

# European Respiratory Society Annual Congress 2013

**Abstract Number:** 2950

**Publication Number:** 1823

**Abstract Group:** 11.1. Lung Cancer

**Keyword 1:** Breath test **Keyword 2:** Lung cancer / Oncology **Keyword 3:** Thoracic oncology

**Title:** Volatile organic compounds of exhaled breath in lung cancer and lung inflammatory diseases

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**Body:** Background The analysis of exhaled breath volatile organic compounds (VOCs) is a non-invasive diagnostic assay that could be applied for diagnosis of lung cancer. Objective The aim of our study was to measure the concentration of VOCs patients with lung cancer, COPD, pneumonia and in healthy volunteers. Methods Exhaled breath samples of 31 patient with lung cancer, 19 with COPD, 11 with pneumonia and 10 healthy volunteers were collected trough T-shape non-rebreathing valve into Tedlar bag system after 5 min. washout breathing of VOCs free air. VOCs concentration (ppb) was detected in gas chromatography/mass spectrometry and termodesorbition device. Results Concentration of methanol, ethanol, dodecane and tridecane in breath samples of cancer patients was significantly lower than in patients with COPD, pneumonia and control group.

Concentration of VOCs in exhaled breath of patients with lung cancer, COPD, pneumonia and control group (ppb)

	Lung cancer	COPD	Pneumonia	Control
Methanol	3499 (983-12312)	24392 (4901-121061)	53400* (6490-438221)	62196* (6052-637319)
Ethanol	28425 (13076-60405)	111510* (43000-28467)	262548* (75798-902880)	220506* (59764-805827)
p-xylene	0.20 (0.06-0.36)	0.62* (0.38-0.89)	0.55* (0.26-0.91)	0.39 (0.12-0.73)
Decane	0.08 (0-0.23)	0.33 (0.11-0.58)	0.39 (0.10-0.74)	0.14 (0-0.44)
Dodecane	0.24 (0.02-0.51)	0.85* (0.44-1.37)	1.30* (0.66-2.17)	0.95* (0.38-1.75)
Tridecane	0.34 (0.03-0.73)	1.11* (0.52-1.92)	1.64* (0.72-3.03)	1.34* (0.49-2.65)

Isopentane	0.36 (0.19-0.54)	0.68* (0.43-0.97)	0.57 (0.27-0.94)	0.70 (0.36-1.11)
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All concentrations are expressed in ppb (95% CI) \* p<0.05 compared to lung cancer group

Conclusions Different VOCs profile can in vivo discriminate patients with lung cancer, healthy patients and patients with inflammatory lung diseases.