

Dear Doctor, SYSTEMIC MANAGEMENT  
NOW ALONG WITH

New

TOPICAL INNOVATION

to Fight

ACNE & PIMPLES

Fast

Dual intensive acne treatment

PURODIL®

Syrup/Tablet/Gel

Introducing  
**Anti-acne Gel**

Enriched with  
**A NOVEL BREAKTHROUGH  
MOLECULE**  
for Acne Treatment

**$\alpha$ -mangostin**

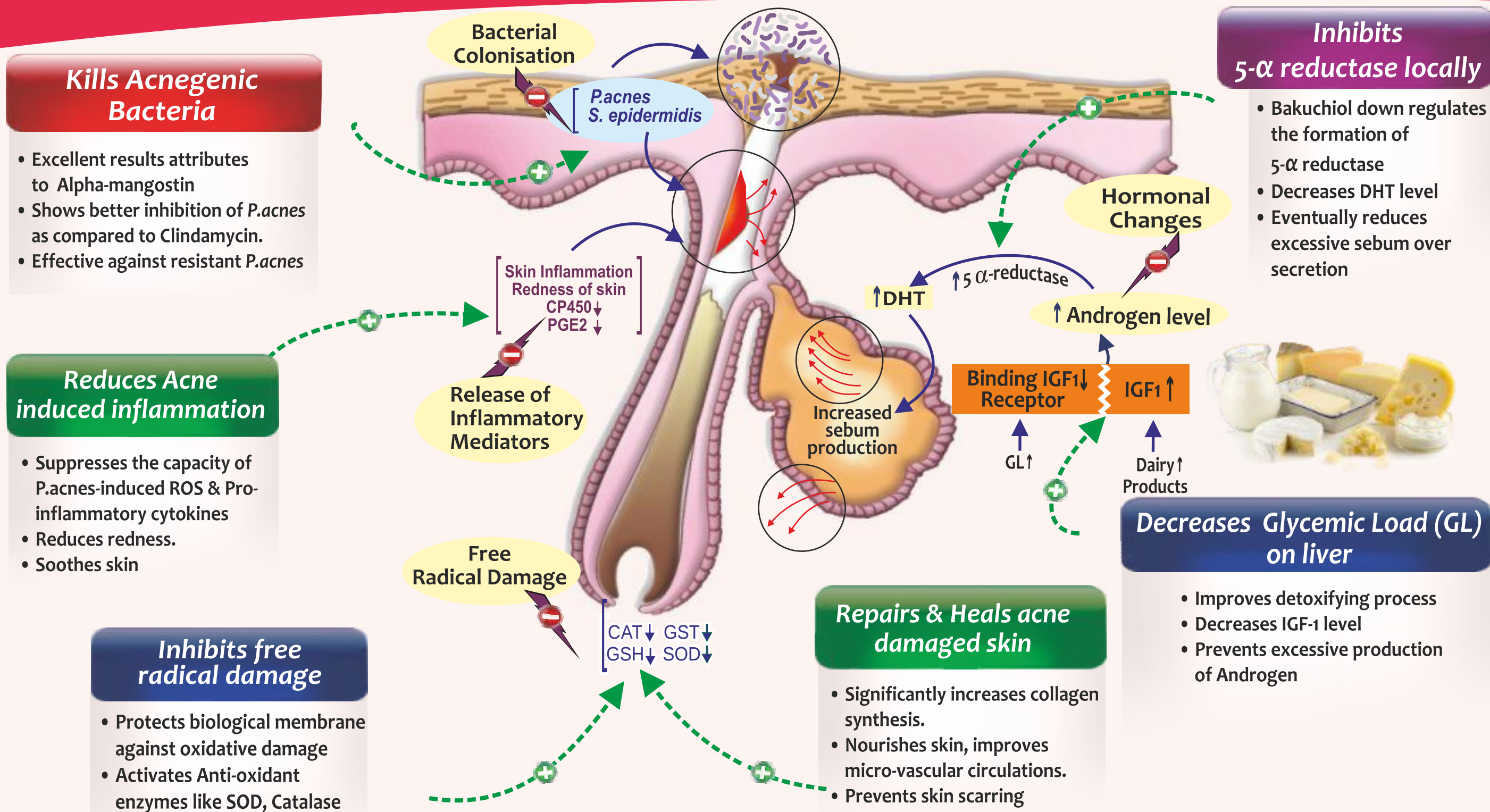


# PURODIL®



A Unique **SYSTEMIC** Approach + New **TOPICAL** Innovation

## MODE OF ACTION OF PURODIL DUAL THERAPY





# PURODIL<sup>®</sup>



A Unique  
**SYSTEMIC**  
Approach

+ New  
**TOPICAL**  
Innovation

ENRICHED WITH A NOVEL PHYTOCONSTITUENT

## $\alpha$ -Mangostin

from - *Garcinia*

### A POTENTIAL ANTI-BACTERIAL

$\alpha$ -mangostin acts as peptidomimetic which act on bacterial membrane, of *P. acnes* & *S. epidermidis* Kills even resistant strain.

