

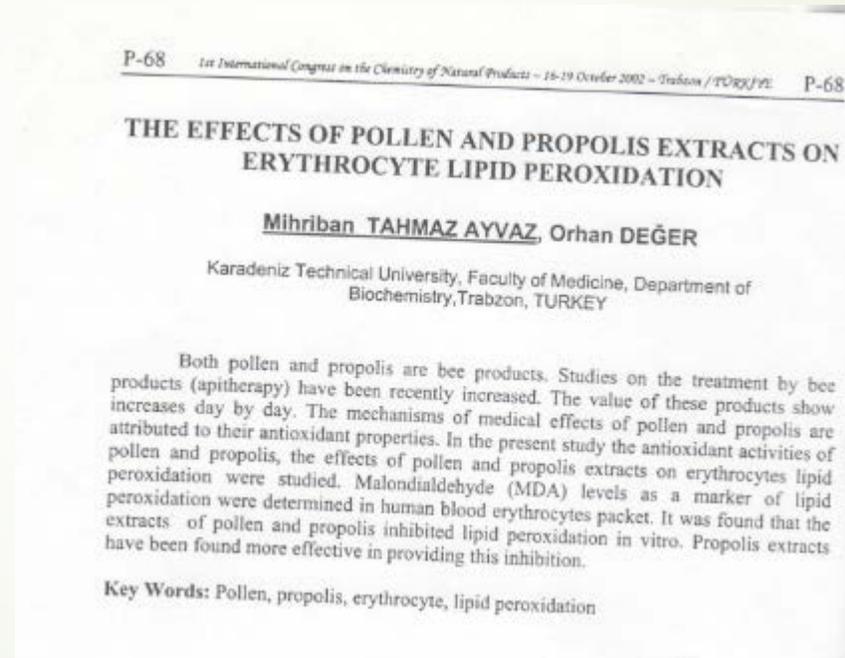
Biological and Medical Studies on Turkish Propolis



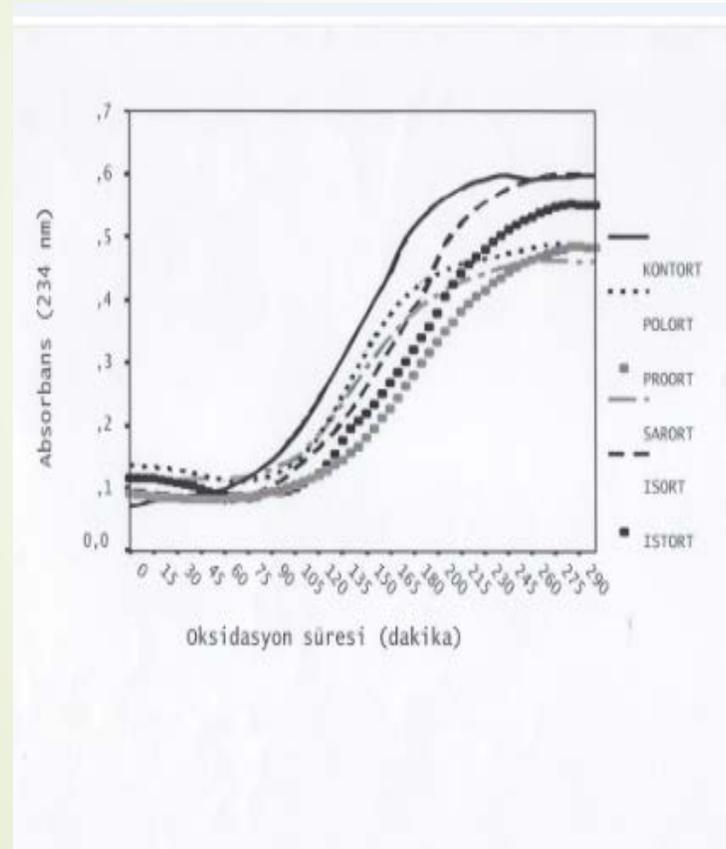
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First study: Inhibition of erythrocyte lipid peroxidation



Effects of various natural products on LDL oxidation



- Absorbance versus oxidation time (min)
- KONT: Control
- POL: Pollen
- PRO: Propolis
- SAR: Garlic
- IS: Nettle

Propolis induces caspase-3 activity in cancer cell lines (Tr J Biochem 29:87, 2004)

