



Pharmacognostic studies on *Camellia sinensis* (L.) O. Kuntze

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Abstract

Tea is a small evergreen tree, 16 m tall on an average, usually pruned back to shrubs in cultivation, distributed throughout Assam, Nilgiris, Western Ghats of India and Nagaland.

Black tea is used in the treatment of diarrhoea and dysentery and for the relief of neuralgic headaches. The Chinese use tea as an astringent remedy to clear phlegm, and as a digestive remedy. Research has demonstrated that the tannins in some green teas appear to reduce the risk of stomach cancer. Japanese research suggests that oolong tea can reduce high blood pressure and help prevent arterial disease. A weak infusion of tea can be used as a cooling wash for sunburn and used teabags can be applied to tired eyes. Keeping these curative properties an attempt is made to standardise this plant pharmacognostically, hence this attempt.

Keywords: *Camellia sinensis* tea Pharmacognosy medicinal plant tannins

Introduction

Camellia sinensis syn *Thea sinensis* is Native to China, spread to India and Japan, then to Europe and Russia, arriving in the New World in the late 17th century (Chopra 2000) [2]. As a cultivated evergreen plant, tea is usually trimmed to below six ft. in height. However, if left to grow wild, the bush can reach 30 ft. Green, oolong and black ('normal') tea are all made from the leaves of the same plant species, *Camellia sinensis* (Ody 1993) [3]. Their chemical content and flavors are, however, very different due to their respective fermentation processes. Green tea leaves are allowed to wither in hot air, then pan-fried to halt the oxidation (fermentation) processes. The leaves of Oolong tea are wilted in sunlight, bruised and allowed to partially oxidise, until reddening of the leaf edges occurs. Black tea leaves are fermented in cool, humid rooms, until the entire leaf is darkened.

Chinese regard tea as antitoxic, diuretic, expectorant, stimulant, and stomachic (Leung 1980) [5]. Tea, considered astringent, stimulant, and acts as a nervine or nerve sedative, frequently relieving headaches. It may also cause unpleasant nerve and digestive disturbances. The infusion is also recommended for neuralgic headaches. Teabags have been poulticed onto baggy or tired eyes, compressed onto headache, or used to bathe sunburn (Duke and Wain 1981) [4]. The plant has a folk reputation as analgesic, antidotal, astringent, cardiotoxic, carminative, CNS-stimulant, demulcent, deobstruent, digestive, diuretic, expectorant, lactagogue, narcotic, nervine, refrigerant, stimulant, and stomachic; used for bruises, burns, cancer, cold, dogbite, dropsy, dysentery, epilepsy, eruptions, fever, headache, hemoptysis, hemorrhage, malaria, ophthalmia, smallpox, sores, toxemia, tumors, and wounds (Duke and Wain 1981) [4].

It is considered to be astringent, cardiotoxic, diuretic and stimulant in property. Green tea is currently being studied to for its anti-osteoporosis activity. Recently, It was It is currently being

studied to see if it will help prevent osteoporosis and it is reported that aqueous Black Tea Extract of may be effective in preventing bone loss due to ovarian hormone deficiency (Das *et al.* 2004) [1]. It is currently being studied to see if it will help prevent osteoporosis and it is reported that aqueous Black Tea Extract of may be effective in preventing bone loss due to ovarian hormone deficiency (Das *et al.* 2004) [1].



Fig 1: *Camellia sinensis*

Major chemical constituents

Tealeaves contain many compounds, such as polysaccharides, volatile oils, vitamins, minerals, purines, alkaloids (eg.caffeine) and polyphenols (catechins and flavonoids). Catechins include galliccatechin, epicatechin (EC), epigallocatechin (EGC), epicatechingallate (EGC) and epigallocatechin gallate (EGCG). Although all three-tea types have antibacterial and free radical capturing (antioxidising) activities, the efficacy decreases substantially the darker the variety of tea is. This is due to lower

contents of anti-oxidising polyphenols remaining in the leaves (Chopra 2000) [2].

Materials and Methods

Voucher specimen: The plant material leaf of *camellia sinensis* was collected from the wild and Identity was confirmed with the voucher specimen using Gamble (1935) [12].

Physico-chemical values such as the percentage of total ash, acid-insoluble ash, water-soluble ash, and water and alcohol-soluble extractives were calculated as per the Indian Pharmacopoeia (Anonymous 1998). Physico-chemical values such as the percentage of total ash, acid-insoluble ash, water-soluble ash, and water and alcohol-soluble extractives were calculated as per the Indian Pharmacopoeia (Anonymous 1998). TLC fingerprinting profile carried as per (Stahl E 1965) [10]. For the Anatomical studies, transverse sections (TS) were prepared and stained (Johansen 1940). A standard, Limit for total microbial count provided by WHO Guidelines (1998) [6] was followed and also Indian herbal pharmacopoeia (2002) [7].

Results and Discussions

Organoleptic properties: Taste: Sweetish
 Color: Dark green
 Odour: Pleasant
 Texture: Smooth

Physicochemical Parameters

Total ash: 05.55%
 Acid-insoluble ash: 00.15%
 Water-soluble extractive: 18.15%
 Alcohol-soluble extractive: 03.65%

