

# Breeding crops for sustainable agricultural production

28.02. – 01.03.2012

Giessen, Germany



## Essential oil content during different stages of development in lemon balm (*Melissa officinalis*)

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Lemon balm is known for its pleasant lemon-like odour and pharmaceutical activity. The scent is mainly caused by a mixture of essential oil components. The essential oil content is an important quality requirement, which does not only determine the quantity and quality of the odour, but also influences the medicinal intensity of the drug. The investigation of single essential oil verticils in lemon balm showed an influence of time on the oil composition in single plants (Hose et al. 1997). To characterize this influence in whole plants we tested six different varieties of lemon balm in a field trial. We harvested all plots two times. When harvesting, we sampled at five different stages of development at different times. To clear the field between the first and the second cut there was an additional harvest. We extracted the essential oil and determined the oil composition for every cut. We also analysed the upper and the lower part of the plants separately. The upper part was considered to be the first two leaf pairs. There was strong evidence that the first leaf pairs had a higher content of essential oil. Also the composition of the oil varied. There is a gradient of oil quantity between different harvesting times with a maximum before start of flowering. This maximum was found all over the varieties, repeats and first and second cut. This trial showed also the influence of harvesting time and development stage on the essential oil quality. There is an increase of odour related components up to an optimal point. At this point the relation between the sum of the components citronellal, citral A, citral B and the total oil components is maximal. These results allowed us to conclude that the optimal time for harvesting is around 10 days before flowering. These data give us a better understanding of the quality and quantity development during ontogenesis. It will be possible to increase the essential oil content of lemon balm drug and optimise the composition of the essential oil.