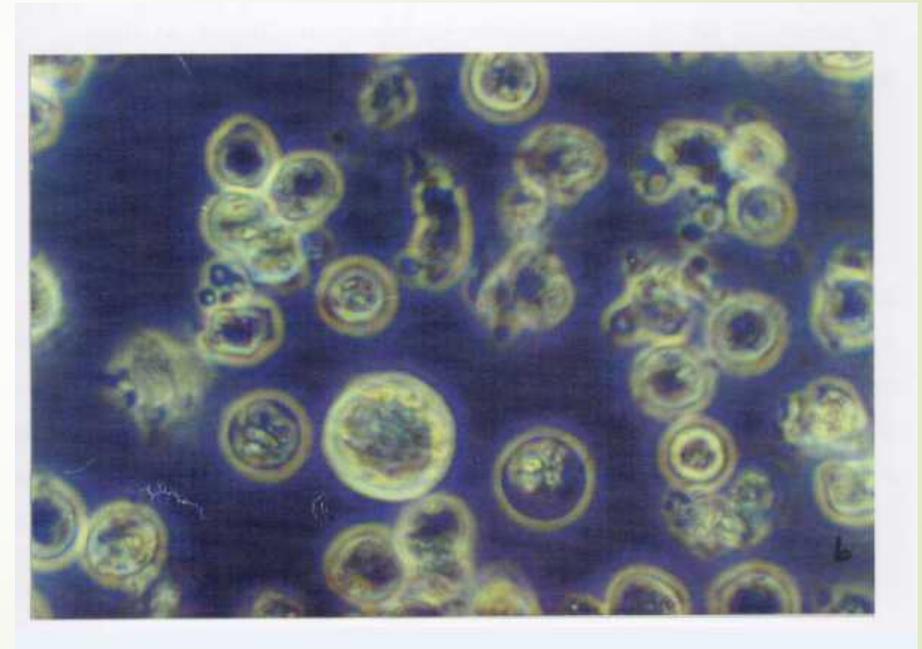
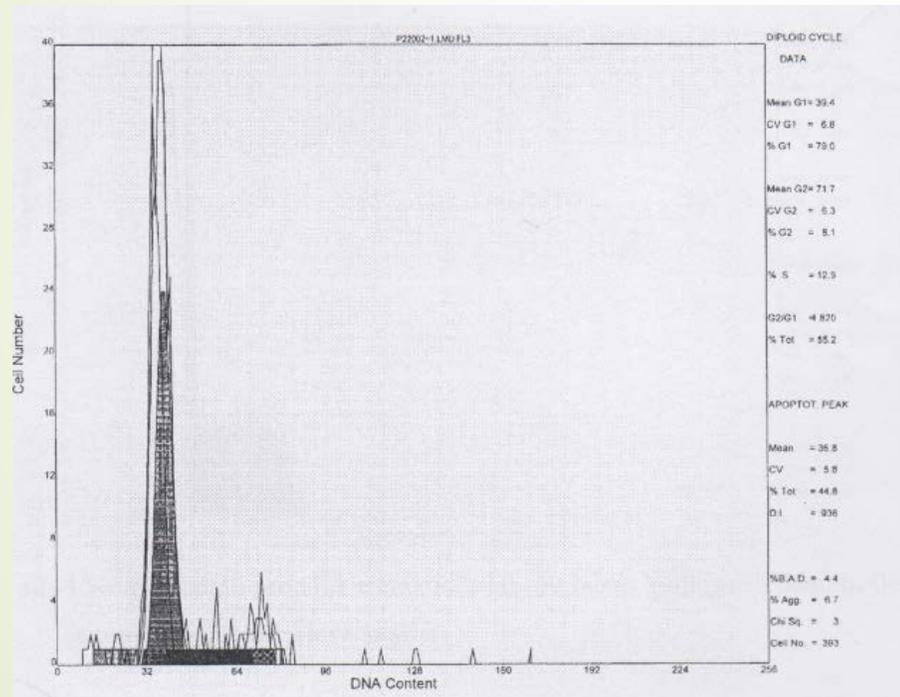
EFFECT OF PROPOLIS EXTRACTS ON CASPASE-3 ACTIVITY IN MYELOID CELL LINES

