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## Cytotoxicity of the Essential oils of *Cymbopogon citratus* and *Ocimum gratissimum*

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The essential oils isolated from leaves of *Cymbopogon citratus* and *Ocimum gratissimum* have been tested for their cytotoxic activity against P<sub>388</sub> leukemia cells. The IC<sub>50</sub> of the *Cymbopogon* oil was found to be 5.7 µg/ml while that of *Ocimum* oil was 10.8 µg/ml. The mixture of the oils (1:1 v/v) showed an IC<sub>50</sub> value of 10.2 µg/ml and there was no synergism in the cytotoxic activity. The oils were standardized by their physico-chemical properties.

NATURAL products, specially higher plants are a rich source of novel chemotherapeutic agents including anticancer drugs. Different kinds of higher plant products have been found effective for different types of tumours. Vinblastine and vincristine isolated from *Catharanthus roseus*<sup>1</sup> have been demonstrated to be effective anticancer agents. Taxol, a complex diterpenoid alkaloid, isolated from *Taxus brevifolia*, has emerged as a highly promising cancer chemotherapeutic agent<sup>2</sup>. These prompted us to find out the cytotoxic potency of the essential oils of *Cymbopogon citratus* and *Ocimum gratissimum* against mouse leukemia P<sub>388</sub> cells. *Cymbopogon citratus* is widely cultivated in India and medicinally used in fever and in bronchitis<sup>3</sup>. *Ocimum gratissimum* is used in Ayurvedic medicine in the treatment of rheumatism and paralysis<sup>4</sup>.

The leaves of *Cymbopogon citratus* and *Ocimum gratissimum* were collected from Medicinal Plant Garden, Banaras Hindu University, Varanasi, India. These were subjected to hydrodistillation through Clevenger's apparatus. The oils were standardized by their physico-chemical properties such as specific gravity, optical rotation, refractive index, acid number, saponification value, ester value, carbonyl percentage and phenolic content<sup>5</sup>. The cytotoxicity of each oil was tested by the MTT [3-(4,5 di methyl

thiazol-2-yl)-2,5-di phenyl tetrazolium bromide] colorimetric assay on a 96 well plate<sup>6</sup>. The cytotoxic property was expressed as IC<sub>50</sub> value (µg/ml) which was defined as the concentration of the sample which achieved 50 per cent reduction of viable P<sub>388</sub> mouse leukemia cells. The oils were mixed together (1:1 v/v) and the cytotoxicity of the mixture was tested by the usual MTT assay technique so as to find out synergism in their toxicity.

The physico-chemical properties of the essential oils are presented in Table-1 and both the oils were found to lack phenolic components. The IC<sub>50</sub> value of *Cymbopogon* oil was found to be 5.7 µg/ml while that of *Ocimum* oil was 10.8 µg/ml. The IC<sub>50</sub> value of the mixture of the oils was found to be 10.2 µg/ml which indicated that there was no synergism in the cytotoxic potency of the oil mixture.

This is the first report of cytotoxicity of the essential oils of *Cymbopogon citratus* and *Ocimum gratissimum* against P<sub>388</sub> leukemia cells. Its antitumour activity may be established after animal as well as clinical trials. Both the plants grow luxuriantly in different parts of India and constitute an easily available source of phytochemicals for antitumour application.

**Table 1: Physico-chemical properties of the essential oils of *Cymbopogon citratus* and *Ocimum gratissimum***

Parameter	<i>Cymbopogon citratus</i> oil	<i>Ocimum gratissimum</i> oil
Colour	Pale yellow	Pale yellow
Specific gravity	0.8875	0.9665
Optical rotation	-6.5 at 32°	+7.708 at 32°
Refractive index	1.496 at 29°	1.488 at 29°
Acid number	7.84	3.85
Saponification value	98.76	52.78
Ester value	90.92	48.15
Carbonyl percentage	56.296	27.16
Phenolic content	Nil	Nil

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