(Biochemica et Biophysica act 1828, 834-44, 2013)

### REDUCES INFLAMMATION CAUSED BY *P. acnes*

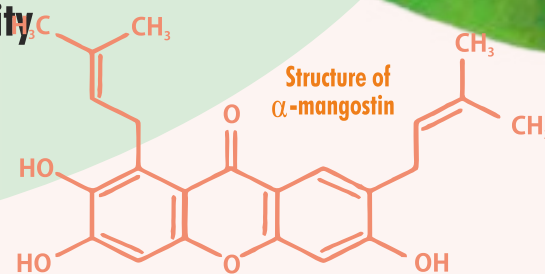
$\alpha$ -mangostin has a remarkable anti-inflammatory effect by inhibiting TNF- $\alpha$  production generated from peripheral blood mononuclear cells (BMC) stimulated with *P. acnes*.

(Fitoterapia, 78; 401-408, 2007)

### REDUCES ROS-INDUCED FREE RADICAL DAMAGE

DPPH radical scavenging activity acts as free radical scavenger.

(Phytother. Res. 23, 1047-1065, 2009)



### DECREASES SEBUM PRODUCTION

Down regulates the formation of 5  $\alpha$ -reductase, decreases DHT level, eventually reducing excessive sebum secretion. (Fragr. J. 32(3),53-57, 2004)

The fruit rinds of *G. mangostana* have been claimed for effective therapy of skin infections like acne & pimples. The pericarp of this plant is a concentrated source of xanthones. *G. mangostana* and its xanthone compounds,  $\alpha$ -mangostin, exerts strong antimicrobial activity against *P. acnes* and *S. epidermidis* which were the critical etiologic agents in acne. It also exerts potential anti-inflammatory & free radical scavenging activity. The xanthone compounds have antibacterial activity against *S. aureus*, both penicillin-resistant and methicillin-resistant strains. The antimicrobial and anti-inflammatory activities of *G. mangostana* are particularly noteworthy considering to solve antibiotic-resistant problem in acne treatment. (J. Sci. Tech. 31(1), 41-47, 2009)

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## PRE CLINICAL STUDIES REVEALING - EFFICACY OF GEL IN ACNE & PIMPLES



Study published in  
**International Journal of Research in Cosmetic Science**

(4(1), 7-9, 2014)



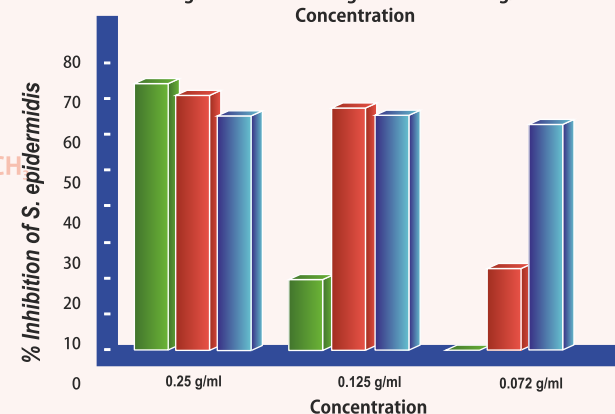
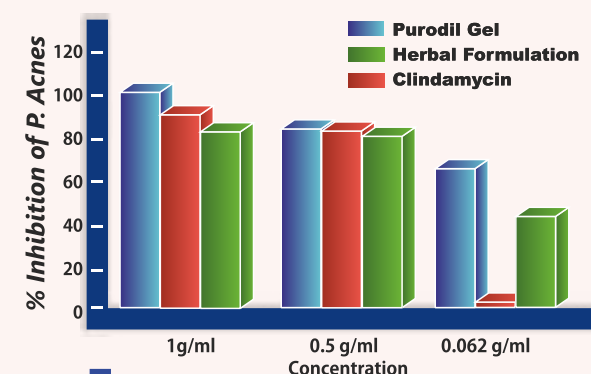
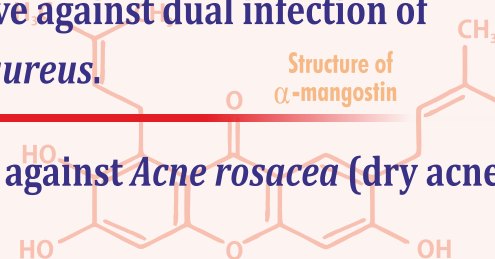
✓ Excellent results attributes to  $\alpha$ -mangostin content

- Purodil gel showed better % inhibition (98%) of *P. acnes* as compared to Clindamycin (84%) at 1g/ml concentration, *in-vitro*.