Meltem ÇOLAK¹, Orhan DEĞER²
Sevil ÖZTÜRK CENGİZ¹, Fahri UÇAR², Ercüment OVALP²

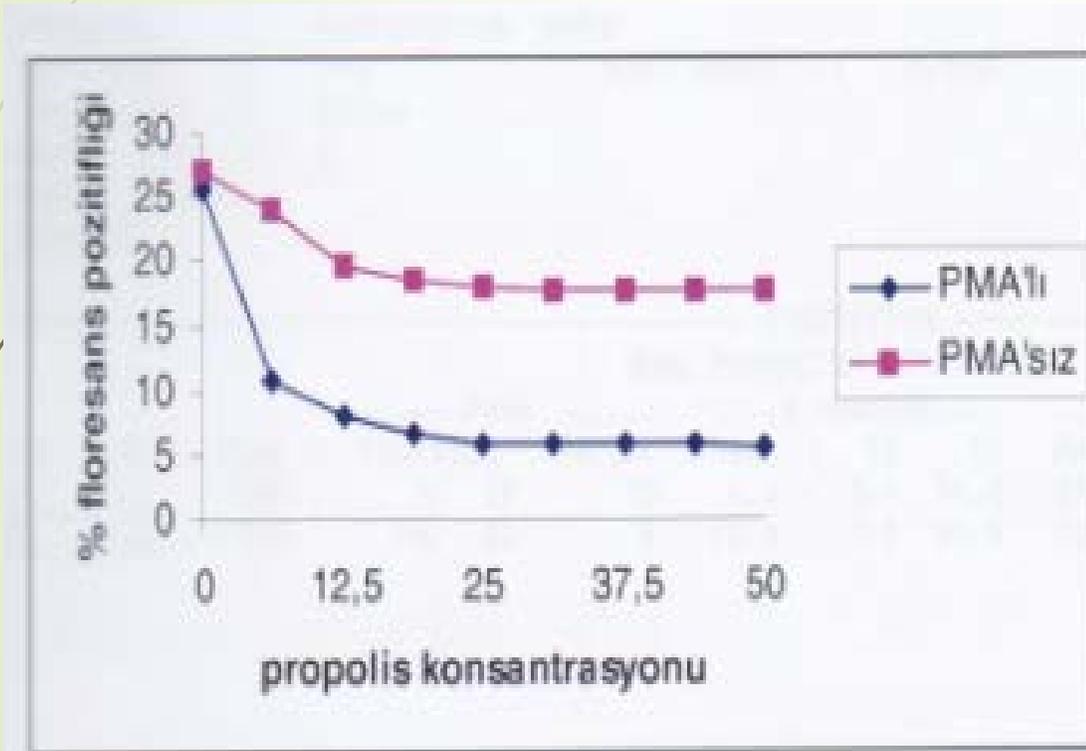
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Propolis is a bee product which consist of resins and bee waxes. The major components of propolis responsible for biological activity are flavonoids, phenolic acids and esters present in resins. Propolis has antibacterial, antiviral, antiinflammatory, antifungal, antimold, immunostimulative, local anesthetic, antihistaminic, antioxidant and tumor cytotoxicity activities. Apoptosis occurs when the cell life cycle ends or various apoptosis triggers, such as radiation, hazardous chemicals, drugs, damage the cell. Caspase-3 activation has an effectors role in both the receptor and mitochondria mediated apoptosis. Caspase cascade and cell death can be initiated by caspase-3 activation. DMSO extracts of natural and commercial propolis different concentrations were used to investigate antitumoral and apoptosis-inducer activity in myeloid HL-60 cell line and lymphoid cell culture with propolis, cell cycle analyses by flow-cytometry and spectrophotometric caspase-3 activity were carried out to determine the apoptosis-induced activity. When compared caspase-3 activities for lymphoid and myeloid cell lines, apoptosis was induced by natural propolis extracts and caspase-3 activities were increased 5-12 times optimally at 12.5 and 6.25 mg/ml propolis concentrations. It was concluded that natural propolis may induce the apoptosis by increasing caspase-3 at these concentration and hence propolis has antitumoral activity.

Flow cytometric cell-cycle analysis of HL-60 cell line treated with propolis (6.25 mg/ml): Induction of apoptosis



Anti-inflammatory effect of propolis: Decreased PMN elastase secretion (*Barlak Y, Değer O, et al. Tr J Biochem 29:89,2004*)



- Concentration of propolis versus % of fluorescence positivity
- PMA: Phorbol myristate acetate (for induction of leukocytes)

Preliminary report

Effects of Turkish pollen and propolis extracts on respiratory burst for K-562 cell lines

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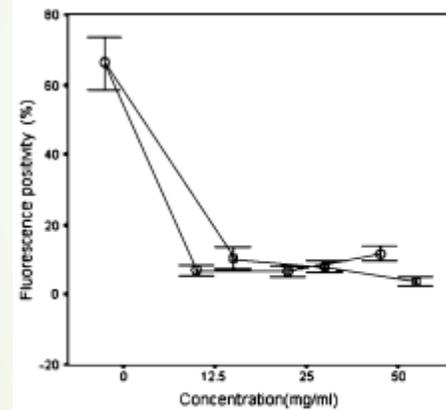


Fig. 2. Effects of pollen and propolis extracts on PMA-induced respiratory burst in K-562 cells (O notation shows pollen and □ shows propolis).

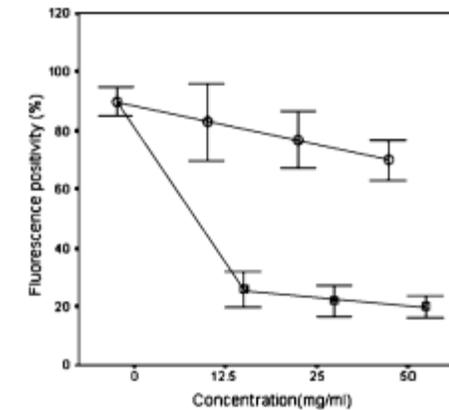
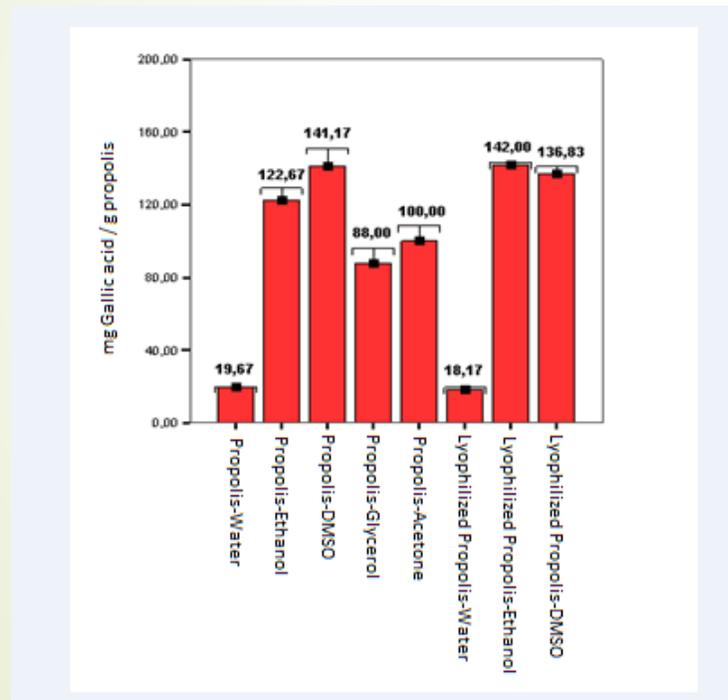


