Novel combination of thymoquinone and resveratrol enhances anticancer effect on hepatocellular carcinoma cell line

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Abstract

Hepatocellular carcinoma remains one of the most dominant malignancies worldwide. Neutraceuticals have become under focus in anticancer treatment. Resveratrol is one of the major components of Polygonum Cuspidatum and is known as chemo-preventive agent. Thymoquinone is one of the most potent constituents in Nigella Sativa and has many medicinal effects. The aim of the present study is to investigate the combined effect of thymoquinone and resveratrol on treatment of hepatocellular carcinoma cells (HepG2). We evaluated the effect of thymoquinone and resveratrol separately and in combination on HepG2. Cell viability, caspase-3 activity, glutathione and malondialdehyde content were determined. The IC50 values of thymoquinone and resveratrol were (46 εM and 64.5 εM) respectively, where each showed potent anti-tumor activity on HepG2. The cell viability was 47.2% and 49.9% respectively. Comparing to the control group, treatment with thymoquinone and resveratrol increased caspase-3 enzyme by 77% and 98.5% respectively, while content of glutathione decreased by 22.8% and 35.6% while malondialdehyde content decreased by 18% and 29.6% correspondingly. The combination (thymoquinone + resveratrol) affected the cell viability leading to further decrease by 9.9% and 12.6%. The content of caspase-3 increased by 89% and 67.5% while the glutathione content had further decrease by 25.6% and 12.8%. Malondialdehyde content decreased by 32.3% and 20.7% all are comparing to thymoquinone and resveratrol separate treatment.

Thymoquinone and resveratrol combination showed significant cell inhibition and increase in caspase-3 indicating cell apoptosis. Both drugs raised reactive oxygen species leading to decrease of glutathione and minor effect on lipid peroxidation, all these results give a new promising combination with enhanced anticancer effect

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