- Effective against resistant *P. acnes*.

- Found effective against dual infection of *P. acnes* & *S. aureus*.

- Also effective against *Acne rosacea* (dry acne)



### Bakuchiol-Potentially inhibits *P. acnes*



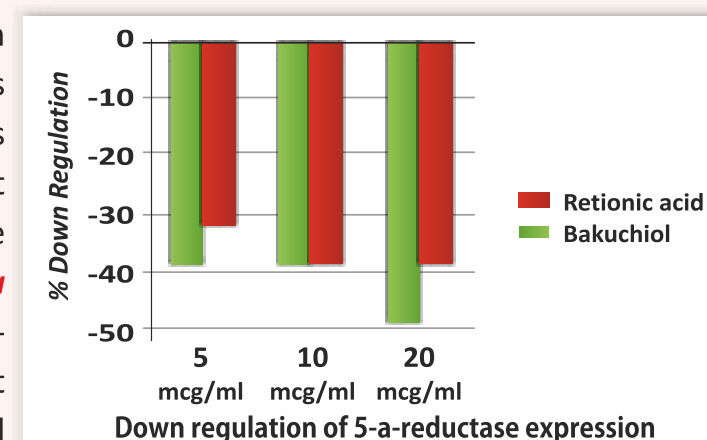
*Psoralea corylifolia* (Bakuchi) contains a monoterpene, Bakuchiol which has been reported to exhibit strong antibacterial effects. Bakuchiol exhibits excellent *P. acnes* inhibitory activity. The IC<sub>50</sub> value of Bakuchiol against *P. acnes* was established to be 0.6  $\mu$ g/ml.

The mechanism involves the up-regulation of TIG (Tazarotene-inducible gene1) by bakuchiol, may provide a solution to the skin ailments (*Acne vulgaris*, *rosacea*) interestingly it is reported that Tazarotene inducible gene 1 (TIG1) is significantly up-regulated by Bakuchiol and the expression of TIG1 is found to be down regulated in variety of human cancers as well as acne, rosacea and psoriasis. Thus, it is quite conceivable to assume that the up-regulation of TIG1 gene by Bakuchiol may provide a solution to skin problems.

(Cosmetics and Toiletries magazine, 126 (7), 2011)

### BAKUCHIOL SHOWS PROMISE AS A NEW AGENT THAT ENHANCES THE EFFECTIVENESS OF ANTI-ACNE FORMULATIONS

The enzyme 5- $\alpha$ -reductase converts testosterone to DHT, which binds to androgen receptors on the sebaceous glands and causes excessive oil production. Excess oil obstructs the skin pores, allowing bacterial growth that causes inflammation, infection and visible acne. The study on *Psoralea corylifolia* (Bakuchi) bakuchiol shows effective in down-regulating the formation of 5- $\alpha$ -reductase. At 10  $\mu$ g/mL, both bakuchiol and retinoic acid showed approximately 40% reductions in 5- $\alpha$ -reductase expression, compared with the placebo. The study demonstrates that bakuchiol exhibits excellent *P. acnes* inhibitory activity, and it is very effective in inhibiting other microorganisms such as *Staphylococcus* and *Candida*.



(Cosmetics & Toiletries 126, 7, 2011)

### BERBERINE DISRUPTS BACTERIAL CELL OF *P. acnes*

*Berberis aristata* (Daruhaldi) extract showed outstanding antimicrobial activity against propionibacterium *acnes* based on the disc diffusion assay with MIC & MBC value of 656 mg/ml and 1250 mg/ml respectively in comparison to standard, Clindamycin with MIC and MBC value of 56 mg/ml and 66 mg/ml resp. The antimicrobial activity of *Berberis aristata* is attributed to the presence of berberine which intercalates with DNA, thereby disrupting bacterial cell. (Pharmacologyonline 2:34-47 (2007))

Clove extract showed testosterone 5- $\alpha$ -reductase inhibition and showed androgen receptor binding inhibition resulting in decreased sebum production.  
(Fragr J. 32, no. 3, 53-57, 2004)



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SYSTEMIC THERAPY NORMALISES GUT-BRAIN- SKIN AXIS - PREVENTS ACNE FLARE UP & RECURRENCE

## Diminish stress induced changes in the body

Purodil syrup/tablet exerts anti-stress action along with adaptogenic, anti-anxiety action, regulates endogenous secretions, breaking vicious cycle of stress-acne-stress.



