Anticancer Activity of Extracts Derived from the Normal Root Culture of *Vernonia amygdalina* on Two Leukemia Cell Types

Hany A. El-Shemy
Department of Biochemistry, Faculty of Agriculture, Cairo University, 12613Giza, Egypt

helshemy@hotmail.com

ABSTRACT

Vernonia amygdalina is a well known African medicinal plant producing the anticancer agents vernodaline and vernolide. Because it grows wild under severe anthropogenic and environmental pressures, and the fact that roots are the principle material for herbal medicine which involves destructive harvesting, we were motivated to establish a fast-growing normal root culture and test the extract activity against leukemia cells *in vitro*. Leaves were cultured on half-strength MS medium supplemented with different auxin types and concentrations. Basal medium supplemented with indole-3-butyric acid (IBA) at 2.0 mg/l favoured induction of the highest number of roots/explants (38.3 ± 1.1). After six weeks well established roots were separated. Fresh root tissue, in amount of a 100 mg were cultured in 80 ml fullstrength MS liquid medium supplemented with 2.0 mg/l IBA and under continuous agitation (80 rpm). The biomass of root culture was increased to 21.9 folds after 5 weeks of culture. Different extracts from the *in vitro* induced root were prepared and tested for their activity against leukemia cells. The results indicated that in the DPPH assay most of extracts showed significant antioxidant activity. In the other hand, the results showed that *in vitro* extract could kill the majority (50-75%) of abnormal cells among primary cells harvested from 3 patients with acute lymphoblastic leukemia (ALL) and 3 with acute myeloid leukemia (AML). DNA fragmentation patterns within treated cells inferred targeted cell death by apoptosis had occurred. The metabolites within the extract may act as tumor inhibitors that promote apoptosis. This example shows that *in vitro* root culture can be an interesting biotechnological alternative to cultivation in the field or to chemical synthesis of anti-cancer agents.

Key words: Anticancer, natural products, plant extracts