# PERSISTENCE OF METHANE AND CARBON DIOXIDE FOAMS

R.H. LABY*, P.J. MOATE* AND B. WALKER**

Aqueous foams generated with methane are more persistent than those generated with carbon dioxide due mainly to the lower water solubility of methane. A quantitative comparison of the persistence of foams generated in vitro from red clover (Trifolium pratense) leaf cytoplasmic protein (RP) and rumen fluid (RF) from cows grazing white clover (T. repens) dominant pasture using these gases was made as part of a continuing study of factors contributing to the onset of bloat in cattle.

RP was isolated by the method of Jones and Lyttleton (1969). Rumen digesta obtained from rumen fistulated cattle, was strained through muslin, cooled in ice/water and used within 4 hours of sampling. Foams were generated at 25°C with gas flow rates of 1 or 2 ml/sec and the compressive strength (s), stress relaxation (r), second order drainage constant ($k_2$) and foam retention ratio (f), (Laby, 1969) were determined as indices of foam persistence.

TABLE 1 Foam properties for RC (0.2% in buffer, pH = 5.7, gas flow rate 1 ml/sec) and for RF (pH = 5.5, flow ratio 2 ml/sec,) using methane and carbon dioxide

| Sample | Gas | s<br>g $cm^{-2}$ | r<br>g $cm^{-2}$ $sec^{-1}$ * $10^{-3}$ | f<br>% | k<br>$ml^{-1}$ $sec^{-1}$ * $10^3$ |
|---|---|---|---|---|---|
| RP | $CO_2$ | 2.33 | 4.4 | 8.4 | 1.58 |
| RP | $CH_4$ | 2.77 ** | 0.4 ** | 21.0 ** | 1.69 |
| RF | $CO_2$ | 0.64 | 0.014 | 8.6 | 2.16 |
| RF | $CH_4$ | 0.87 ** | 0.003 ** | 13.5 * | 4.92 ** |

* $P < .05$; ** $P < .01$

The smaller stress relaxation and larger foam retention ratio given with methane foams shows that they are much more persistent than those generated with carbon dioxide. Therefore the role of these gases in the aetiology of bloat deserves further study.

JONES, W.I. and LYTTLETON, J.W. (1969). N. Z. Jl. Agric. Res. 12:31 – 46.
LABY, R.G. (1969). N. Z. Jl. Agric. Res. 12:427 – 436.

* Department of Agriculture, Dairy Research Institute, Ellinbank, Vic 3820.

** LaTrobe University, Bundoora, Vic 3083