Abstract

Anticancer Effects of Oleocanthal and *Pinus Pinaster* on Breast Cancer Cell in Culture †

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**Abstract:** Phytotherapy has been used for many years due to anticancer and anti-proliferative
effects. In this study our purpose was to show the anti-proliferative and apoptotic effects of
oleocanthal and *Pinus pinaster* on MCF-7, MDA-MB-231, 67NR and 4T1 breast cancer cell lines. 
Biological effects of these plants were researched via morphology, MTT assay for cytotoxicity (IC50),
immunocytochemical procedure for oxidative stress (eNOS), angiogenesis (VEGF) and TUNEL
method for apoptosis. Statistical analysis was performed with the H-score. Oleocanthal and *Pinus
pinaster* extracts showed significant dose and time-dependent inhibition of growth of breast cancer
cells. A significant increase in iNOS staining was observed while a decrease in VEGF staining was
observed after extract application at IC50 dose. The results showed a significant increase in
apoptosis in extract-treated breast cancer cell lines. We showed that the toxic effect of Oleocanthal
and *Pinus pinaster* extracts created by oxidative stress mechanisms. The increase of oxidative stress
in breast cancer cells caused the inhibition of cell proliferation and apoptosis. Our results indicated
that these plants suggest potential agents in breast cancer treatment. Future studies will focus on
the identification of the molecules responsible for anti-cancer activity of these substances in order
to improve the quality of life of the patients.

**Keywords:** oxidative stress; breast cancer; apoptosis