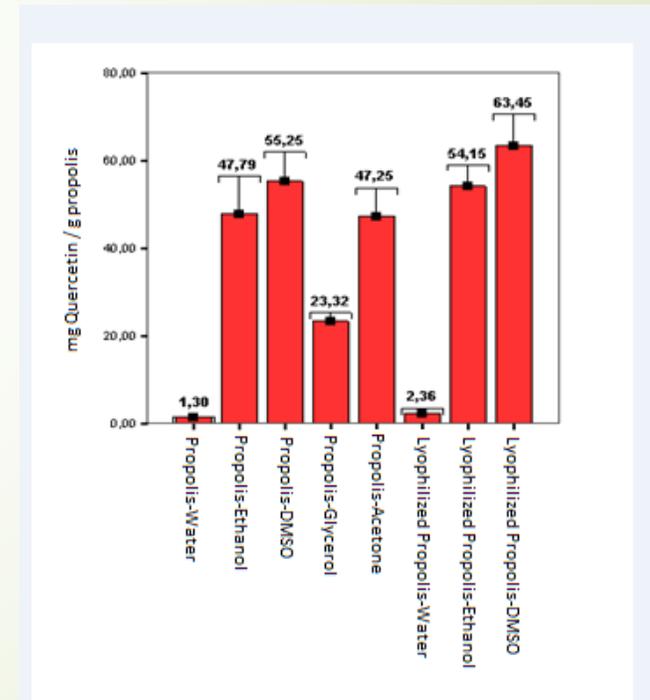
Fig. 1. Effects of pollen and propolis extracts on PMA-induced respiratory burst in MNCs (O notation shows pollen and □ shows propolis, bars show SD).

Investigation of solubility of Turkish propolis in different solvents (*Çakıroğlu T, Değer O, et al. Tr J Biochem 35:S30, 2010*)

Total polyphenolics

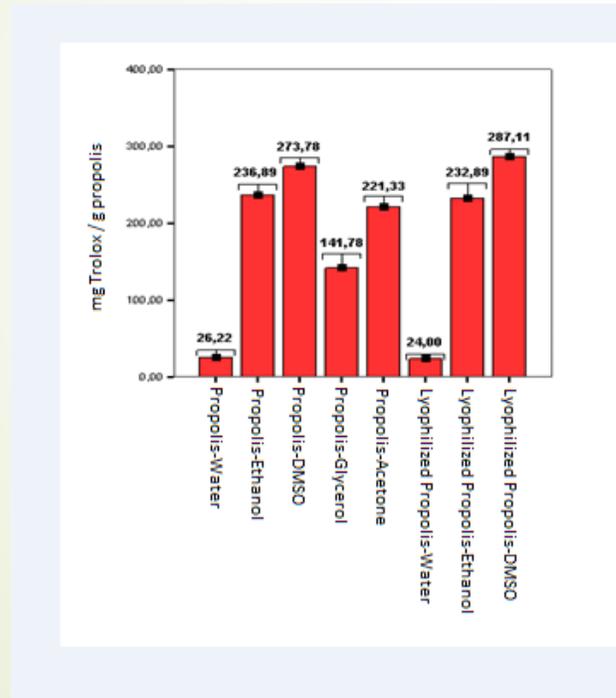


Total flavonoids

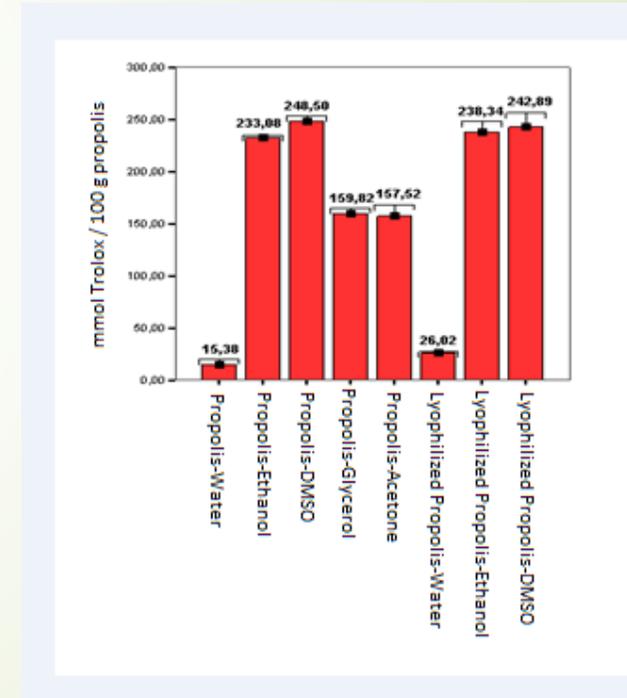


Investigation of solubility of Turkish propolis in different solvents (*Çakıroğlu T, Değer O, et al. Tr J Biochem 35:S30, 2010*)

