

# Radio protective and Antioxidant Effects of Zinc Aspartate and Fermented Papaya Preparation F.P.P. in Children with Acute Myelo-Lympholeukemia

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## INTRODUCTION

The combined use of irradiation and chemotherapy is a fundamental principle in modern cancer management; especially in children<sup>1</sup>. The only limitation is that cytotoxic drugs enhance the radiation damage to normal tissues<sup>2</sup>. Radiation therapy can induce acute and late reactions of normal tissue. Although acute radiation injury is mostly expressed in the rapidly proliferating tissues such as skin, mucous membranes, spermatogonia and haematopoietic cells, the late deleterious effect of irradiation occur in the central nervous system. The encephalopathy syndrome has been documented in about 50% of children with acute lympholeukemia (ALL) subjected to cranial and spinal cord irradiation for 4 to 8 wk.<sup>3</sup> This includes headache, somnolence, anorexia, nausea, vomiting and sometimes unconsciousness.

Radiation-induced injury can be reduced by the administration of radio protective agents. As the injury following the ionizing irradiation exposure is the most spectacular example of free-radical pathology<sup>4</sup> it is not surprising that radio protective agents usually possess free-radical scavenging properties. Thus, different types of superoxide dismutase (SOD) have been widely used<sup>5,6</sup> as well as alpha-lipoic acid<sup>7</sup>, N acetylcystein<sup>8</sup> and vitamin E.<sup>9</sup> Zinc is known to be one of the most important trace elements with antioxidant properties<sup>10</sup>. In addition, zinc aspartate was found to reduce significantly the irradiation toxicity against haematopoietic tissue<sup>11</sup> and does not affect the anti-tumor activity of therapeutic irradiation.

There is an evidence that alpha-TNF, capable of inducing the over expression of mitochondrial Mn-SOD, increases the resistance of cells to radiation<sup>12</sup>. Earlier, we showed<sup>13</sup> that FPP a non-toxic natural food supplement produced by yeast fermentation of *Carica papaya*, is a powerful immuno-modulator that stimulates macrophages and lymphocytes to produce alpha-TNF and interferon. In addition FPP exhibits free-radical scavenging<sup>14</sup> and antioxidant<sup>15,16</sup> activities.

Therefore it's seems interesting to study the effects of Zinc aspartate and FPP administration to children suffering from acute myeloleukemia (AML) and ALL in order to prevent the late encephalopathy syndrome. Effects of these drugs on children's free-radical status, namely the oxygen radical production by blood leukocytes, the leukocyte CuZnSOD and MnSOD activities and the erythrocyte-reduced glutathione content, have been estimated.