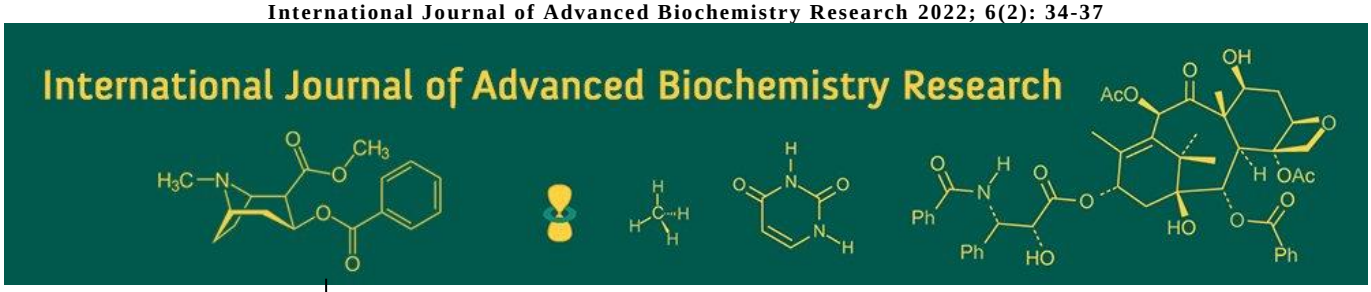

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Ethnopharmacology, phytochemistry, and pharmacology of *Acacia saligna* (Labill.) H.L. (Wendl.)

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Abstract
Acacia saligna Labill., also known as coojong, the blue-leafed wattle, golden wreath wattle, the orange wattle, the Western Australian golden wattle, and also known as Port Jackson willow in the place of Africa, is a little tree in the Fabaceae family. It is widely dispersed over Western Australia's south-west region, reaching the Murchison River in the north, and Israelite Bay in the east. It is indigenous to Australia. The most prevalent phenolic substances of this plant are benzoic acid, *o*-coumaric acid, caffeine, *p*-hydroxy benzoic acid and ellagic acid while the identified flavonoid compounds were naringenin, quercetin, and kaempferol. Due to its ability to develop into a woody shrub or tree in a variety of soil types, it is useful for many different things. In addition to being utilized as an ornamental plant, it has also been used for tanners, reforestation, animal feed, mine site rehabilitation, firewood, mulch, and agroforestry. The selected pharmacological activity of this plant includes antioxidant, antibacterial, antifungal, anti-ulcerative colitis, anticancer, cytotoxic and anti-hyperglycaemic etc.

Keywords: *Acacia saligna*, traditional use, phytochemicals, pharmacological activities

Introduction
The spread of harmful illnesses around the globe has had a profound impact on both environmental progress and human health. Natural compounds are increasingly in demand from consumers as alternatives to hazardous chemicals due to their negative reputations (Al-Huqail *et al*., 2019) [1]. Medicinal and aromatic plants have a wide range of uses as anticancer, anti-inflammatory, antitumor, antioxidants, antimalarial, analgesic, antimicrobials and this plant are also well-known for its medicinal and biopesticide capabilities (Aye *et al*., 2019) [2].

Medicinal plants are rich in different types of phytochemical compound like polyphenols, alkaloids, saponins, flavonoids, and others in their various parts, including flowers, leaves, seeds, bark, wood, and also in branches (EL-Hefny *et al*., 2017) [6]. Humans have known and used plants with therapeutic and medicinal properties since the beginning of time (Jain and Saklani, 1991) [13]. 80% of people still utilize traditional folk remedies made from natural materials in developing nations (Farnsworth *et al*., 1985) [10].