FRAP Assay

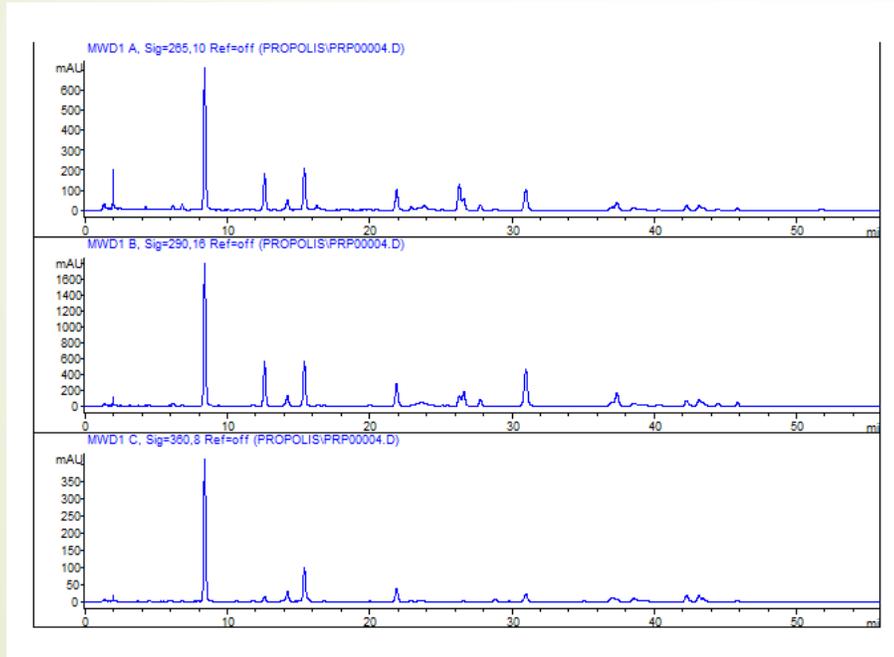


Total Antioxidant Status Assay

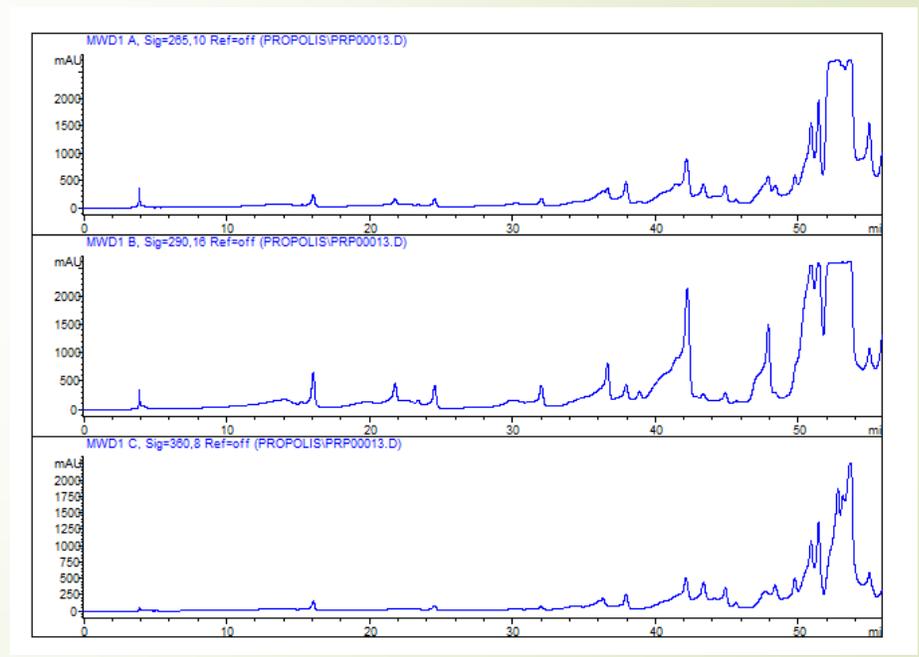


Investigation of solubility of Turkish propolis in different solvents (*Çakıroğlu T, Değer O, et al. Tr J Biochem 35:S30, 2010*)

WEP



EET (Ethanol extract)



Barlak et al. *Proteome Science* 2011, **9**:74
<http://www.proteomesci.com/content/9/1/74>



