

react with DNFB. If the consumption of DNFB were made in this way to a significant degree, then the optimal conditions for the reaction would be different from those reported earlier.<sup>3)</sup> Actually, however, the reaction yield was the highest (97%) when 20  $\mu$ l of DNFB was added as shown in Table 1. This shows that the optimal conditions do not change considerably if the rice sample is sufficiently cleaned up.

Since *N*-methyl carbamates are known to be thermolabile, the temperature was kept at 30°C throughout the procedure when the Meobal-containing solutions were evaporated to dryness. Actually, when the evaporation was performed at temperature above 40°C, the recovery of Meobal was reduced by 20% or more.

This method was developed particularly for the residue analysis of Meobal in rice grains. However, since the dinitrophenylation reaction is applicable to *N*-methyl carbamates in general,<sup>3)</sup> this method with some modifications may probably be applied for the analysis of other *N*-methyl carbamates in other crops. Considering the variation in the lipid composition of various plant materials,<sup>4)</sup> the clean-up procedure, especially column chromatography, must be suitably modified for successful application.

A limitation of the present method would be that a mixture of *N*-methyl carbamates must be separated prior to the dinitrophenylation reaction in order for the individual carbamates to be analysed. Particularly when its metabolites<sup>5)</sup> are to be analysed together with intact Meobal, the prior separation will be essential. This is left

as our future project.

### Summary

A gas chromatographic method is described for the residue determination of 3,4-dimethylphenyl *N*-methyl carbamate (Meobal®) in rice grains. Powdered rice grains were subjected to extraction with a dichloromethane-acetone-water mixture. The extract was cleaned up by a combination of column and thin layer chromatography. Meobal in the cleaned-up sample was converted to 2,4-dinitrophenyl methylamine (DNP-MA) by simultaneous hydrolysis and dinitrophenylation and the DNP-MA was determined by electron capture gas chromatography. Recovery was 87% when the sample was fortified at the 0.5 ppm level. The lowest limit of sensitivity was 0.01 ppm or less.

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## 抄 録

Grass Grub Beetle (コガネムシの一種)の性誘引物質

Sex Attractant of the Grass Grub Beetle.  
R. F. Henzell, M. D. Lowe, *Science* 168, 1005 (1970).

コガネムシの一種 grass grub beetle *Costelytra zealandica* (White) の幼虫は、ニュージーランドにおける牧草の害虫の一つである。この成虫の雌が性誘引物質を発散することは、すでに知られていた。今回1500匹の処女雌の腹部を洗滌することによりこれを抽出した。これを濃縮後昇華精製し、ついで層薄クロマ

トグラフィーで Rf 値を比較した結果、フェノールと一致した。さらにペーパークロマトグラフィー、ガスクロマトグラフィーでも誘引物質はフェノールであることが確認された。

室内での生物検定には、パラフィン製の擬似体に一定量のフェノールを塗布して10匹の雌の入った容器に置いて数分後の交尾行動によって判定した。それによると 0.1  $\mu$ g でも 80% の雄が反応することがわかった。さらに野外試験で一夜に 100ppm のフェノール水溶液が71匹の雄を誘引した。しかし、近くにおいた水のみを入れたトラップには一匹もオスは捕われなかった。(高橋正三)