

SHORT COMMUNICATION

FORMATION OF MONOFLUOROCARBON COMPOUNDS
BY SINGLE CELL CULTURES OF *GLYCINE MAX*
GROWING ON INORGANIC FLUORIDE

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(Received 9 November 1971)

It was discovered by Miller *et al.*,^{1,2} that ordinary forage plants, viz. soy bean and alfalfa, exposed to inorganic fluoride could synthesize fluoroacetate and fluorocitrate. We have therefore exposed single cell cultures of *Glycine max* to fluoride to see whether the synthetic capacity exists at this level.

The cells were grown on agar with 10^{-3} M sodium fluoride for seven weeks and extracted with water. The organic acid fraction was isolated into ether, methylated and examined by GLC giving the results shown in Table 1.

TABLE 1. FLUOROACIDS IN CELL CULTURES OF *Glycine max*

	Compounds (μ g)	
	Fluoroacetate	Fluorocitrate
Cell culture (24 g)	100	30
Medium (7 l.)	20	1

It is obvious from these results that single cell cultures of *Glycine max* can convert inorganic fluoride to fluoroacetate ($\text{FCH}_2 \cdot \text{COO}^-$) and to fluorocitrate. This appears to be an inherent property of the plant.

EXPERIMENTAL

Soy bean single cell cultures were grown on an agar medium, Heller H₂, containing Tryptone (1 mg/ml) and Na F (10^{-3} M) for 7 weeks. 7 separate cultures were taken (24 g), and the 7 separate media were pooled and worked together. The cultures were homogenized in a micro homogenizer (Waring blender type) in water, ratio 1:4. The solid was spun down for 10 min at 3000 g. The supernatant was decanted; the residue again suspended in H₂O, and the pH adjusted to pH 7.5–8.0; it was again homogenized. After centrifuging the 2nd supernatant was decanted and the residue washed well with H₂O. The combined supernatants and washings were brought to pH 7.5, and the volume reduced *in vacuo* to approx. 5.0 ml. After acidification with H₂SO₄ to pH 2.0, the solution was extracted with Et₂O, 5 \times 20 ml. The combined Et₂O extracts were dried (Na₂SO₄), reduced in volume and methylated with CH₃N₂. The methylated compounds were subjected to GLC on PEG 20 M (1.5 m \times 6 mm) with Ar as carrier. Fluoroacetate was detected isothermally at 65° and fluorocitrate was detected using temperature programming from 75 to 225° at 5° min.

Acknowledgements—We are grateful to the Wellcome Trust for grants in aid of this work and to the Royal Society for a grant for apparatus. We also thank Dr. D. H. Northcote and R. Day for the specimens of single cell cultures used, and Professor F. G. Young for facilities provided.

¹ C. J. LOVELACE, G. W. MILLER and G. W. WELKIE, *Atmospheric Environment* **2**, 187 (1968).

² J. YE-O CHENG, MING-HO YU, GENE W. MILLER and G. W. WELKIE, *Environ. Sci. Techn.* **2**, 367 (1968).

Key Word Index—*Glycine max*; Leguminosae; fluoroacetate; fluorocitrate; cell cultures.