BRAIN

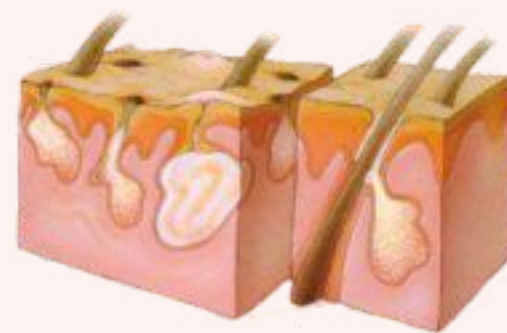
**ANTI-STRESS**

## Reduces burden of oxidative stress

Inhibits free radicals which may be found due to stress, pollutants, fried food etc. thereby protects the epidermal cells, checks acne flare-ups.

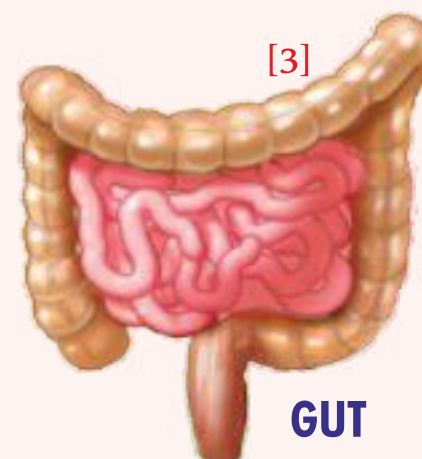


JUNK FOOD



ACNE

## PURODIL BREAKS Potential Pathways of GUT-BRAIN-SKIN AXIS in Acne vulgaris



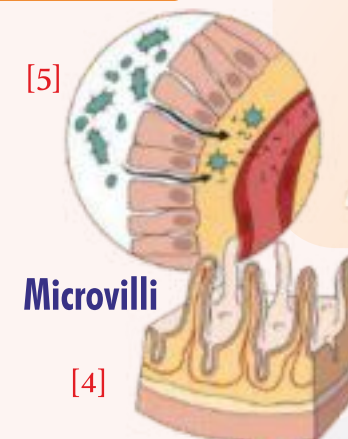
GUT

**DETOXIFICATION**

## Stimulates Liver functions, causes effective detoxification



Modulates bio-transformation reactions in detoxification process, protects from cytotoxic, genotoxic and metabolic toxicants.



Microvilli

## Reduces endotoxin production

Purodil systemic therapy protects from damage caused by inflammatory mediators, helps to remove toxins (waste metabolites) from the body system and boost body defense system, ensuring faster relief.

Potential Pathways of the Gut-Brain-Skin Axis in Acne Vulgaris: [1] Psychological distress alone or in combination with [2] high fat diet, processed comfort foods devoid of fiber, cause alterations to [3] gut motility and microbiota profile [4]. Loss of normal microbial biofilm (Bifidobacterium in particular) causes intestinal permeability and endotoxins gain systemic access [5]. Burden of inflammation and oxidative stress is increased, substance P\* is elevated, insulin sensitivity is decreased due to endotoxemia [6]. In those genetically susceptible to acne vulgaris, this cascade increases the likelihood of excess sebum production, exacerbations in acne and additional psychological distress. Both GIT toner and antimicrobials may play a role in cutting off this cycle at the gut level.

\* P - primary mediators of stress induced amplification of inflammation and sebum production in Acr

(Gut Pathogens 3(1), 1-11, 2011, Ind. J. Natural Products & Resources 1 (2), 125-135, 2010)



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**STUDIES SHOWING - EFFICACY &**

**SAFETY STUDY OF ANTI-ACNE GEL**

## PRE-CLINICAL STUDY

**Dr. B. P. Panda, MPBL (Microbial and Pharmaceutical Biotechnology Laboratory) Jamia Hamdard**

### **PRIMARY SKIN IRRITATION TEST OF PURODIL GEL IN EXPERIMENTAL SUBJECTS**

An study was conducted in experimental subjects to evaluate the primary skin irritation index of Purodil gel in accordance with the guide line of animal ethics committee. The purpose of this study was to determine the dermal irritation potential of Purodil gel to the nude skin of the experimental subjects. The study was conducted with Purodil gel applied topically once a day for one week.

