15 Colorless oil; $[\alpha]_D^{28} - 16°$ ($c = 1$, $CHCl_3$); ^1H NMR ($CDCl_3$) δ 0.81 (3H, t, $J = 6.9$ Hz; H_3-18'), 1.18 (24H, br s), 1.99 (2H, q, $J = 7.2$ Hz; H_2-5'), 2.77 (1H, d, $J = 5.9$ Hz; OH-2'), 4.54 (1H, t, $J = 5.9$ Hz; H-2'), 5.43 (1H, dd, $J = 15.3$ and 5.9 Hz; H-3'), and 5.81 (1H, dt, $J = 15.3$ and 7.2 Hz; H-4'); EIMS m/z 253 $(M - COOMe)^+$.

16 White crystals, mp 92–94 °C [lit.[3] mp 100.5–101 °C]; $[\alpha]_D^{22} + 14°$ ($c = 0.1$, $CHCl_3$) [lit.[3] $[\alpha]_D + 15.7°$ ($c = 0.86$, $CHCl_3$)]; ^1H NMR ($CDCl_3$) δ 0.89 (3H, t, $J = 6.9$ Hz; H_3-18), 1.27 (26H, br s), 1.60 (2H, m; H_2-4), 2.10 (3H, s; Ac), 2.07 (3H, s; Ac), 2.08 (3H, s; Ac), 4.07 (1H, dd, $J = 11.6$ and 3.9 Hz; H-1), 4.25 (1H, dd, $J = 11.6$ and 6.1 Hz; H'-1), 4.40 (1H, m; H-2), 4.91 (1H, m; H-3), 5.84 (1H, d, $J = 9.0$ Hz; NH); EIMS m/z 428 (M + 1), 368, 294, and 144.

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Use of oven-dried blood for in vitro feeding of tsetse flies

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Summary. Comparison of the survival, fecundity and offspring size of *Glossina palpalis palpalis* females fed reconstituted oven-dried blood, fresh, frozen/thawed, or reconstituted freeze-dried blood showed that oven-drying at 45 °C does not diminish the nutritional quality of blood. The significance of this finding is discussed with a view to optimizing costs and conditions of blood-diet storage and transportation in the context of mass-rearing of tsetse flies.
Key words. Tsetse flies; blood feeding; oven-dried blood; mass-rearing.

Mass-rearing of tsetse flies, for release in tsetse control programs employing the Sterile Insect Technique (SIT), is dependent on the availability of a suitable source of food for the flies. Laboratory colonies of tsetse flies have so far been fed either in vivo on a variety of host animals[1] or in vitro on various types of blood presented underneath suitable types of membranes[2,3].

The use of fresh blood for in vitro feeding of tsetse flies is hampered by limitations imposed by storage costs and nutritional quality deterioration and necessitates a regular supply of fresh blood. An added complication is the variable nutritional quality arising from genetic, environmental and physiological effects on blood composition and from the influence of chemical, physical and microbiological agents on blood during collection, handling and storage. Therefore routine quality control tests are conducted to ascertain the suitability of particular batches of blood before use in feeding flies in the main colony. The fulfilment of this requirement has been made possible through increasing the shelf-life of blood by a variety of methods. Wetzel and Luger[4] were the first to use blood, stored deep-frozen, for in vitro feeding of tsetse flies. Later Wetzel[5] investigated freeze-drying of blood as a further improvement in conditions of storage and transportation of blood suitable for feeding tsetse flies in large numbers.

Freezing and freeze-drying involve high operational costs and require a reliable electricity source. In the current study we investigated the use of low-temperature oven-drying as a cheaper method of preparing dried blood suitable for in vitro feeding of tsetse flies.

Material and methods. Bovine and porcine blood were collected by venipuncture from animals at a local abattoir and defibrinated by mechanical agitation during collection[3]. Each batch and type of blood was used to prepare four different diets: 1) Fresh defibrinated bovine (FBB) or porcine (FPB) blood was dispensed into capped vials in volume aliquots sufficient for one day's feeding, irradiated (1 KGy) and stored at 4 °C until used for feeding. 2) Fresh defibrinated blood was dispensed as described above, irradiated (1 KGy) and stored at – 20 °C until used. Just before feeding, vials containing frozen bovine (FFBB) or porcine (FFPB) were thawed out in warm water (ca 40 °C). 3) Defibrinated bovine or porcine bloods were each freeze-dried using the procedure described by Wetzel[5]. The freeze-dried bloods were stored vacuum-sealed in aluminium bags at room temperature. To prepare the diets appropriate amounts of freeze-dried bovine (FdBB) or porcine (FdPB) blood were weighed and added to distilled water (23.25%, W/V). The rehydrated bloods were dispensed into stoppered vials, irradiated (1 KGy) and stored (up to 45 days) at 4 °C until used in feeding tests. 4) Blood to be oven-dried was mixed (1:4, V/V) with distilled water and dispensed into 250-ml glass petri dishes. This dilution procedure decreased the viscosity of blood and prevented the formation of a film of hard-dried material which would insulate and conceal undried blood underneath. The petri dishes containing the diluted blood were placed in an oven equipped with an air fan and the samples were dried at 45 °C. The blood took 30–40 h to dry. The dried product was stored in aluminium bags until required. To prepare diets appropriate amounts of the oven-dried bovine (OdBB) or porcine (OdPB) blood were weighed and mixed (23.25%, W/V) with distilled water. The rehydrated blood was dispensed into stoppered vials, irradiated (1 kGy) and stored at 4 °C until used for feeding.

