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## WONDERS FROM NATURE IN THE TROPICAL SOUTHEAST ARCHIPELAGO: HEALTH FROM JUNGLES AND BUSHES

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### ANNOUNCEMENTS

- The 2019 International Conference on Quality of Life was held at Kyoto Pharmaceutical University from Sept 28-29, 2019. Further information can be found at <http://as4qol.org/icqol/2019/>
- We have moved to continuous publication. Beginning January 2019 the editing committee has decided to adopt a continuous publishing model for Journal publication. Individual articles will be released online as they become ready, allowing a steady stream of informative quality articles. We will also be moving to a calendar year issue cycle. In traditional terms, each volume will encompass a single year and consist of a single issue. Publishing on a just-in-time basis allows authors to present their results in a timely fashion, and our readers, students, and colleagues to access our content and cite articles more quickly and free from the restrictions of a predefined timetable. As a result of these changes, the look and style, as well as the function, of the Journal will be different, and hopefully improved.
- The 2019 International Meeting on Quality of Life was held recently. Proceedings as well as photos and other information can be found at <http://as4qol.org/icqol/>

MORE INFORMATION AT [HTTP://AS4QOL.ORG/ICQOL/2018/](http://AS4QOL.ORG/ICQOL/2018/)

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## Wonders from Nature in The Tropical Southeast Archipelago: Health from Jungles and Bushes

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### 1. Introduction

There are thousands of plant species in the tropics: many, though, cannot survive in the temperatures and environments either too far north or south or on soils unfriendly to the typical tropical species. From these tropical plant species can be derived ingredients and extracts that provide holistic cures and heal many diseases that modern medicines often cannot treat.

In this review, 3 of the many plants that are of health interests are focused on: 1) The pecah beling (as Malaysians call it) or “blackface general” (*Strobilanthes crispus*) due to the appearance of its leaves; 2) pandan (a Malay name for the plant), or vanilla grass or fragrant screwpine (*Pandanus amaryllisfolius* Roxb.), and 3) the queen of fruits or as is commonly called, mangosteen (*Garcinia mangostana*). Of these plants, the parts used in folk medicine happened mostly to be the leaves and stems of the plants, and the mesoderm or peel for fruits, as documented in practices used by the local population in treating diseases or then consumed as a preventative treatment against illness in remote tropical areas where modern medicine is seldom available, least of all a medical officer trained in modern medicine. Therefore, in the rural areas of Southeast Asia, these plant species are cherished; some for culinary preparation, while others for disease prevention or cure.

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#### 1.1 *Strobilanthes crispus* (L) *Blume*

Commonly known as the Black Face General (BFG) among members of the Chinese community, and as ‘Pecah Beling’ and ‘Keji Beling’ among the Malays (in Malaysia) and Indonesians, respectively. There are many other names given to it locally as well.

BFG, which is grows freely in well-drained moist soil, requires at least 5-6 hr of



Fig. 1: *S. Crispus* leaves are oblong-lanceolate in shape, rather obtuse and shallow crenate-crispate. The upper surface of leaves is rough, darker green and covered by short hair. The flowers are yellow in color and have the characteristics of short, dense and pinnated spikes.

sunlight daily, and it prefers an outdoor environment. The etymology describes its Genus as cone-flowers belonging to the species with curved or wavy margins of the family Acanthaceae. It is actually more of a shrub originating in Madagascar and the Malay Archipelago.

The leaves and stem of *S. Cripus* are prized. The leaves are very distinct, with crenate margins, and a rough texture. The upper surface, covered by short hairs, is dark green, glossy, with deeply depressed secondary and tertiary veins (Fig. 1). The stem, petiole, and primary veins on the underside of leaves are sometimes purplish in appearance. Flowers—with short, dense and pinnacled spikes—are yellow in color.

BFG exhibits potent antioxidation effect, and boosts the immunodefense system. It is commonly used to prevent infection via its antimicrobial action, and facilitates the excretory systems with its laxative and diuretic effects. In rural areas, it is used to prevent and treat kidney stones. In patients suspected of having or being diagnosed with cancer, many seek out BGF leaf extract as a frontline folk medicine. The leaves are used extensively in the tropics by families with children suffering from cough and ague. The common consumption recipe is: (a) boil fresh leaves with water and consume as an herbal tea or drink; or (b) infuse dried leaves with hot water as if brewing tea for consumption.