***The skin irritation studies on nude skin of experimental subjects after one week resulted in the score of zero on the scales of 0-4 for erythema and edema each as compared to the standard irritant-formalin solution which resulted in a score of 4 on the scales of 0-4 for erythema formation and 1.6 for edema.***

After 1 week study the Average Primary skin irritation Index (PII) score of the Purodil gel and control were found to be zero each as compared to formalin (a standard irritant) which resulted in 5.3 score on a scale of 0-8.

***These results confirm the safety of Purodil gel for topical application as Purodil gel had been found to have No undesirous effects like skin irritation, erythema, redness of skin, eschar formation and edema or any other such untoward effects.***

### **Primary Skin Irritation (PII) Study**

A. Skin responses on Skin Irritation Studies	Time	Score (on 0-4 scale)				
		Group 1 Control	Group 2 Purodil gel	Group 3 Alc. Extracts of Purodil	Group 4 Alc. Extracts+ oils of Purodil	Group 5 Formalin (Std. irritant)
Erythema & Scar formation	1 hr	0	0	0	0	0
	24 hr	0	0	1	0	2
	168 hr	0	0	3	1	4
Edema formation	1 hr	0	0	0	0	0
	24 hr	0	0	1	0	1
	168 hr	0	0	1	0	1
B. Av. Primary Skin Irritation Index (PII) (On 0-8 Scale)		0	0	1	0.16	5.30

## CLINICAL STUDY

***A clinical study was conducted to evaluate the efficacy of PURODIL GEL in patients with mild to moderate acne vulgaris. 40 patients with mild to moderate acne vulgaris were selected and inspected for the disease.***

The results indicated that the inflammatory acne index and total counts were significantly reduced after 3 weeks of treatment with Purodil Gel. It was observed that the rate of healing of papular and pustular lesions in test and control groups were significantly different ( $p < 0.001$ , and  $p < 0.05$ , respectively) the inflammation index in the treatment group was significantly reduced ( $p < 0.001$ ). The results of administration of herbal and placebo cream are tabulated in table below .

**The results indicated that treatment with the Purodil Gel resulted in clinical efficacy in comparison with negative control. Almost 7 fold reduction in papula number was found, after 3 weeks of treatment with the Purodil Gel as compared to control groups.**

**Also comparing the number of pustules and nodules after 3 weeks, the reduction of inflammation and severity indices in test group were highly significant ( $p < 0.001$ ).**

**Comparison of Acne vulgaris indices in treatment and control groups, before & after treatment (Mean  $\pm$  SE, n=40)**

Index	The number of papules		The number of pustules		Inflammation		Severity Index	
	Before	After	Before	After	Before	After	Before	After
Control	17.03 $\pm$ 2.16	16.46 $\pm$ 2.80	2.13 $\pm$ 0.36	0.90 $\pm$ 0.22	21.93 $\pm$ 1.05	14.20 $\pm$ 2.76	1.55 $\pm$ 0.11	1.6 $\pm$ 0.12
Test	19.40 $\pm$ 1.05	2.51 $\pm$ 0.90	2.21 $\pm$ 0.57	0.62 $\pm$ 0.25	23.24 $\pm$ 0.12	2.03 $\pm$ 1.03	1.60 $\pm$ 0.08	0.32 $\pm$ 0.07
P value	0.49	<0.001	0.098	<0.05	0.27	<0.001	1.00	<0.001

The above study was conducted at Aggarwal Hospital, New Delhi under the supervision of Dr. B.P. Gupta HOD, Department of Ayurveda, Aggarwal Hospital, New Delhi.

**The analysis of the results with PURODIL Gel revealed significant improvement in the patients & following observations were reported :**

