 mg kg ⁻¹	46 ± 5*	31 ± 2*	6.7 ± 0.2	56 ± 5	70 ± 3	14 ± 2
15 mg kg ⁻¹	41 ± 3**	32 ± 2*	6.8 ± 0.3	75 ± 3	80 ± 2*	8 ± 1*
75 mg kg ⁻¹	38 ± 2**	33 ± 1*	5.8 ± 0.2*	92 ± 12*	87 ± 2*	5 ± 1*

*P<0.05 when compared with the control group, **P<0.001 when compared with the control group.

On the basis of the published scientific evidence of each Etana component, the mechanism of action of Etana can be fourfold. First, it has been shown that ginsenosides, which are extracted from Panax ginseng, increased the plasma levels of FSH, LH, testosterone (total and free forms) and spermatozoa concentration and motility.⁴ This suggests that ginsenosides act on the hypothalamus and or pituitary to increase plasma FSH and LH, thus activating testes to increase testosterone levels and spermatozoa formation.^{4, 19} Second, it was found that *Eurycoma longifolia* enhanced the testosterone effect by increasing the sexual performance of inexperienced castrated male rats.⁶ Third, it has been shown that ginsenosides and icariin, isolated from *Epimedium grandiflorum*, promoted the release of nitric oxide (NO) from corpus cavernosum.^{10, 20} The release of NO induces the relaxation of the smooth muscle and thus enhances erection. In addition, ginsenosides and icariin were found to increase intracavernosal pressure.^{10, 20} Furthermore, icariin was found to be a cGMP-specific phosphodiesterase 5 inhibitor *in vitro*,²⁴ but not *in vivo*, after oral dosing for 4 weeks.¹⁰ In this study, however, the dose response of Etana showed a bell-shaped curve (Figure 2), suggesting a phosphodiesterase inhibition. Fourth, the addition of flower pollen extract and *Centella asiatica* improves blood circulation to the prostate and penis, thereby enhancing the level of the other components (or their effects) of Etana to reach the genital tract.¹¹⁻¹³ Furthermore, it is known that one of the major problems that could result in ED is chronic prostatitis.^{2, 13} Both *Centella asiatica* (Gotu Kola) and flower pollen have antioxidative activities that are important to reduce male infertility and help in managing chronic prostatitis.^{11, 13}

In addition to enhancing erectile function, Etana has other benefits. It lowered the serum cholesterol level after 28 days of oral dosing in a dose-dependent manner. This cholesterol-lowering effect is mainly due to Panax ginseng and flower pollen.²¹⁻²³

It has been shown that Panax ginseng lowers cholesterol and triglyceride levels by activating lipoprotein lipase in hyperlipidemic rats.²² In this study, however, the rats were normal and 28 days of Etana administration did not cause any significant change in the triglyceride levels.

This paper describes a new combination of herbal extracts that enhances erectile function and is safe after a long day of use. In addition, this herbal combination could also help in reducing the serum cholesterol level and in managing chronic inflammation of the prostate.¹¹⁻¹³ Clinical studies are warranted for evaluating Etana's significance in ED and in men with chronic prostatitis.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgements

This work was funded by The Jordanian Pharmaceutical Manufacturing Co. PLC (JPM), Naor, Jordan.

References

1. McVary KT. Erectile dysfunction. *New Eng J Med*. 2007; 357: 2472-2481.
2. Rosen RC, Link CL, O'Leary MP, Giuliano F, Aiyer LP, Mollon P. Lower urinary tract symptoms and sexual health: the role of gender, lifestyle and medical comorbidities. *BJU Int* 2009; 103: Suppl 3: 42-47.
3. Feifer A, Carrier S. Pharmacotherapy for erectile dysfunction. *Expert Opin Investig Drugs* 2008; 14: 679-690.
4. Salvati G, Genovesi G, Marcellini L, Paolini P, De Nuccio I, Pape M *et al*. Effects of Panax Ginseng C. A Meyer saponins on male fertility. *Panminerva Med* 1996; 38: 249-254.
5. De Andrade E, de Mesquita AA, Claro Jde A, de Andrade PM, Ortiz V, Paranhos M *et al*. Study of the efficacy of Korean Red Ginseng in the treatment of erectile dysfunction. *Sian J Andol* 2007; 9: 241-244.
6. Ang HH, Cheang HS, Yusof AP. Effects of *Eurycoma longifolia* Jack (Tongkat Ali) on the initiation of sexual performance in inexperienced castrated male rats. *Exp Anim* 2000; 49: 35-38.

