Red Wine Phenolic Complexes and Their in Vitro Antioxidant Activity

BAOSHAN SUN,*† ISABEL SPRANGER,‡ JINGYU YANG,† CONCEICAO LEANDRO,† LEI GUO,§
SÔNIA CANÁRIO,† YUQING ZHAO,§ AND CHUNPU WU§

†L-INIA, Dois Portos, Instituto Nacional de Recursos Biológicos, I.P., Quinta da Almoinha, 2565-191
Dois Portos, Portugal, and §Shenyang Pharmaceutical University, 110016 Shenyang, People’s Republic of
China

Phenolic complexes are a major group of polyphenols in aged red wine. The objective of this work
was to evaluate the in vitro antioxidant activity of the phenolic complexes. Thus, red wine
polyphenols were fractionated into various fractions including monomers, oligomers, polymers,
anthocyanins, and complexes. The in vitro antioxidant activities of these fractions and other phenolic
standards (catechin, epicatechin, quercetin, and malvidin 3-glucoside) as well as ascorbic acid were
verified by DPPH* test. On the other hand, the variation of antioxidant activities during the reaction
between epicatechin and malvidin 3-glucoside mediated by acetaldehyde in a model wine solution
was also monitored. The results showed that both the phenolic complex fraction and newly formed
condensation products between epicatechin and malvidin 3-glucoside maintain antioxidant activities
as strong as those of their compositional phenolics. This work provides, for the first time, direct
evidence about the in vitro antioxidant activities of red wine phenolic complexes.

KEYWORDS: Red wine; phenolic complexes; fractionation; in vitro antioxidant activities; DPPH test

*Corresponding author (e-mail evn.sun.baoshan@mail.net4b.pt).