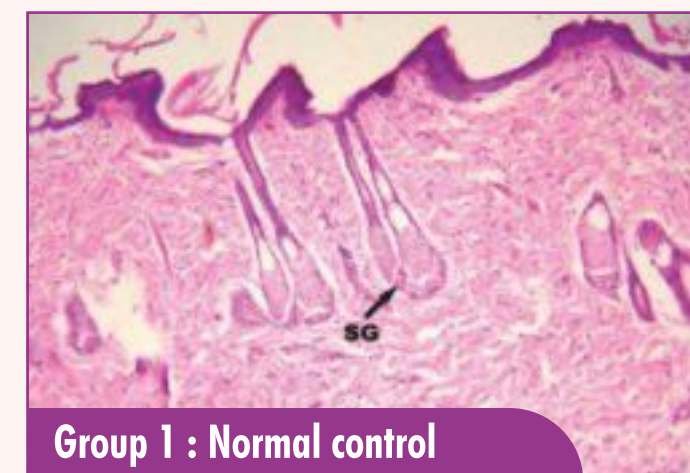
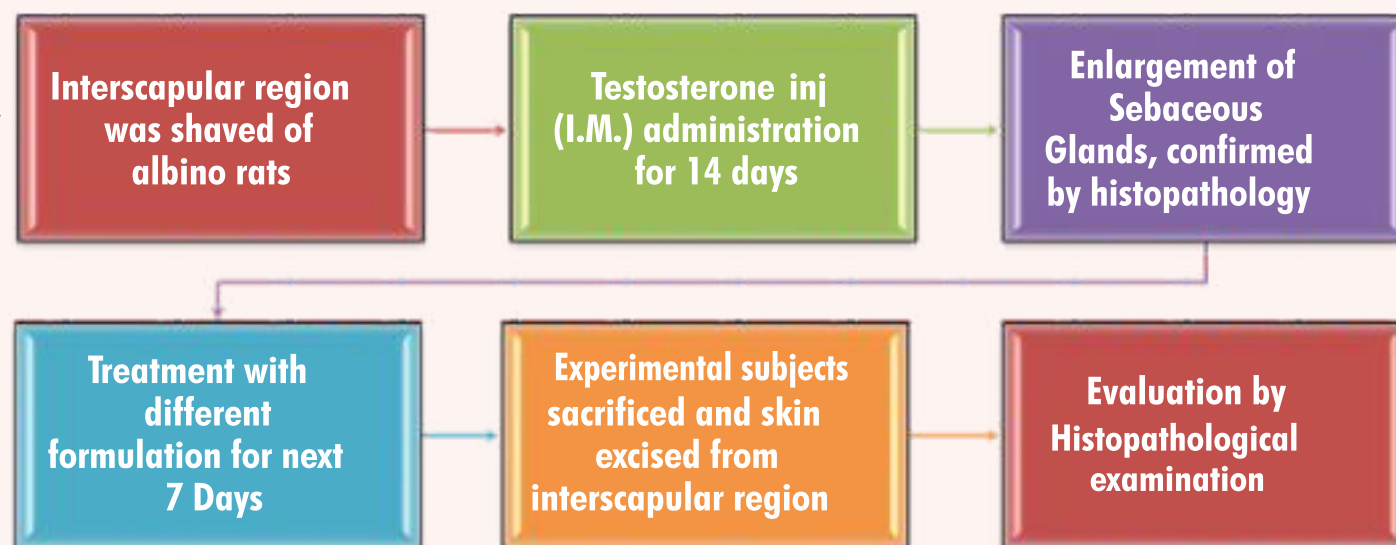
- Promising anti-acne & anti-inflammatory effects.
- Improvement in the skin tonicity while on the treatment.
- Devoid of any adverse effect.



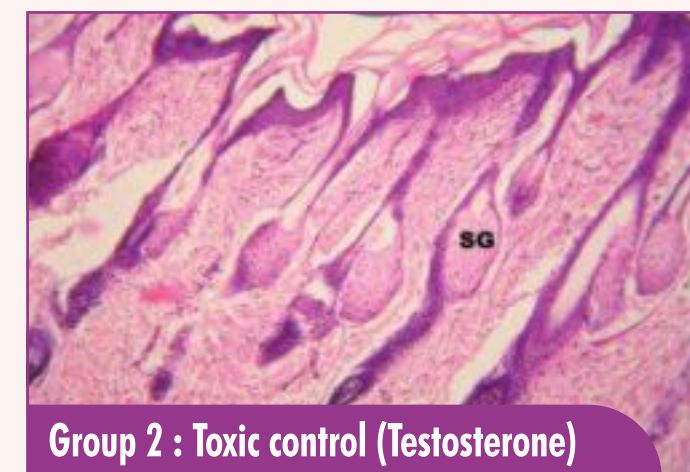


### REDUCES SIZE & NUMBER OF SEBACEOUS GLANDS SIGNIFICANTLY

In experimental study, acnes were induced by testosterone inj. and then treated with 3 different preparations. (Standard allopathic gel, Standard herbal gel, Purodil gel)



