

Nanoemulsified gamma-oryzanol rich fraction blend regulates hepatic cholesterol metabolism and cardiovascular disease risk in hypercholesterolaemic rats

ABSTRACT

We have reported that a bioactive-rich fraction, called EORY, from a combination of supercritical fluid-extracted rice bran oil and palm oil has abundant gamma-oryzanol, tocopherols and tocotrienol. Moreover, EORY has balanced composition of polyunsaturated:saturated fatty acids, with the potential for hypocholesterolaemic and antioxidant effects. However, the bioactive compounds in EORY are lipophilic and therefore pose bioavailability problems. This study evaluated the cardioprotective effects of orally-administered EORY emulsion and its nanoemulsion (NEORY) on diet-induced hypercholesterolaemic rats. NEORY reduced body weight gain, heart weight, lipid parameters and oxidised LDL, and improved HDL better than EORY and simvastatin. NEORY also significantly increased hepatic mRNA expression of HMGCoA reductase, apolipoprotein A1 and LDLR, and lowered apolipoprotein B and LPL. The effects of NEORY on lipid parameters, lipid peroxidation markers and hepatic cholesterol metabolism suggested that it could regulate the risk of cardiovascular disease, possibly due to increased absorption of gamma-oryzanol, tocopherols and tocotrienol.

Keyword: Cardioprotection; Gamma-oryzanol rich fractions–palm oil blend nanoemulsion; Lipid parameter; F₂-isoprostane; Heart weight; Hepatic cholesterol metabolism