Acacia saligna (Labill.) H. L. (Wendl.), is native to the place of Western Australia and is a member of the Fabaceae family and also it has been introduced to Egypt and other Mediterranean nations in Africa (Midgely *et al*., 2003) [14]. *A. saligna* is a small, prickly, quickly-growing, frequently multiple-stemmed, shrubby plant or tree with a maximum height of 9 meters, though it typically grows shorter (Duke, 1983) [5]. Plants can have one or more stems, and their mature trunks range in diameter from 20 to 40 cm. Plants sometimes form thickets and produce suckers (Bartle *et al*., 2002) [4]. Different *Acacia* plants produce bioactive substances known as allopathic materials; proanthocyanidins, tannins, phenols, flavonoids and phenolics are the most prevalent compounds present in different parts of the *Acacia* species (Rubanza *et al*., 2005) [16]. This paper aims to determine the traditional uses, phytochemicals, and pharmacological reports of *A. saligna* on the basis of existing literature.

Plant taxonomy
Domain: Eukaryota
Kingdom: Plantae
Phylum: Spermatophyta
Subphylum: Angiospermae
Class: Magnoliopsida
Order: Fabales
Family: Fabaceae
Genus: Acacia
Species: *Acacia saligna* (Labill.) H. L. (Wendl.)

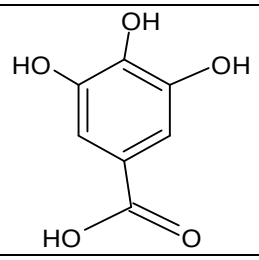
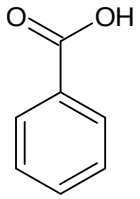
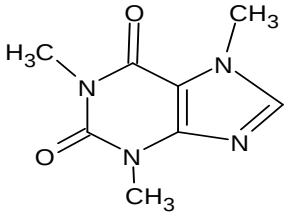
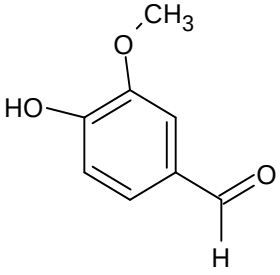
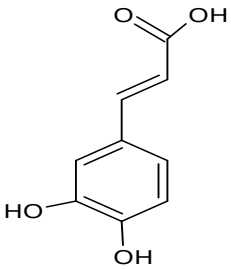
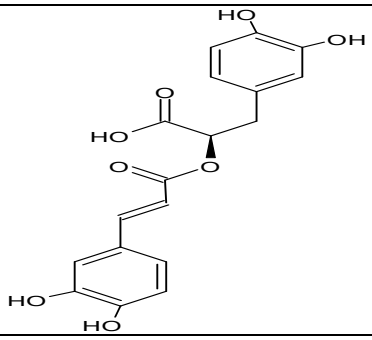
Fig 1: *Acacia saligna* (Labill.) H. L. (Wendl.)

Traditional uses

Astringent and tannins can be found in varying amounts in the bark of *A. saligna* species. Astringents are frequently used internally for medical purposes. They help to prevent internal bleeding and are used to treat diarrhea and dysentery (Fern, 1997) [9]. They are used externally as washes, to cure wounds and also some other skin issues; hemorrhoids; sweaty feet; some eye diseases; and also as a mouthwash (Maiden, 1889) [15]. The seeds of this plant are edible similarly to other tiny legume seeds, and they can also be ground and added to breads and sweets as a flavoring or nutritional supplement (Lister *et al*., 1996) [12].

Phytochemical groups and phytoconstituents

The plant is characterized by having caffeine as well as phenolic and flavonoid substances. Gallic acid, benzoic acid, caffeine, and chlorogenic acid were found in *A. saligna* bark extract, which was accompanied by rosmarinic acid, vanillin, caffeic acid and ferulic acid as the primary components (Salem *et al*., 2021) [17]. The most prevalent phenolic substances were benzoic acid, o-coumaric acid, caffeine, ellagic acid and p-hydroxy benzoic acid, while the identified flavonoid compounds were naringenin, quercetin, and kaempferol (Al-Huqail *et al*., 2019) [1]. Other identical compounds include hyperoside, quercetin 3-glucuronide, ISO quercetin, and p-coumaric acid (Elansary *et al*., 2020) [7]. Some important phytochemicals isolated from the plant have been shown in Figure 2.