BGF or pecah beling leaves/stems contain many minerals, vitamins (C, B1, B2), caffeine, polyphenols, catechins, alkaloids, tannins, phenolic acids (p-hydroxybenzoic acid, p-coumaric acid, gallic acid, vanillic acid, gentinic acid, caffeic acid, ferulic acid, transcinnamic acid, syringic acid, chlorogenic acid), and flavonoids (apigenin, rutin, catechin, quercetin, naringenin, kaempferol).

## 1.2 *Pandanus amaryllifolius* Roxib.

*Pandanus amaryllifolius* is a tropical plant in the Pandanus genus (family: Pandanaceae). This plant is common known as pandan (in Malay), or as “fragrant screwpine” or “vanilla grass” (Fig. 2) due to fragrance of its leaves. The aromatic leaves are much enjoyed by local people, and they are used extensively in flavoring local dishes, cakes and drinks in South Asia and Southeast Asia. The plant is sterile, with flowers only growing very rarely, and is propagated by cutting and vegetative reproduction. It is no wonder it is seldom found growing wild, albeit it often being cultivated near households.

The “Panda” leaves (PL) of the plant are much cherished, and they contain many vitamins (it is a rich source of vitamins A and C), various minerals, antioxidants, phytochemicals (for arthritis), carotenoids (which reduce atherosclerosis, alleviate sunburn, and aid in skincare). Additionally, the leaves contain beta-carotene, thiamin, riboflavin, niacin (alleviate dizziness, cramps, nourish hair/luster, prevent dandruff), and may overcome impotence.

Traditionally, the PL extract is used to alleviate rheumatism, induce better sleep, relieve stress-induced headache, treat skin fungal infection (tinea versicolor), reduce nasal/throat phlegm, and prevent seasonal allergies & flu/colds. These useful effects may be due to their properties in elevating the immuno-defensive systems to relieve arthritis, joint pain, headaches, and earaches. Although the leaf extract increases appetite, it appears to release endogenous insulin to regulate blood sugar levels and reduce uric acid to help reduce gout symptoms. PL extract has been and is reported to elicit anti-inflammatory responses, treat constipation/boils, and relieve flu/cold symptoms. Two very useful outcomes observed in folk medicine are calming effects serving as de-stressors and facilitating the induction of sleep.

The common recipe in preparing fresh BFG leaves and PLs for consumption by local communities is to: (a) to boil fresh leaves in water and consume it as an herbal tea or drink; or (b) infuse dried leaves with hot water as is done in brewing tea for consumption.



Fig. 2: *Pandanus amaryllifolius* leaves smell fragrant (2-acetyl-1-pyrroline) typical of basmati rice. The plant is upright, green with fan-shaped sprays of long, narrow, blade-like leaves and woody aerial roots.

### 1.3 Garcinia mangostena

Mangosteen, or purple mangosteen (Fig. 3), is a tropical fruit with a creamy sweet taste known as ‘Queen of fruits’, native to Southeast Archipelago. It belongs to the family Clusiaceae. The Mangosteen fruit is prized for its juicy, delicate texture and slightly astringent flavor. Although available in canned or dried form, it is often eaten fresh locally.

Mangosteen fruits are eaten locally as a ‘cooling’ agent, but traditionally mangosteen peelings (MPs) are also used commonly as folk medicine. MPs contain flavanols (e.g. xanthonoids), xanthones, mangostin, phytochemicals, and polysaccharides.



Fig. 3: *Garcinia mangostena* fruits encased white mesoderm with brownish red or purple ectoderm. The peel (ectoderm) has many medicinal benefits.

