Pu-erh Tea
College of Pu-erh Tea
Yunnan Agricultural University

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Outline

I. Pu-erh Tea’s long history
II. Pu-erh Tea’s unique origin
III. Pu-erh Tea’s unique raw material
IV. Pu-erh Tea’s unique processing
V. Pu-erh Tea’s unique quality
VI. Pu-erh Tea’s unique effects on human health
Tea in Yunnan

Very important
Chairman Hu in Yunnan Tea Garden
九州茶区的许多民族奉拜诸葛亮字孔明的三国时蜀国丞相为“茶神”。
为获得茶叶丰收，有的直接祭祀茶树，祭前要呼喊孔明，有的不仅供奉茶山本土，还设立茶山守护神供奉。
A Wild Old Tea Tree
More Than 2700 Years Old

- Tall: 25.6M
- Diameter: 1.2M
A Wild Old Tea Tree
More Than 1700 Years Old

- Tall: 32.12M
- Diameter: 2.9M
Old Tea Tree (Fengqing)
Transition type

- Tall: 11.8M
- Diameter: 1.14M
1,000 years old Jingmai Tea Plantation
古树发芽
Flavan-3-ol

Catechol

\(-\)-epiafzelechin (EA)
3-\(O\)-gallate (EAG)
\(-\)-epicatechin (EC)
3-\(O\)-gallate (ECG)
3-\(O\)-(3’-\(O\)-methyl)-gallate
3-\(O\)-(4’-\(O\)-methyl)-gallate
3-\(O\)-\(p\)-hydroxybanzoate
3,5-di-\(O\)-gallate

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\begin{array}{cccc}
\text{G:} & \text{C} & \text{OH} & \text{OH} \\
\text{3MeG:} & \text{C} & \text{OH} & \text{OMe} \\
\text{4MeG:} & \text{C} & \text{OH} & \text{OMe} \\
\text{p-HB:} & \text{C} & \text{OH} & \text{OH} \\
\end{array}
\]
紫芽
Tree Diagram for 48 Variables
Unweighted pair-group average
Euclidean distances

UPGMA Analysis
In most countries tea is plucked manually.

Pick the top two leaves and bud from new shoots that sprout on the top of the bushes.
白族姑娘采茶
Old Tea Trees
Pick Tea Bud in Yunnan
Pu-erh Tea’s characteristics

Unfermented Pu-erh tea

- Black-green tea leaves; long-lasting and pure aroma; mellow and after-sweet flavor; bright and yellowish-green liquor; the infused leaves are thick and yellowish-green.
Factors affecting the production of Pu-erh tea

- High moisture in sun-dried tea
- Long time storage before trading
- Long, sultry valley
- Location and climate of Yunnan Province
Piled-fermented Pu-erh Tea

- Reddish-auburn tea leaves; bright and red liquor;
- Unique aging aroma; mellow and sweet after-taste;
- The infused leaves are reddish-auburn

The liquor
“The Head-shaped Tea” from the Qing Dynasty has been kept in the Palace Museum in Beijing. It remains unchanged.
The examiners holding the Golden Melon Royal Tea or Pumpkin Royal Tea, a tribute in ancient times.
weighing
The uniqueness of Pu-erh Tea

- Yunnan Pu’er compressed tea is a kind of post-fermented tea.
  - mellow and sweet after-taste
  - bright and brownish-red liquor
  - aging aroma
  - long-lasting storing
Pu-erh Tea’s uniqueness

1. the unique origin or production location

The original place of Pu-erh tea is located in Lancang River Valley, including the whole Xishuang Banna and Simao region nowadays. Hygrothermal climate and complicated surface feature are important to form the adapt circumstance.
Source area scene
Tea mountain scene
2. the unique raw material

The ingredients in fresh tea leaves vary with the different varieties of tea plants. The raw material of Pu-erh Tea is from a morph (Camellia assamica), Yunnan large-leaved variety. It has much higher levels of tea polyphenol, catechin, theine, theanine, and water extraction than small and medium-leaved varieties.
Camellia assamica
Tea garden
3. the unique processing of Pu-erh Tea

- Actually, historical Pu-erh Tea is made of fresh large-leaves though deactivation of enzymes and rolling and drying. It is commonly called “Green primary tea”, which is rolled and fried by handwork.
The processing of Pu-erh Tea