Flies and feeding tests. Freshly emerged *Glossina palpalis palpalis* females were obtained from a stock colony routinely maintained at this laboratory under conditions described by Van der Vloedt[6]. Each diet was supplemented with ATP (10^{-3} M) and tested on 30 newly emerged females in three

Performance of *G. p. palpalis* fed different types of whole blood diets.*

Diet	% Survival		Pupae produced per female		Mean puparial weight
	25 days	35 days	25 days	35 days	(mg) ± SD
Bovine blood					
FBB	95.0	93.4	0.54	1.52	30.54 ± 3.01
FFBB	83.3	73.3	0.62	1.17	27.71 ± 4.07
FdBB	98.4	85.0	0.72	1.32	29.21 ± 2.90
OdBB	93.3	81.7	0.72	1.48	29.63 ± 3.19
Porcine blood					
FPB	93.3	80.0	0.53	0.90	28.96 ± 4.11
FFPB	96.6	88.9	0.63	1.15	31.15 ± 3.26
FdPB	95.6	91.1	0.55	1.51	25.72 ± 4.19
OdPB	93.3	83.3	0.73	1.37	30.13 ± 4.08

* Abbreviations of diets FBB, FFBB, FdBB, OdBB, FPB, FFPB and OdPB are as described under "Materials and methods". Data are a mean of results obtained for 3 different batches of each type of blood.

replicates. The flies in each group were fed in vitro, five days a week, on the respective diets and kept for 35 days, during which time the performance (survival, fecundity and offspring size) of flies fed the different diets was recorded.

Results and discussion. For each type of blood (bovine or porcine) the different diets were prepared from the same batch of blood to facilitate comparison and correlation of nutritional quality with the type of the diet. The results of the feeding tests, shown in the table, indicate no major differences in the nutritional quality of the different blood types. Oven-drying does not appear to diminish the nutritional quality of whole blood as a diet for *G. p. palpalis;* performance on oven-dried blood diets is similar to that obtained using fresh, frozen/thawed or freeze-dried blood preparations as diets for *G. p. palpalis.*

The low-temperature oven-dried blood product was readily soluble in water, the solubility being especially enhanced by drying the blood after diluting it with water. The oven-drying method reported in the present study requires neither expensive equipment nor sophisticated technology. It would be ideal for preparing dried blood products, particularly in the context of mass-rearing of tsetse flies in a SIT program, for longer shelf-life and lower storage and transportation costs.

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Announcements

Hildegard Doerenkamp and Gerhard Zbinden Foundation for Realistic Animal Protection in Scientific Research

Scientific Award 1988

A prize of DM 50000.– will be awarded for outstanding scientific contributions leading to the reduction of animal use in biomedical research. The specific topic for the year 1988 is: "Reduction of animal use in biomedical research by computer modelling."

Preference will be given to applications leading to a reduction of the use of large animals (dogs, cats, monkeys). Research in pharmacokinetics and drug metabolism is included in the topic.

The applications may consist of published or unpublished reports on computer use in all areas of biomedical research, provided that they are directly relevant to the topic of this year's prize.

Computer programs for simulation of animal experiments in teaching and research are also acceptable. No special application forms are required. The jury reserves the right to split the prize among not more than three applicants. Languages: English, German, French.

Deadline for submission is December 31, 1988. Applications should be sent to: Prof. G. Zbinden, Institute of Toxicology, Schorenstraße 16, CH-8603 Schwerzenbach/Switzerland.

Courses

In the series "Current Advances in Laboratory Techniques" The Royal Postgraduate Medical School of the University of London is organizing courses on the following topics:

Monoclonal Antibodies: 27 June–1 July and 21–25 November 1988; 26–30 June and 23–27 November 1989

Endocrine Pathology: 9–13 May 1988; 8–12 May 1989

In vitro Receptor Autoradiographic Techniques: 16–20 May 1988

Modern Immunocytochemistry: 10–14 October 1988

Immunocytochemistry in Cytopathology: Methods and Applications: 5–9 December 1988

Immunolabelling for Electron Microscopy: 9–20 January 1989

Molecular Biology: 17–21 April 1989

In situ Hybridisation: 24–28 April 1989

Details and application forms are available from: Professor Julia M. Polak, Histochemistry Unit, at the Royal Postgraduate Medical School, Hammersmith Hospital, Du Cane Road, London W12 OHS, England.

Friedrich Miescher-Award 1989

To commemorate the 100-year anniversary of the discovery of nucleic acids the Swiss Society for Biochemistry has created the Friedrich Miescher-Award. This prize is intended to honor young biochemists and is donated by the Friedrich Miescher-Institute of Ciba-Geigy Inc. in Basel.

Excerpts from the statutes:

I. The Friedrich Miescher-Award may be awarded once every year to a young scientist for outstanding achievements in biochemistry.
II. Preference will be given to candidates not older than 35 years. Only candidates who have not reached the age of 40 years on January 1st, 1989 are eligible.
III. The scientific work must have been carried out in Switzerland or by Swiss scientists abroad.

Applications or nominations of candidates should be submitted by **November 1, 1988** to the secretary of the Swiss Society for Biochemistry:

Dr. L. Kühn, Swiss Institute for Experimental Cancer Research, 155, ch. des Boveresses, 1066 Epalinges s/Lausanne, Switzerland.