Effect of seaweed mixture intake on plasma lipid and antioxidant profile of hypercholesterolaemic rats

Abstract

Cardiovascular disease (CVD) is the leading cause of death in many countries. Hypercholesterolaemia is a recurring risk factor in CVD leading to coronary atherosclerosis, stroke and ischemic heart disease. Previous research has proven that seaweeds are highly nutritious, providing a good source of dietary fibre, minerals, proteins and vitamins as well as being high in antioxidants. Antioxidants have been known to retard low-density lipoprotein (LDL) oxidation to reduce CVD risk in hypercholesterolaemia. However, there is yet to be a study on the effect of a mixture of different seaweed species on cholesterol lowering properties. Therefore, this study was designed to investigate the effects of a mixture of extracts from two seaweed species, red seaweed Kappaphycus alvarezii and brown seaweed Sargassum polycystum on plasma lipid and antioxidant profiles of rats fed high-cholesterol diet. S. polycystum extract significantly decreased plasma cholesterol by 37.52 % over an 8-week treatment period compared to K. alvarezii and mixture groups. However, S. polycystum showed an increase in plasma triglyceride (TG) levels by 16.66 %. K. alvarezii extract most effectively decreased TG levels by 40.11 % and the mixture extract most effectively increased high-density lipoprotein cholesterol by 56.71 %. All treatment groups were able to reduce LDL cholesterol levels compared to the high-cholesterol group, with no significant differences between them. K. alvarezii and S. polycystum mixture extract had the best atherogenic index, which is an indicator of lipid disorder in coronary diseases, among treatment and high-cholesterol-fed groups. All treatment groups were able to restore enzyme antioxidant levels (superoxide dismutase and catalase) to normal.