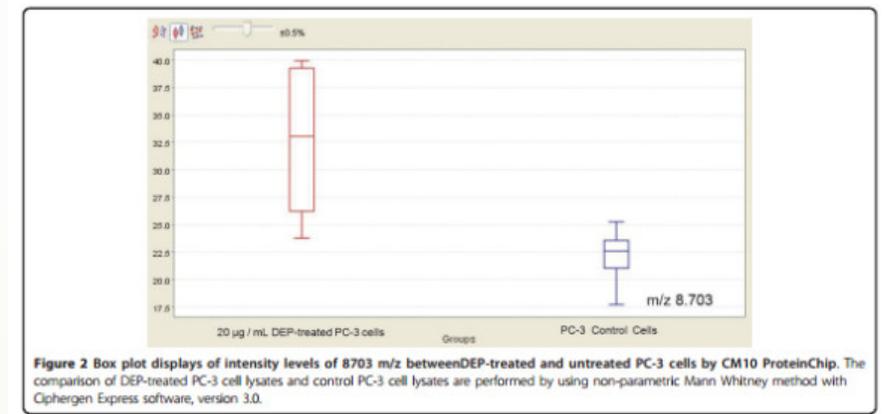
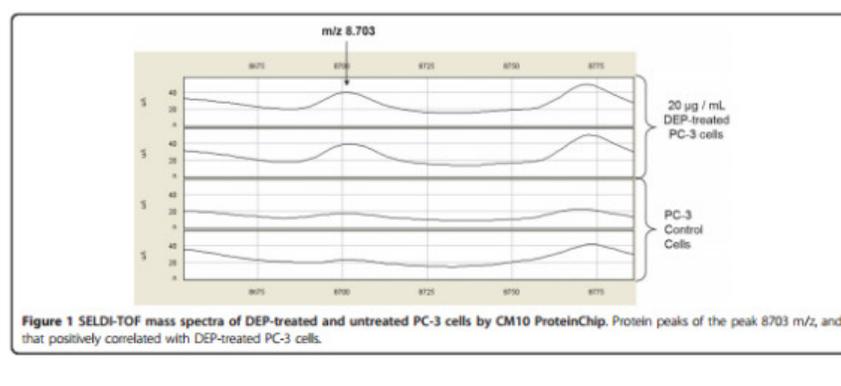
RESEARCH

Open Access

Effect of Turkish propolis extracts on proteome of prostate cancer cell line

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Barlak et al. 2011



Barlak et al.2011

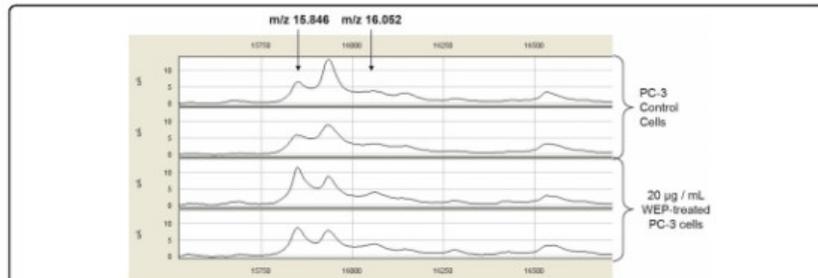


Figure 3 SELDI-TOF mass spectra of WEP-treated and untreated PC-3 cells by CM10 ProteinChip. Protein peaks of the peaks 15846 m/z, and 16052 m/z that are positively correlated with WEP treatment of PC-3 cells.

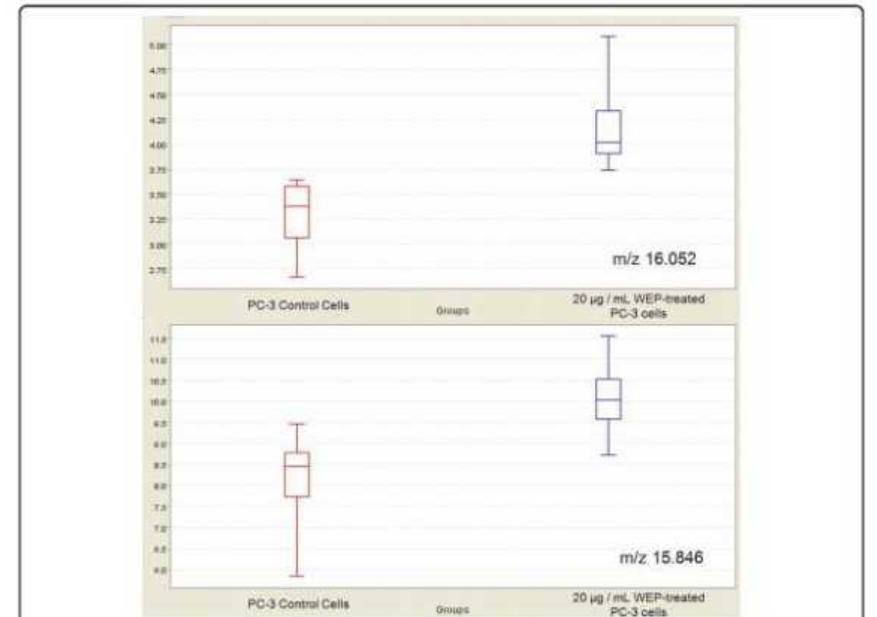
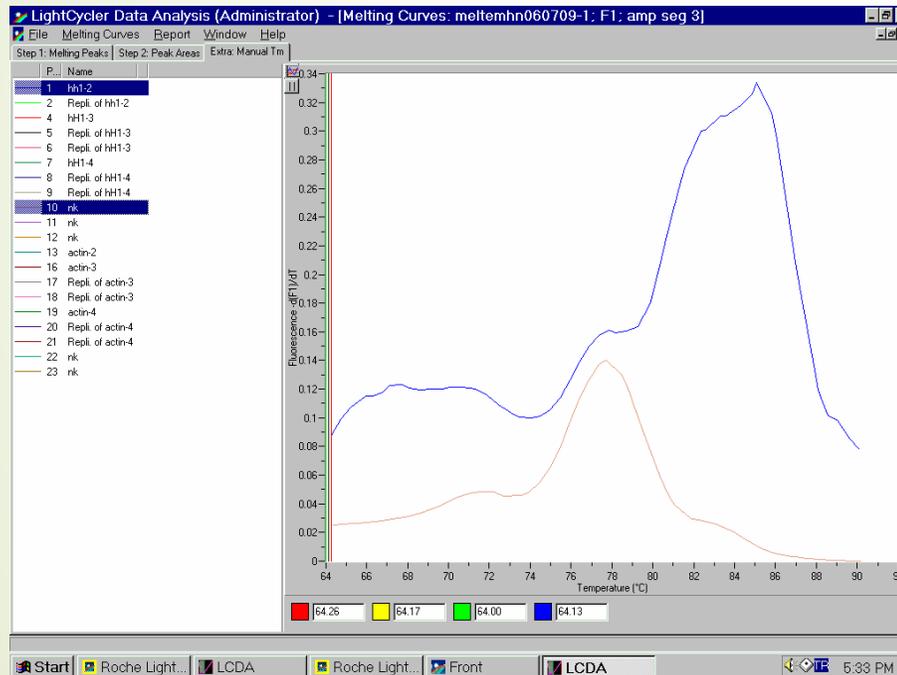


