

On the Occurrence of Oct-1-en-3-ol in Clover Plants

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During a gas chromatographic investigation of volatile substances in some fodder plants we have isolated and identified by mass spectrometry several organic compounds¹. The main compound obtained in the flowers and leaves of the tested clover plants (*Trifolium repens*, *Tr. pratense*, and *Tr. hybridum*) was identified as oct-1-en-3-ol. The mass spectra (Fig. 1) and the gas chromatographic retention times of natural and synthetic oct-1-en-3-ol were identical. The highest concentration (about 20 mg/kg) of this substance, which has a strong mushroom-like odour, was found in the

flowers of white and alsike clover. l-Oct-1-en-3-ol has been isolated previously in essential oils of the families *Labiatae* (*Mentha pulegium*, *M. timija*, and *Lavandula officinalis*), *Cupressaceae* (*Chamaecyparis obtusa*) and *Agaricaceae* (in a mushroom, *Armillaria matsutake*)². It is of interest to note that recently Stark *et al.*³ have identified the corresponding ketone, oct-1-en-3-one, responsible for the metallic off-flavour in dairy products. A possible precursor of this ketone is, according to Stark *et al.*, oct-1-en-3-ol, which is also found in oxidized dairy products. Hoffmann⁴ has detected oct-1-en-3-ol in the autoxidation products of soybean oil and has shown that this alcohol is formed from linoleic acid. It is also possible that oct-1-en-3-ol in dairy products can originate from the fodder of the cows. We have performed some feeding tests¹ on cows with synthetic oct-1-en-3-ol and found that this alcohol could enter the milk via the organism, if a dilute solution of oct-1-en-3-ol (1 g) was fed directly into the rumen. The maximum concentration of oct-1-en-3-ol in the milk, as measured by gas chromatography⁵ was obtained after 2 to 4 h. This concentration was low (about 20 $\mu\text{g/l}$, or 0.02 ppm) and in organoleptic tests no detectable off-flavour was found. Stark *et al.* have, however, pointed out that the corresponding ketone, oct-1-en-3-one, has a flavour-threshold concentration of about 0.001 ppm and 0.01 ppm in butterfat and skim milk, respectively.

Full details of these investigations will be published later.

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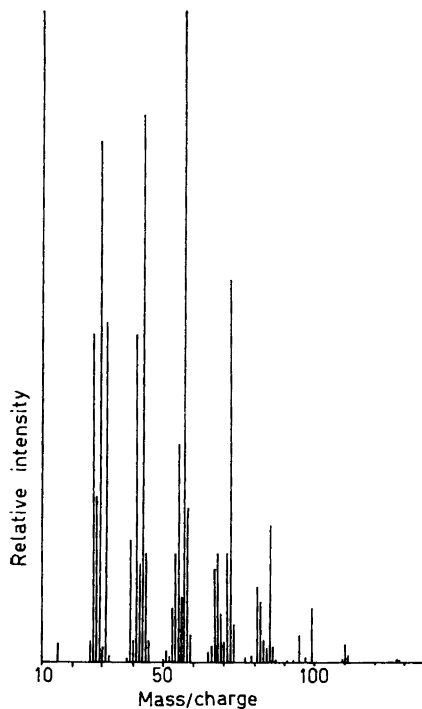


Fig. 1. Mass spectrum of dl-oct-1-en-3-ol.

1. Unpublished results.
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