

A comparative study on the antimutagenic properties of aqueous extracts of *Aspalathus linearis* (rooibos), different *Cyclopia* spp. (honeybush) and *Camellia sinensis* teas

Abstract

Antimutagenic activity of aqueous extracts of the South African herbal teas, *Aspalathus linearis* (rooibos) and *Cyclopia* spp. (honeybush) was compared with that of *Camellia sinensis* (black, oolong and green) teas in the *Salmonella* mutagenicity assay using aflatoxin B₁ (AFB₁) and 2-acetylaminofluorene (2-AAF) as mutagens. The present study presents the first investigation on antimutagenic properties of *C. subternata*, *C. genistoides* and *C. sessiliflora*. The herbal teas demonstrated protection against both mutagens in the presence of metabolic activation, with the exception of “unfermented” (green/unoxidised) *C. genistoides* against 2-AAF, which either protected or enhanced mutagenesis depending on the concentration. Antimutagenic activity of “fermented” (oxidised) rooibos was significantly ($P < 0.05$) less than that of *Camellia sinensis* teas against AFB₁, while for 2-AAF it was less ($P < 0.05$) than that of black tea and similar ($P > 0.05$) to that of oolong and green teas. Antimutagenic activity of unfermented *C. intermedia* and *C. subternata* exhibited a similar protection as fermented rooibos against AFB₁. Against 2-AAF, fermented rooibos exhibited similar protective properties than unfermented *C. intermedia* and *C. sessiliflora*. Unfermented rooibos was less effective than the *C. sinensis* teas and fermented rooibos, but had similar ($P > 0.05$) antimutagenicity to that of fermented *C. sessiliflora* against AFB₁ and fermented *C. subternata* against 2-AAF. Fermented *C. intermedia* and *C. Genistoides* exhibited the lowest protective effect against 2-AAF, while fermented *C. intermedia* exhibited the lowest protection when utilising AFB₁ as mutagen. Aspalathin and mangiferin, major polyphenols in rooibos and *Cyclopia* spp., respectively, exhibited weak to moderate protective effects when compared to the major green tea catechin, (–)epigallocatechin gallate (EGCG). Antimutagenic activity of selected herbal tea phenolic compounds indicated that they contribute towards (i) observed antimutagenic activity of the aqueous extracts against both mutagens and (ii) enhancement of the mutagenicity of 2-AAF by unfermented *C. genistoides*. Antimutagenic activity of the South African herbal teas was mutagen-specific, affected by fermentation and plant material, presumably due to changes and variation in phenolic composition.