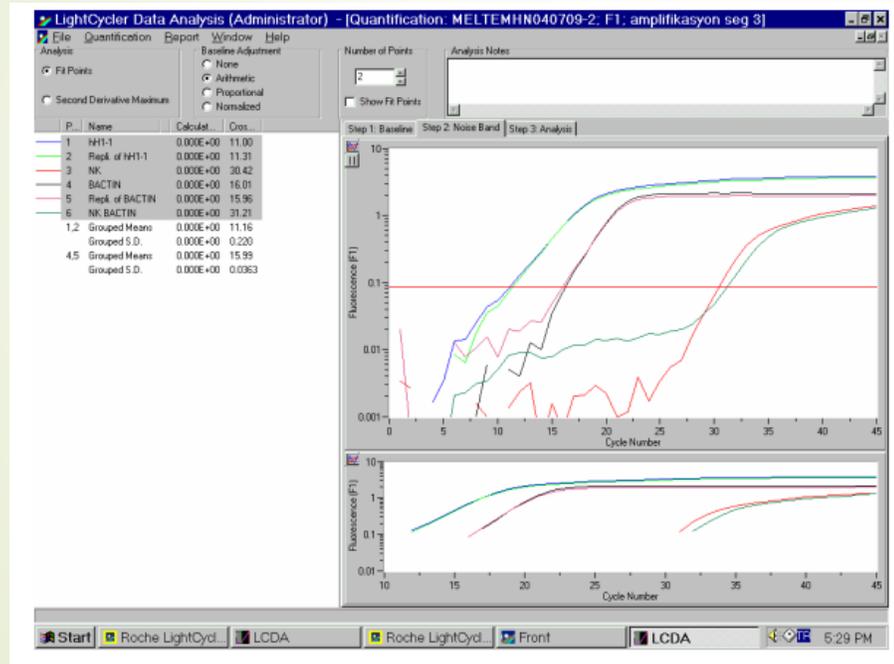
Figure 4 Box plot displays of intensity levels of 15846 m/z, and 16052 m/z between WEP-treated and untreated PC-3 cells by CM10 ProteinChip. The comparison of WEP-treated PC-3 cell lysates and control PC-3 cell lysates are performed by using non-parametric Mann Whitney method with Clphergen Express software, version 3.0.

Effects of bee pollen and propolis extracts on expression of voltage-gated sodium channels in metastatic human prostate cell lines (PhD thesis, Çolak M, 2010)



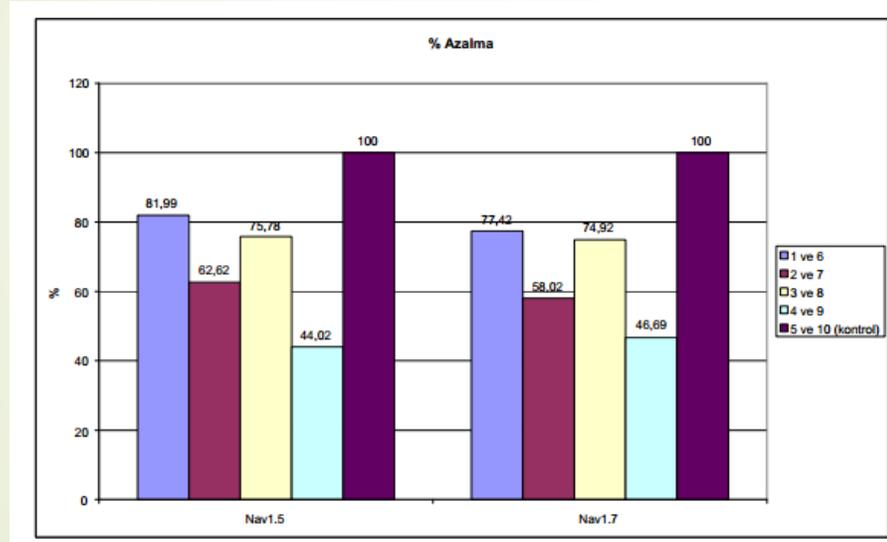
- RTPCR
- Melting curve analysis of VGSC Nav1.5 isoform in PC-3 cell lines treated with DEP
- Djamgoz et al. reported that VGSC proteins increased in human prostate cancer (Prostate 48:165-178,2001; Molecular Cancer 6:1-12, 2007), and in turn metastatic potential increased.

