

Potential of some *Alstonia* sp (pulai) as medicinal plants – A review

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INTRODUCTION

- Genus *Alstonia* belong to family Apocynaceae (known have a vey high biological activity and medicinal properties); traditionally used for chronic respiratory in china; malaria in Douala town, Africa
- In Indonesia, become target of interest. Ex: study on cancer and its economic aspect
- In CFBTI, since 2003. Collection of several pop and established ex-situ conservation area in Gunung Kidul
- Mostly focus on its wood quality
- This paper therefore trying to provide other potential of pulai as medicine not only for *A. scholaris* but also other *Alstonia* sp

Alstonia scholaris



- wide distribution from India to Queensland and into Solomon Islands
- The most *Alstonia* species use for traditional medicine

Phytochemistry analysis (leaves) contained:

- four picrinie-type monoterpenoid indole alkaloid (5-methoxyaspidophylline, picrinine, picralinal & 5-methoxystriactamine)
- unprecedented cage-like alkaloid
- Two novel alkaloids (Scholarisine 1 and (±)-scholarisine II)
- two C₁₃-norisoprenoids

Flowers

- Betulin, betulinic acid and ursolic acid; β -sitosterol and n-tetracosane to be the major sterol and hydrocarbon and linoleic acid was the predominant fatty acid
- new triterpenoids (the oleanane type and the ursane type)

Stem bark

- the presence of starch, lignins, alkaloids, flavonoid and proteins
- Steroid: 3-hydroxy adiantulanosterol together with four known compounds

Fruit

- Alkaloids, carbohydrates, phenolic compound, terpenoids, cardiac glycosides and flavonoids in major amounts while fixed oils and fats, saponins and steroids in lesser amounts

Extracts of follicles and latex had very low phenolics, flavonoids, and proanthocyanidins, however, follicles had relatively higher levels of proanthocyanidins than flavonoids and phenolics

Pharmacological of *A. scholaris*

1. Anti tubercle
2. Anti diabetic, antihyperlipidemic and anti oxidant
3. Anti anxiety
4. Chemopreventive activity
5. Radioprotective/protection against radiation
6. Anti cancer
7. Broncho-vasodilatory, anti tussive, asthmatic and expectorant activities
8. Anti oxidant
9. Anti bacterial
10. Anti inflammatory and analgesic effect
11. Anti aging
12. Anti fertility
13. Anti malaria activity
14. Hepatoprotective/hepatitis

Alstonia boonei



- A good source of macro and micro minerals with the highest conc. In the bark and leaves
- Abundance of (z)-9-octadecenoic acid in leaf and stem bark and methyl (7E)-7-octadecenoate in root
- Pottasium was the most abundant mineral in all plant part while iron and zinc had their highest concentration in leaves

Calcium, phosporus, iron, sodium, potassium, magnesium and also alkaloids, tannins, saponins, flavonoids and cardiac glycosides together with ascorbic acid in stem bark

In the leaves identified ascrobic acid 2,6-hexadecanoate and 9-octadececanoic. It also identified monoterpenoids, oxgenated compounds and fatty acidis include Octadecanoic acid methyl ester, benzoic acid thio, 9-Octadecene etc

Pharmacological *A. boonei*

1. Anti bacterial
2. Anti malaria
3. Anti diuretic
4. Anti diabetes and posses hypoglyceamic properties
5. Antihelmintic activity
6. Anti typhoid
7. Anti psychotic
8. Anti fertility/contraceptive
9. Pesticide/insecticidal

Other *Alstonia* species (*A. macrophylla*)



Leaves have lipid, saponin, tannin, alkaloid, phenol, steroid, flavonoid and other chemical constituent

Stem bark, three indole alkaloids (10-methoxyaffinisine, 10-methoxycathafoline and alsoterrenal, alstonisine, alstonal, alstophylline, vincamajine, lochnerine and cathafoline

Pharmacological:

1. Anti inflammatory
2. Anti bacterial
3. Anti pyretic
4. Analgesic activities
5. Anti cancer

Other *Alstonia* species

Alstonia angustifolia

- Phytochemistry: alkaloid (4'-hydroxy-3',5'-dimethoxybenzoylvincamajine) from root; dimeric alkaloids (macrocarpamine, macralstonine acetate and villastonine)
- Pharmacological: Anti protozoan

Alstonia marquisensis

- Phytochemistry: narcissin, 3-caffeolqunic acid and 5-feruloyquinic; akuamicine type: alstovine, vincanidine from its bark

Alstonia venenata

Pharmacological: anti bacterial

Alstonia congensis

Pharmacological:

1. Anti diarrhoeal
2. Anti protozoan activity

Its acute and subacute exp: no evidence of drug-induced symptoms or death but sub acute revealed a tendency to cause kidney problems fro a long-term use

Conclusion

- *Alstonia* species are traditionally known to cure various diseases in many countries including Indonesia.
- rich to many chemical constituents
- They have anti malarial, anti bacterial, anti cancer, anti oxidant, anti inflammatory, analgesic effect, anti aging etc.
- Can also be used as insecticidal and hold good promise for use as alternative crop protectant.
- This review has shown that findings from phytochemistry and pharmacological studies either in vivo and/or in vitro have justified and supported its traditional practices.

Thank you