# Catechins: a powerful weapon against oxidative stress and DNA lesions

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**Abstract**

The number of cancer cases has increased at a terrifying rate worldwide due to exposure to harmful mutagenic agents such as radiation, tobacco, among others that causes mutations at a DNA level. A health policy based on a balanced diet involving healthy and plant-based foods seems to ameliorate and be effective against cancer.

Catechins are the main plant-phenolic component present on one of the most consumed beverage in the world after water: the tea.[1] The catechins intake through green tea ingestion can alleviate or repair the DNA damage via antioxidant mechanisms or by modulating the intracellular redox environment. These dietary-derived antioxidants molecules exert a chemopreventive role during disease progression, offering a great potential to be used in new cancer fighting strategies.[2-4]

One of the goals of our study is to reveal all the physical processes underlying the action mode of catechins in order to understand how these compounds interact with DNA and affect the biological environment and thus develop or improve the current drug delivery systems. Our previous work showed that is a pre-requisite have a stable delivery system which provides sufficient time to repair the DNA-damage induced by UV, avoiding in this way the cell collapse.[5, 6]

Thin films of catechin molecules encapsulated in liposomes (DPPG) were prepared and exposed to ultra-violet radiation in conditions near of cell medium to assess the radiation-induced changes in catechins and DNA. Additional radiation studies will be carried out in order to evaluate the photosensitizing properties and the efficacy of these molecules to modulate DNA-damage mechanisms.

**References**

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**Figures**

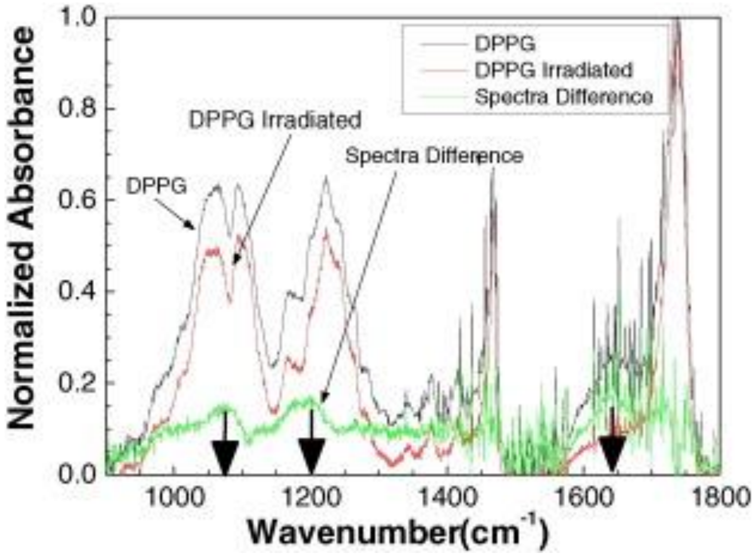


**Figure 1.** Infrared spectra of DPPG cast films prepared from DPPG aqueous solutions without and with UV irradiation. To visualize the damage induced in DPPG by exposure to radiation, the difference between the spectra was also added. The vertical arrows indicate the wavenumber of bands that disappear upon irradiation.

**Table 1**. Characteristic infrared absorptions in DPPG cast films

| Wavenumber ($cm^{-1}$) | Assignment | References |
|---|---|---|
| 1738 | Stretching of carbonyl group (C═O) | [28–30] |
| 1638 | Vibrations of C═O groups which are embedded in hydrogen bonds; | [31,32] |
| | DPPG unfolded structure; | [33] |
| | DPPG unordered conformations | [34–35] |
| 1467 | $CH_2$ scissoring | [12,14,15] |
| 1414 | In-plane bending of C—O—H group | |
| 1241 | Antisymmetric stretching of hydrated $PO^{4-}$ group | [27] |
| 1222 | P═O antisymmetric stretching of $PO^{4-}$ group | [12–15] |
| 1169 | Asymmetric stretching of CO—O—C groups | [26] |
| 1070 | Symmetric stretching of CO—O—C groups | [26] |
| 1096 | Symmetric stretching of CO—O—C groups | [12–14,25] |
| 1057 | Symmetric stretching of C—O—C groups | [12–14,25] |
| 1047 | Symmetric stretching of C—O—P groups | [12–14,25] |