		
Gallic acid	Benzoic acid	Caffeine
		
Vanillin	Caffeic acid	Rosmarinic acid

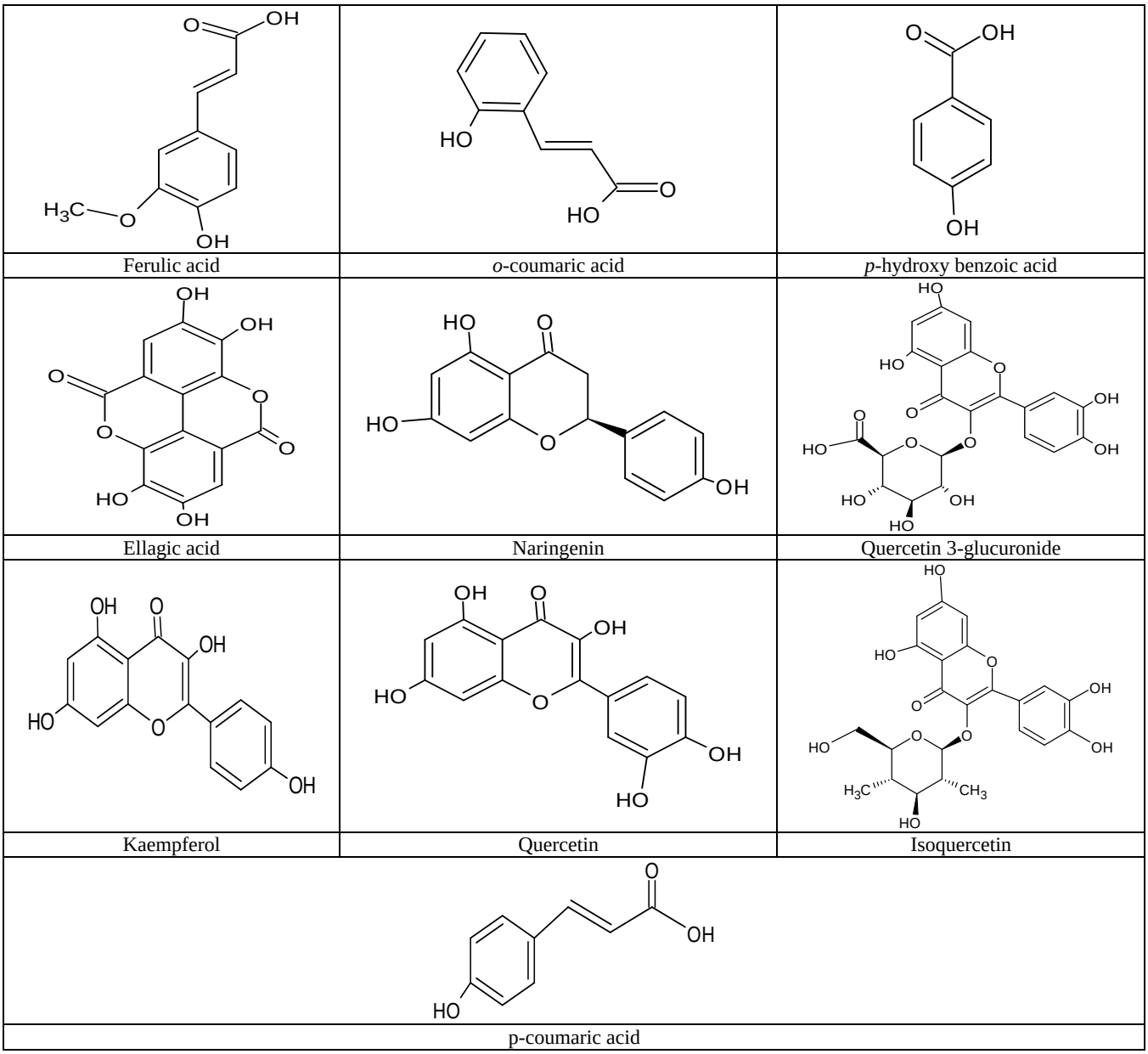


Fig 2: Important phytoconostituents isolated form the *Acacia saligna* (Labill.) H. L. (Wendl.)