7. Ang HH, Lee KL. Effect of *Eurycoma longifolia* Jack on orientation activities in middle aged male rats. *Fundam Clin Pharmacol* 2002; 16: 479-483.
8. Ang HH, Lee KL, Kiyoshi M. *Eurycoma longifolia* Jack enhances sexual motivation in middle-aged male mice. *J Basic Clin Physiol Pharmacol* 2003; 14: 301-308.
9. Gu Y, Meng G. Preparation conditions for decoction of *Epimedium grandiflorum* Morr. *Zhongguo Zhong Yao Za Zhi* 1990; 15: 412-413, 446.
10. Liu WJ, Xin ZC, Xin H, Yaun YM, Tian L, Guo YL. Effects of icariin on erectile dysfunction and expression of nitric oxide synthasae isoforms in castrated rats. *Asian J Andol* 2005; 7: 381-388.
11. Brinkhaus B, Linder M, Schuppan D, Hahn EG. Chemical, pharmacological and clinical profile of the East Asian medical plant *Centella asiatica*. *Phytomedicine* 2000; 7: 427-428.
12. Pointel JP, Boccalon H, Cloarec M, Ledevhat C, Joubert M. venous insufficiency of the lower limbs. *Angiology* 1986; 37: 420-421.
13. Chen HJ, Wang ZP, Chen YR, Qin DS, Fu SJ, Ma BL. Effects of pollen extract EA-10, P⁵ on chronic prostatitis or infertility with chronic prostatitis. *Acta Pharmacol Sin* 2002; 23: 1035-1039.
14. Badwan A, Taha H, Qinna N. Multi-component herbal composition for the treatment of male erectile dysfunction. Patent Pending Appl #. EP200700011673, Publ: 08/06/2008; International Classes A61K36/258; A61K36/185; A61K36/296; A61K36/25; A61P15/10.
15. Benassi-Benelli A, Ferrari F, Quarantotti BP. Penile erection induced by apomorphine and N-nopropyl-norapomorphine in rats. *Arch Int Pharmacodyn* 1979; 242: 241-247.
16. El-Thaher TS, Matalka KZ, Taha HA, Badwan AA. *Ferula harmonis* 'zallouh' and enhancing erectile function in rats: efficacy and toxicity study. *Int J Impot Res* 2001; 13: 247-251.
17. El-Thaher TS, Khatib S, Saleem M, Shnoudeh A, Badwan AA. A novel compound JPM8: *in vivo* penile activity promotion in rats, effect on the relaxation and cGMP/cAMP accumulation in isolated rabbit corpora cavernosa. *Int J Impot Res* 2002; 14: 453-461.
18. McKay D. Nutrients and botanicals for erectile dysfunction: examining the evidence. *Altern Med Rev* 2004; 9: 4-16.
19. Chen X, Lee TJF. Ginsenosides-induced nitric oxide-mediated relaxation of the rabbit corpus cavernosum. *Br J Pharmacol* 1995; 115: 15-18.
20. Choi YD, Rha KH, Choi HK. *In vitro* and *in vivo* experimental effect of Korean red ginseng on erection. *J Urol* 1999; 162: 1508-1511.
21. Ji W, Gong BQ. Hypolipidemic effects and mechanisms of Panax notoginseng on lipid profile in hyperlipidemic rats. *J Ethnopharmacol* 2007; 113: 318-324.
22. Wójcicki Jm Samochowiec L., Bartłomowicz B, Kinek A, Jaworska M, Gawrońska-Szklarz B. Effect of pollen extract on the development of experimental atherosclerosis in rabbits. *Atherosclerosis* 1986; 62: 39-45.
23. Xin ZC, Kim EK, Lin WJ, Tian L, Yuan YM, Fu J. Effects of icariin on cGMP-specific PDE5 and cAMP-specific PDE4 activities. *Asian Andol* 2003; 5: 15-18.