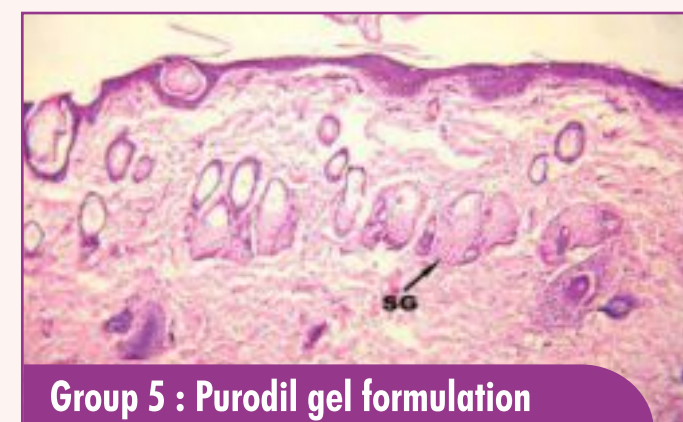
Group 1 : Normal control



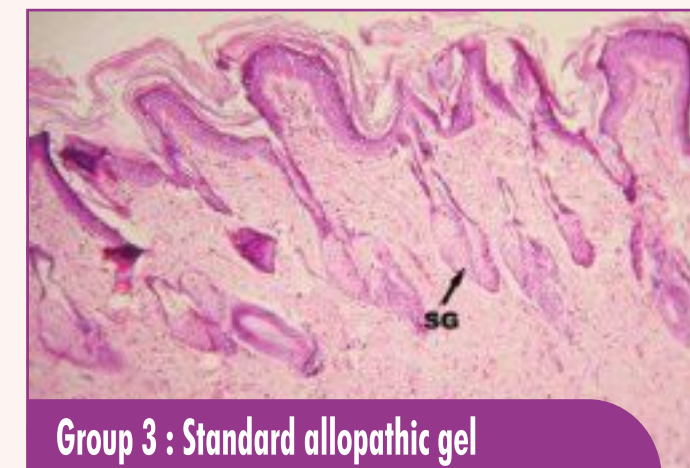
Group 2 : Toxic control (Testosterone)



Group 4 : Herbal standard cream



Group 5 : Purodil gel formulation



Group 3 : Standard allopathic gel

#### Study showed -

- Treated groups showed a significant reduction in number and size of sebaceous glands as compared to the toxic group.
- Amongst the treated groups the Allopathic Standard animals showed decrease in number of sebaceous glands but not in size of the unit while the Purodil (Ethosomal) gel Formulation and Herbal standard subjects showed a decrease in both number and size of sebaceous glands.
- The results indicate a protective effect of the drugs used against the effect of testosterone administration on the sebaceous glands in the dermis.
- From the above observations it is concluded that the  $\alpha$ -mangostin loaded PURODIL (ethosomal) gel formulation had a protective effect on both the number and size of sebaceous glands.

• The experimental subjects were divided into five groups, each consisting of five animals:  
 • Group 1 : Normal Control  
 • Group 2 : Toxic control - Testosterone inj. (Testoviron depot 100mg/ml) (1.42mg/kg/body wt. I.M.)  
 • Group 3 : Standard Allopathic gel (Cyproterone acetate)  
 • Group 4 : Herbal standard anti acne cream  
 • Group 5 : Purodil gel formulation

(Sharma S. Optimisation of extraction technology of  $\alpha$ -mangostin from *Garcinia mangostana* and development of its ethosomal anti-acne formulation  
 M. Pharm Thesis by Dept. of Pharmacog. & Phytochem.,  
 Jamia Hamdard, 2012)



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## ACTS AS ANTI-INFLAMMATORY

### CHECKS ACNE AGGRAVATION

Curcumin from *Curcuma longa* (Haridra) inhibited calcium / calcium ionophore – stimulated formation of LTB<sub>4</sub> (leukotriene B<sub>4</sub>) from endogenous arachidonic acid with EC<sub>50</sub> of 27x10<sup>-7</sup> M. Since leukotrienes are considered to be involved in the initiation & maintenance of a variety of inflammatory diseases, the inhibition of leukotriene synthesis may at least in part be responsible for anti-inflammatory action of curcumin. (Planta Medica, 58, 226, 1992)

### INHIBITS PROSTAGLANDIN FORMATION

*Glycyrrhiza glabra* (Mulethi) exhibits anti-inflammatory activity due to inhibition of Phospholipase A<sub>2</sub> activity, an enzyme critical for anti-inflammatory responses. In-Vitro research demonstrated that Glycyrrhizic acid inhibits cyclooxygenase activity, prostaglandin formation (PGE<sub>2</sub>) as well as inhibiting platelet aggregation stimulating the inflammatory process.

(Alternative Medicine Review, Vol.10, No. 3, 2005).

