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Introduction

- The first report of validation of an “ethnobotanical process” for *T. bellerica* fruits, a well-established medicine for gastrointestinal disorders [1].
- The study will develop broader perspectives in ethnopharmacological research, stretching beyond “what” extending to “how”.

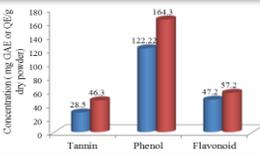
Methodology

- Ethnobotanical survey of villages dominated by Tharu and Buksa tribes.

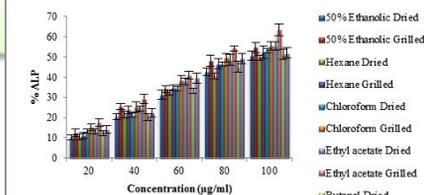


- Collection of *T. bellerica* fruits in Jan-Feb 2015 (Voucher LWG 98572).
- Fruits were grilled at 150 deg cent, extracted with 50% ethanol and the extract was partitioned into hexane, chloroform, ethyl acetate and butanol fractions.
- Phytochemical studies:
 1. Estimation of phenols, flavonoids and tannins.
 2. Non-targeted metabolic profile of ethyl acetate fraction (GC-MS) of dried (DF) & grilled fruits (GF).
 3. HPTLC profile (gallic and ellagic acid).
- *In-vitro* studies
 1. DPPH free radical scavenging
 2. Anti- lipid peroxidation assay
 3. Antibacterial activity (*E. coli*).
- *In-vivo* studies
 1. Anti-diarrheal activity (castor oil induced diarrhea).
 2. Antiulcer activity: aspirin induced, pylorus ligation induced and ethanol induced ulcer models.
 3. Estimation of pro-inflammatory cytokines TNF α and IL-6 and anti-inflammatory cytokine IL-10.

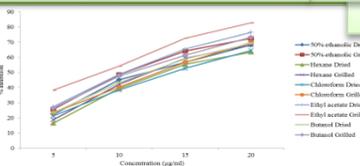
Results



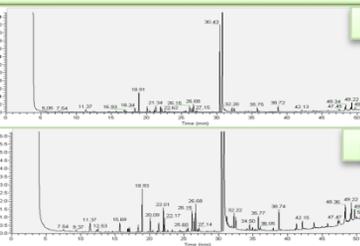
Estimation of phenols, flavonoids and tannins



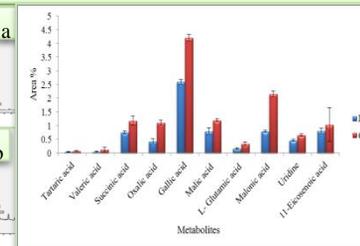
Anti-lipid peroxidation using goat liver homogenate.



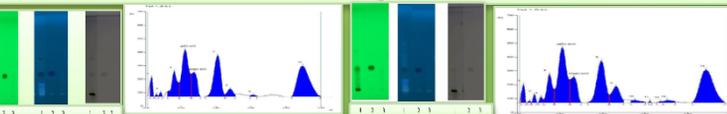
(a) Inhibition of DPPH free radical; (b) IC₅₀ of 50% ethanolic extract and successive fractions of dried and grilled fruits of *T. bellerica*



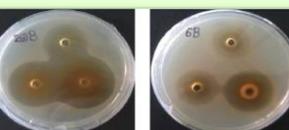
GC chromatograms of ethyl acetate fraction of (a) dried and (b) grilled fruits of *T. bellerica*



Metabolites with significantly differential abundance as detected by GC-MS profile



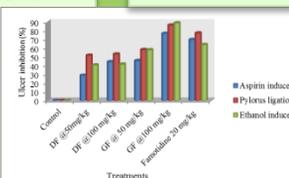
HPTLC fingerprint profile of *T. bellerica* (a) dried and (b) grilled fruits under UV 254, UV 366, after derivatization and densitometric scanning profile along with marker compound (D) Lanes 1- Ethyl acetate fraction; 2- Gallic acid; 3- Ellagic acid



Growth inhibition of pathogenic *E. coli* by ethyl acetate fractions of (a) grilled and (b) dried fruits of *T. bellerica*



Antidiarrheal effect of *T. bellerica* ; p<0.05-0.01; DF= dried fruit; GF= grilled fruit



Untreated : treated ethanol induced ulcer

Effect of ethyl acetate fraction of dried and grilled fruits of *T. bellerica* (100mg/kg b.w.) on the levels of TNF α , IL6 and IL10 cytokines in rat stomachs with ethanol induced gastric ulcers

| Cytokine | Control | DF | GF |
|--------------|------------------|--------------------|-------------------|
| TNF α | 2126.00 ± 123.40 | 448.50 ± 12.48* | 324.6 ± 20.42** |
| IL6 | 1239.00 ± 220.42 | 128.52 ± 14.28 | 87.24 ± 19.62 |
| IL10 | 1821.00 ± 324.2 | 3772.40 ± 123.12** | 4862.50 ± 128.3** |

*The results are expressed as μ g of protein and reported as mean \pm SE of three determinations. Statistical analysis by ANOVA, **p<0.05, *p<0.001

Conclusion

Grilling enhances gastroprotective activity of *T. bellerica* fruits owing to changes in its metabolite content.

Reference: [1] The Ayurvedic Pharmacopoeia of India (2001) 1st edition, Published by The controller of Publications, Civil Lines, New Delhi. Part 1 01:252.