MPs have recently caught the attention of local scientists. According to ethnobotanist Dr. James

Table 1: A summary of the health benefits with oral use of extracts derived from BFG (blackface general) leaf, PL (pandan leaf), and PL (mangosteen peel). Effects are considered positive (○), moderately positive (±), and not positive (—)

Benefits	BFG Leaf ext	PL ext	MP ext
Antiangiogenic	○	○	○
Antimicrobial	○	○	○
Anti-HIV	○	±	±
Antilytic	○	○	○
Laxative	○	±	○
Diuretic	○	○	○
Free radical scavenging	○	○	○
Anti-stress/calm effect	—	○	○
Wound-healing	○	—	—
Antidiabetic	○	○	○
Hypolipidemic	○	○	○
Antiulcerogenic	○	±	○
Anti-allergic	○	○	○
Anti-calculitic	○	○	○
Anti-depressant	—	○	○
Anti-diarrheal	○	○	○
Anti-glucomic	○	○	○
Anti-cataract	—	—	○
Anti-inflammatory	○	○	○
Anti-oxolytic	—	○	○
Anti-osteoporosis	—	—	○
Anti-parkinson	—	—	○
Anti-vertigo	—	○	○
Immunoenhancement	○	○	○
Detoxofication	○	○	○

Duke, MP extract has found to contain ingredients exhibiting 200-plus medicinal benefits. MP extract contains high antioxidant levels, and exhibits antimicrobial and antifungal activity. It is also potently anti-inflammatory on skin abrasions and wounds. Additionally, MP extract has been reported to provide anti-cancerous and anti-allergic effects. Furthermore, it is used as anti-malarial agent by local communities. For gastrointestinal disturbances—a common problem in tropical areas with poor hygiene—the MP extract proves to a frontline folk-medicinal agent against certain common diseases.

## 2. Summary of the actions of these 3 functional extracts

As a comprehensive presentation of the many health benefits of these plant/food ingredients in folk medicine reported by local communities and some recent scientific studies, Table 1 may provide a quick and useful perspective on functional food ingredients/extracts, although much remains to be proven.

### 2.1 Contraindications

It is not advisable to use BFG leaf extract when pregnant. As for PL extract, it is not recommended for those with kidney problems to use it. Adverse effects such as nausea, indigestion, and renal issues may appear. In the case of MP extract, contraindications have not been reported when daily doses of 250-500 mg/kg were administered in humans for more than 2 months, while showing antiobesity effects.

Of the various medical benefits of BFG leaf, PL, and MP extracts (Table 1), the anticancer and antidiabetic effects are especially focused upon in this review, because of the high costs and serious adverse effects of modern medicines. BFG leaf extract activates caspases 8/9, and promotes tamoxifen-induced apoptosis in inhibiting cancer cells (especially breast cancer). The BFG extract may be used even if patients are prescribed anticancer drugs. In buffering the high blood sugar levels of diabetes, the extract inhibits glucosidase in the intestine to suppress glucose absorption into the bloodstream via microvilli.

Exhibiting similar effects against cancer cells and buffering high blood sugar levels in diabetes, PL extract contains functional food ingredients that elicit cytotoxic, antimetabolic, and antiproliferative effects with apoptotic action against cancer cells (especially breast cancer), and may be used in combination with anticancer drugs. In buffering diabetes-induced complications, orally ingested PL extract contains ingredients that stimulate insulin release.

As for MP extract, apart from inducing apoptosis, enhances natural killer (NK)-cell activity; it also decreases matrix metalloproteinase (MMP)-2 and MMP-9 as well as AKT (or protein kinase-B or PKB) to neutralize cancer (especially colon, breast) cells. In line with effects of BFG leaf and PL extracts, MP extract can also be used in combination with anticancer drugs. In cases of diabetes, MP extract increases cell proliferation in glucose-induced mesangial cells, significantly reduces TGF- $\beta$ 1 and fibronectin, and thereby inhibits diabetic glomerulosclerosis to eventually prevent diabetes-induced kidney complications.

## 3. Conclusion

The results reviewed in this study are based on literature reported by various reports, from studies of both scientific and folk medical practice. More controlled scientific and clinical studies are required to confirm the above findings. Tests to evaluate the quality control and active ingredients of the extracts are necessary, and proper dosages and regimens of the present 3 extracts are needed to clarify the effects reported. However, in cases where modern drugs would not work after use and where adverse effects are unbearably painful and demanding on the human body, it can be a more appealing 'choice' for desperate patients to try out traditional medicines such as these than for them to do nothing and remain without hope.