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# Basal and postprandial substrate oxidation rates in obese women receiving two test meals with different protein content

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## References

**Background & aims:** Fuel utilisation and storage in lean and obese subjects seem to be differently affected by the macronutrient distribution intake. The aim of this intervention study was to explore the extent to which the fat mass status and the macronutrient composition of an acute dietary intake influence substrate oxidation rates.

**Methods:** Fuel utilisation in 26 women, 14 obese (BMI=37.1±1.1 kg/m<sup>2</sup>) and 12 lean (BMI=20.6±0.5 kg/m<sup>2</sup>) was measured over 6 h to compare the metabolic effect of a single balanced protein (HC) meal and a high protein (HP) single meal, which were designed to supply similar energy contents (1672 kJ). The macronutrient composition as a percentage of energy of the HC meal was 55% carbohydrate, 15% protein and 30% fat, while the HP meal contained 40% carbohydrate, 30% protein and 30% fat. Nutrient oxidation rates and energy expenditure were calculated by indirect calorimetry (hood system), whereas exogenous amino acid oxidation was estimated from the <sup>13</sup>C isotopic enrichment of breath after oral administration of L[1-<sup>13</sup>C]leucine.

**Results:** Fasting lipid oxidation was higher in the obese than in the lean women ( $P<0.05$ ), and it was significantly correlated with body fatness ( $P<0.01$ ). A single HP meal consumption produced higher postprandial fat oxidation as compared with HC meal intake ( $P<0.02$ ), in both obese and lean subjects, with no apparent changes in glucose oxidation rates. Furthermore, postprandial fat utilisation after the test meal intake was higher in obese than in the lean women ( $P<0.01$ ). The time course of <sup>13</sup>CO<sub>2</sub> in breath followed a similar pattern in both dietary groups, although a non-statistically significant higher trend in protein and <sup>13</sup>C-leucine oxidation was found in the HP group.

**Conclusions:** Net lipid oxidation depends on both short-term dietary composition intake and fat body mass, being significantly higher after a relatively high protein meal as compared to a balanced diet intake and in obese women as compared to lean controls.

## Keywords:

[Obesity](#), [Fat oxidation](#), [Stable isotope](#), [Diet composition](#), [Energy expenditure](#)

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