- The first operation work is piled-fermentation. The quality of Pu-erh tea is heavily dependent on this process.
baking
Natural post-fermentation during long-term transportation of the tea
Investigate the health benefits of Pu-erh tea
Tested materials (L–R):
Fermented Pu-erh tea;
Unfermented Pu-erh tea;
Chinese herbal
Pu-erh tea -- an easy way to deal with human diseases

- Lower atherosclerotic risk factors in rat hyperlipidemia model
- Anti-oxidative effects in aged mice model
- Anti-immunosenescence effects in aged mouse model
Project 1
Pu-erh tea aqueous extracts lower atherosclerotic risk factors in rat hyperlipidemia model

Body weight gain in the rats was reduced by highest dose of fermented tea extract without increasing in food intake, suggesting large consumption of tea inhibits over-eating induced obesity.
Pu-erh tea dose-dependently reduces serum levels of total cholesterol (TC) and triglycerides (TG) in rats fed hyperlipidemic diets.
Pu-erh tea significantly increases serum levels of high density lipoprotein cholesterol (HDL-C) and reduces low density lipoprotein cholesterol (LDL-C) in hyperlipidemic rats.
Pu-erh tea reduces serum levels of malondialdehyde (MDA) while increases superoxide dismutase (SOD) and glutathione peroxidase (GSH-Px).
Pu-erh tea gavages: serum cholesterol decease while fecal cholesterol increase
Aging: first risk factor of common geriatrics

Oxidative stress; link aging and geriatrics

Present strategy: treatment geriatrics individually

Treating aging to cure the diseases

Nature Reviews Drug Discovery 2005; 1038/nrd1777:1-12
Immunosenescence

- Old people easily suffer from infection and tumor
- One of biggest trouble of human now
- No practical and effective approach
Natural Killer in blood

Pu-erh tea aqueous extracts on blood Natural Killer cells of senescence accelerated mice

CD4CD49 Positive cells


Low 125mg/kg Med.250mg/kg High 500mg/kg

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Low 125mg/kg Med.250mg/kg High 500mg/kg
Pu-erh tea aqueous extracts on spleen Natural Killer cells of senescence accelerated mice

CD4CD49 Positive cells

Low 125mg/kg Medium 250mg/kg High 500mg/kg
Our results indicate:

- Pu-erh tea is not a cure for each elderly disease, it targets for basic mechanisms of all geriatrics.
- Pu-erh tea is not a cure for specific infections, but targets for underlying causes of all infections.
- Daily drinking Pu-erh deals with big trouble.
Tea Drinking is beneficial to human health
Hope you drink more tea
上善若水  精行俭德

“上善若水”出自于老子《道德经》第八章：“上善若水。水善利万物而不争，处众人之所恶，故几于道。居善地，心善渊，与善仁，言善信，正善治，事善能，动善时。夫唯不争，故无尤。” 老子还说：“以其不争，故天下莫能与之争，此乃效法水德也。水几于道；道无所不在，水无所不利，避高趋下，未尝有所逆，善处地也；空处湛静，深不可测。善为渊也；损而不竭，施不求报，善为仁也。” 此处取“上善若水”一词入院训，一取其哲理睿智，以作为我院师生为学为人的启迪；二来“善水”喻普洱茶清纯利民的本质，同时也是对所有茶品作为健康饮品的颂扬，以激励我院师生的专业自豪感，更好的继承和发扬茶文化，更好的研究和新普洱茶相关知识和技术。

“精行俭德”一词出自陆羽《茶经》。《茶经》开篇说：“君之爱茶，亦宜自俭也”，“俭宜最宜精行俭德之也”。这里的精行俭德，是指人的行为要精诚、致、认真、勤恳、求实，品德要俭朴、高尚、纯正。陆羽在《茶经》中还强调，茶要适时采摘、精心制造，茶具要洁净，煮茶之水、煎茶之火都要有一定的规范。圣陆羽所倡导的饮茶之法，推而广之，就是做人处事，都应该讲究“精行俭德”。这种“精行俭德”精神，包含了健康、和乐、勤俭、精进和明智等中国茶文化的核心元素。

“上善若水，精行俭德”，前者是为学为人的哲学观，后者是茶道精神所要求的基本个人修养，我院师生当谨记在心、努力践行，并以此垂范世人。

云南农业大学龙润普洱茶学院

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