

## Redox Balance Signalling in Occupational Stress: Modification by Nutraceutical Intervention

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There is increasing evidence that psychosocial stress can be viewed as a system-wide derangement of cellular homeostasis, with heightened oxidative stress and triggered pro-inflammatory mechanisms. The aim of this study is twofold: a) to replicate findings that psychological stress increases oxidative damage and b) to determine whether a fermented papaya preparation known to exert significant protective antioxidant properties could buffer such increases in nuclear DNA damage while also inducing epigenetic protective mechanisms. Twenty-eight sedentary men and women (age range: 28-52), who reported living a stressful lifestyle but with an overall positive attitude, were recruited for this study. Chronic diseases as well as severe burnout and use of drugs for anxiety constituted exclusion criteria. Subjects were supplemented for 1 month with 9g/day (4.5g twice a day) of a certified fermented papaya preparation. All subjects were given a stress and sleep quality questionnaire together with a diet and life style assessment. Blood was collected at 2 and 4 week, erythrocyte and leukocyte were separated to assess redox balance and heme oxygenase-1 (HO-1) gene expression while bilirubin oxidized metabolites (BOMs) were tested in the urine. Stressed individuals showed a significant abnormality of redox status with increased MDA of erythrocyte and increased level of 8-OHdG in leukocyte and BOMs excretion ( $p < 0.05$ ). Nutraceutical supplementation brought about a normalization of such values already at the 2 week observation ( $p < 0.05$ ) together with a significant up-regulation of HO-1 ( $p < 0.01$ ). Taken together, the results of this study confirm that stressful occupational life per se, without any overt psychiatric illness, may be associated to increased oxidative stress. Supplementation with functional food affecting redox regulation may be part of the therapeutic armamentarium to be considered in this clinical setting.