Effects of bee pollen and propolis extracts on expression of voltage-gated sodium channels in metastatic human prostate cell lines (PhD thesis, Çolak M, 2010)



- Melting curve analysis of VGSC Nav1.5 isoform in PC-3 cells treated with WEP (=Water Extracts of Propolis)

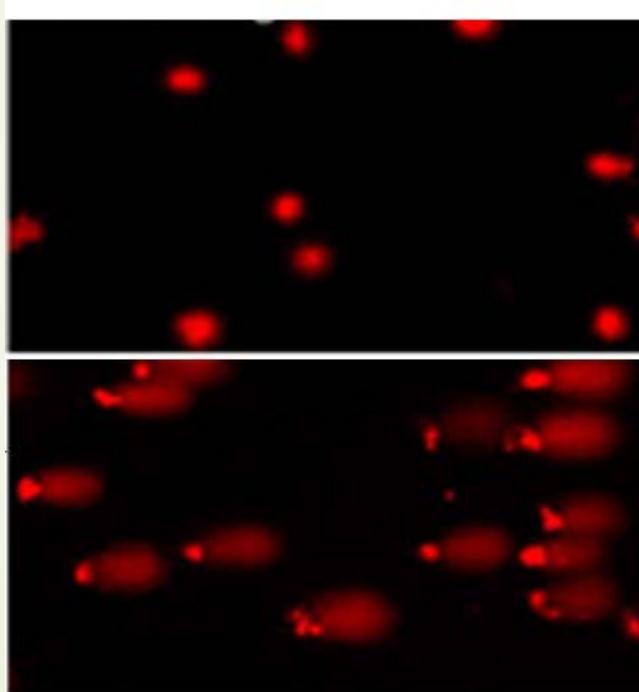
Effects of bee pollen and propolis extracts on expression of voltage-gated sodium channels in metastatic human prostate cell lines (PhD thesis, Çolak M, 2010)



- Decrease (%) in expression levels of VGSC isoforms
- 1 & 6: 20 µg/ml WEP
- 2 & 7: 20 µg/ml DEP
- 5 & 10: Control

**PREVENTIVE AND PROTECTIVE EFFECTS OF
TURKISH PROPOLIS ON H₂O₂-INDUCED DNA DAMAGE
IN FORESKIN FIBROBLAST CELL LINES**

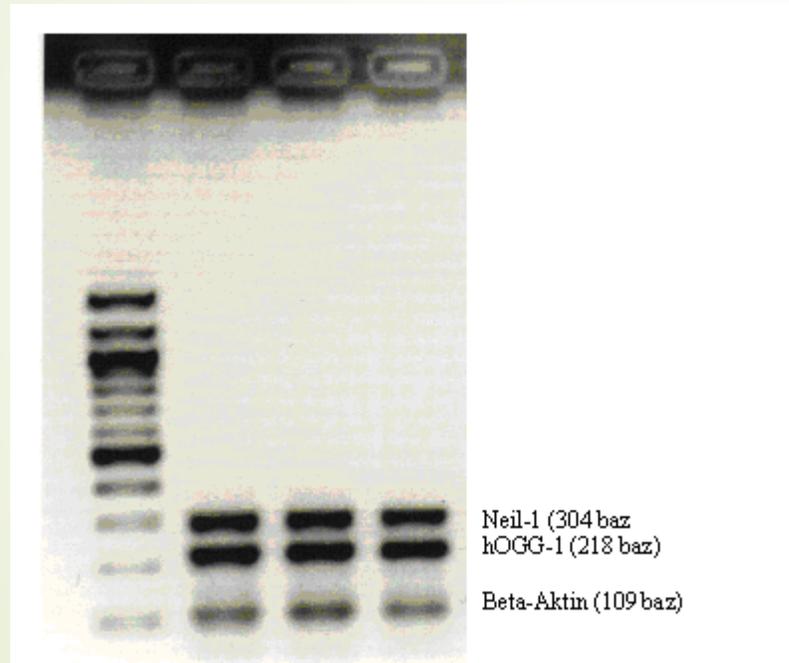
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I. AKALIN,¹ O. DEGER¹ and A. BEDIR³



- ▶ COMET Assay: Fluorescence microscopy

Effect of Turkish propolis extracts on genotoxicity of fibroblast cell lines by DNA repair enzymes. *Turan İ, et al. Tr J Biochem 36(S),2011*

- ▶ Neil-1 and hOGG are DNA glycosylase enzymes. They repair DNA damage by oxidative stress.



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