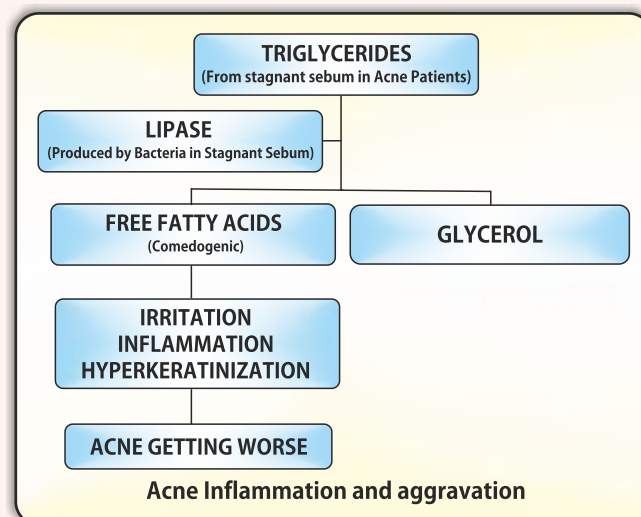
### CHECKS SKIN ALLERGIES, STABILIZES MAST CELLS

Isoliquiritigenin, from *Glycyrrhiza glabra* (Yashtimadhu) possesses cell membrane stabilizing effect. Isoliquiritigenin inhibited histamine release from peritoneal exudates induced by immunological and non-immunological reaction. In addition, it protects red blood cell membrane against various agents.

(Chem.Pharm.Bull., 40(6), 1439-1442, 1992)



*Glycyrrhiza glabra*  
(Yashtimadhu)



### EXERTS ANTI-HISTAMINIC ACTION

Bioflavonoids like Quercetin, Rutin etc. from *Azadirachta indica* (Neem) and *Hemidesmus indicus* (Sariva) are known to inhibit histamine release, protecting against various skin affections. Flavonoids inhibit enzymes which increase histamine release from mast cells and basophils & act by blocking intracellular reservoir of histamine. (Planta Medica, 63, 225-256, 1997) The Treatise on Indian Med. Plant, NISC, CSIR, New Delhi 1995).

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## EXERTS DETOXIFYING ACTION

## MODULATES DETOXIFICATION PROCESS



*Swertia chirata* (Chirayata) modulates biotransformation reactions in detoxification process, protects from cytotoxic, genotoxic and metabolic actions of environmental toxicants, activates glutathione-S-transferase (GST), glutathione peroxidase (GPX), superoxide dismutase (SOD) and catalase (CAT), & reduction in lipid peroxidation.

(Teratog.Carcinogen.Mutagen, 23 (Suppl.1), 313-322, 2003)

### STIMULATES LIVER FUNCTIONS CAUSES EFFECTIVE DETOXIFICATION

Supplementation of *Andrographis paniculata* (Kalmegh) during severe liver damage condition results in elevation of the glutathione levels, which exerts protective effect on the hepatocytes by detoxification of xenobiotics.

(Ind.J.Pharmacol., 32, 288-293, 2000)

### IMPROVES ELIMINATION OF TOXINS

According to the Townsend Letter for Doctors (December 1994), antioxidant, antiviral & antibody-stimulating properties of *Glycyrrhiza glabra* (Yashtimadhu) Roots make it a liver protectant and detoxifier. Licorice Root is regarded as an important herb for treating kidney ailments and is also recommended for the liver and respiratory tract. (Planta Medica 50; 1984)



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## THE MOST COMPREHENSIVE APPROACH TO MANAGE ACNE & PIMPLES

### EXCLUSIVE BENEFITS OF DUAL-THERAPY

Enriched with  $\alpha$ -mangostin, a novel  
Phyto compound in Acne Treatment

Effective against both  
*P.acnes* & *S. epidermidis*

Repairs & heals acne  
damaged skin

Rapid & complete  
absorption of gel

Prevents relapse of acne,  
pimples & urticaria

Modulates  
Detoxification process

Breaks vicious cycle  
of Stress-acne-stress



**Indications:** Acne vulgaris, Acne rosacea,  
Pimples, Skin blemishes, Acne spots,  
Boils, Urticaria, Skin Allergies  
or as directed by the Physician.

#### DOSAGE

**SYRUP:**  
ADULTS : 2-3 tsf. BD  
CHILDREN : 1-2 tsf BD  
**TABLETS:**  
ADULTS : 2 tabs. BD  
or as directed by the  
Physician.

#### USAGE- GEL

After cleansing, use daily every  
morning and at night. Apply a  
small amount of gel with your  
ring finger, gently tap around  
acne and blemishes area.  
(for best results leave overnight).