TLC

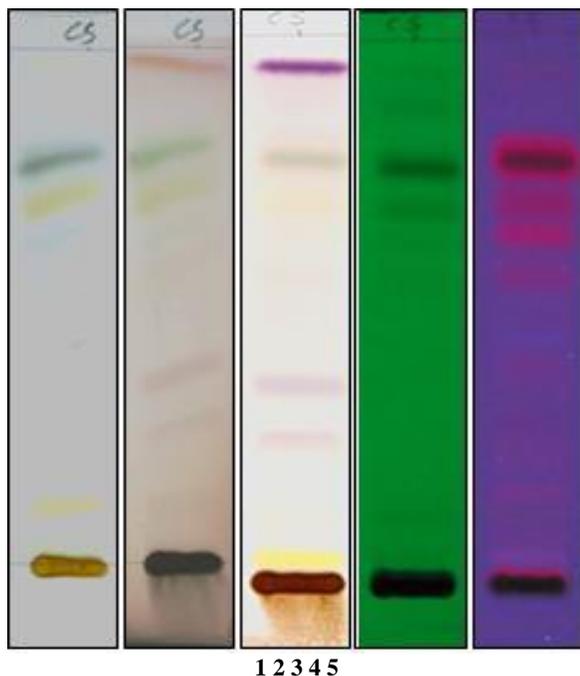


Fig 1: Visible Light, 2 - H₂SO₄, 3 – Anisaldehyde, 4 - Short UV, 5- Long UV

Table 1

TLC Finger Printing Profile								
1. Under Visible Light								
Rf Values	0.11	-	-	-	-	0.71	0.79	-
2. Sprayed with 10% H ₂ SO ₄								
Rf Values		0.27	0.37	-	-	0.72	0.8	0.97
3. Sprayed with Anisaldehyde								
Rf Values	0.04	0.26	0.36	-	-	-	0.77	0.94
4. Under Short UV (254 nm)								
Rf Values	-	-	-	-	-	0.69	0.77	-
5. Under Long UV (366 nm)								
Rf Values	0.02	0.16	-	0.57	0.64	0.7	0.78	-

Anatomical studies

Microscopic characteristics: Single layer epidermis both upper and lower epidermis, Large vascular bundle at the center of the midrib, 3. Sclerenchymatous cells are present covered by the phloem cells, xylem present in the mid rib region protoxylem cells present towards the lower epidermis and metaxylem cells present towards upper epidermis, 4. Stomats are seen both upper and lower epidermal region with guard cells, 5. Starch grains are present hypodermal region of the midrib region.

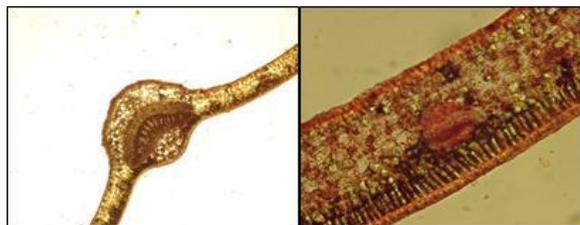


Fig 2: T S of Leaf

Powdered plant material

Powder Colour: Green:

1. Epidermal cells with thin cuticle layer, palisade parenchymatous cells are present,
2. Stomats are seen with guard cells phloem fibers present.
3. Lignified vessels and calcium oxalate crystals

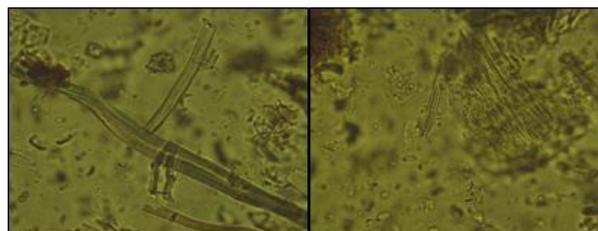


Fig 1: Tracheids

Fig 2: palisade tissues

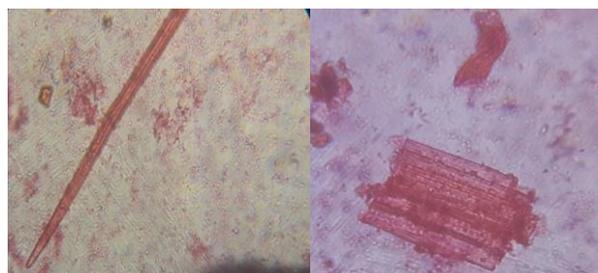


Fig 3: Trichome

Figure 4



Fig 5: Starch

Fig 6: starch

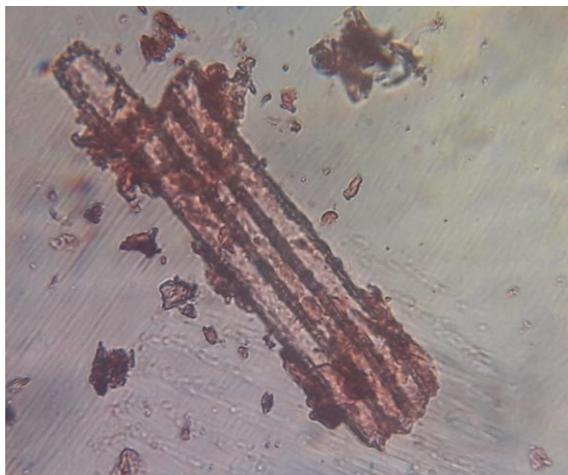


Fig 7: vessels

Microbiology Limit tests

Total Aerobic Bacterial Count (TABC): 1.2×10^3
Total Yeast and Mould Count (TYMC): 0.7×10^3
(Microbial contamination limit for raw herbs - TABC: $<10^7$,
TYMC: $<10^5$)

Conclusion

The pharmacognostic studies on *Camellia sinensis* revealed that, the physicochemical parameters are well within the limits. The TLC studies has shown 2 common bands in all the 5 observations at Rf values 0.70 & 0.80. whereas when sprayed with 10% H₂SO₄ and Anisaldehyde a common spot was observed in the area of Rf value 0.94-0.97. The Anatomical characters revealed characteristic features in *Camellia* and Microscopic studies on powderes Tea sample showed, stomata, trichome, starch grains and Vessels. The Microbiological studies revealed that the plant sample is conforming with the limits.

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