Pharmacological activities

Antioxidant activity

Elansary *et al*. (2020) [7] suggested that methanolic extracts of *A. saligna* show antioxidant activity. The identified polyphenols in *A. saligna*, namelyhyperoside, gallic acid, quercetin 3-glucuronide, quercetin, ISO quercetin and p-coumaric acid had substantial antioxidant activity, with quercetin 3-glucuronide that having the lower shalf-minimal inhibitory concentration (IC_{50}) value.

Antibacterial activity

Elansary *et al*. (2020) [7] provide evidence that extracts from *A. saligna* demonstrate antibacterial activity against several microorganisms. The most susceptible bacteria, *Escherichia coli* and *Staphylococcus aureus*, showed the lowest IC_{50} values, while those with the highest resistance were *Listeria monocytogenes* and *Mariniluteicoccus flavus*. With the exception of hypero side, quercetin, and quercetin 3-glucuronide, which had only moderate to weak antibacterial properties, other identified polyphenols such as rutoside, p-coumaric acid and apigenin 5-glucosideshowed high antibacterial activities against all microorganisms.

Antifungal activity

Elansary *et al*. (2020) [7] studies suggest that *A. saligna* extracts demonstrate potent antifungal properties against the majority of fungi tested. The strongest antifungal effects were demonstrated by apigenin 5-glucoside, rutoside, hyperoside and p-coumaric acid.

Anti-ulcerative colitis activity

The cause of ulcerative colitis (UC), an inflammatory condition that recurs, is unknown. The development of novel drug therapies is justified by the elevated risk of cancer among UC patients (Abdallah *et al*., 2020) [3]. Abdallah *et al*. (2020) [3] suggested that *A. saligna* butanol extract (ASBE) caused a decrease in ulcer area, colon weight and ulcer index, and that treatment with ASBE reduced the acetic acid-induced UC. Interleukin-1 (IL-1) and cyclooxygenase (COX)-2 levels in the inflamed colon were significantly decreased by ASBE therapy, along with prostaglandin E2 (PGE2) and COX-2 levels. In terms of ulcer indicators, elevated PGE2 production, and histological changes including inflammatory infiltration and intestinal

mucosal lesions, the nano-formulation of ASBE demonstrated superior defense against the leaf extracts.

Anticancer activity

Elansary *et al*. (2020) [7] provide evidence that *A. saligna* leaf extracts significantly lower the accumulation of reactive oxygen species in all cancer cells studied. Identified polyphenols and methanolic leaf extracts demonstrated antiproliferative activities that might be attributed to the accumulation of necrotic cells during apoptotic periods that are harmful to cancer cells.

Cytotoxic activity

According to Gedara and Galala (2014), *A. saligna* led to the isolation of two new naturally occurring compounds, spirostane saponins and pyrrolizid. This spirostane saponins compound exhibited strong cytotoxic effects on the liver cancer HEPG2 cell line.

Anti-hyperglycaemic activity

An hereditary and/or acquired lack of insulin synthesis by the pancreas, as well as the ineffectiveness of the insulin that is generated, are the two main contributing factors to the chronic disease diabetes mellitus. El-Toumy (2006) [8] suggests that diabetic hyperglycemia is decreased by oral administration of *A. saligna* leaf extract.

Conclusion

This present study is to determine the phytochemicals, traditional uses, and pharmacological benefits of *A. saligna*. Several types of compounds that are found in this plant are responsible for different pharmacological activities. Flavonoid and phenolic type compounds are found in this plant, including gallic acid, benzoic acid, caffeine, rosmarinic acid, ferulic acid, o-coumaric acid, ellagic acid, kaempferol, and quercetin. The main pharmacological activities are antioxidant, antibacterial, antifungal, anti-ulcerative colitis, anticancer, cytotoxic, and anti-hyperglycaemic etc.

Conflict of interest: None declared

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