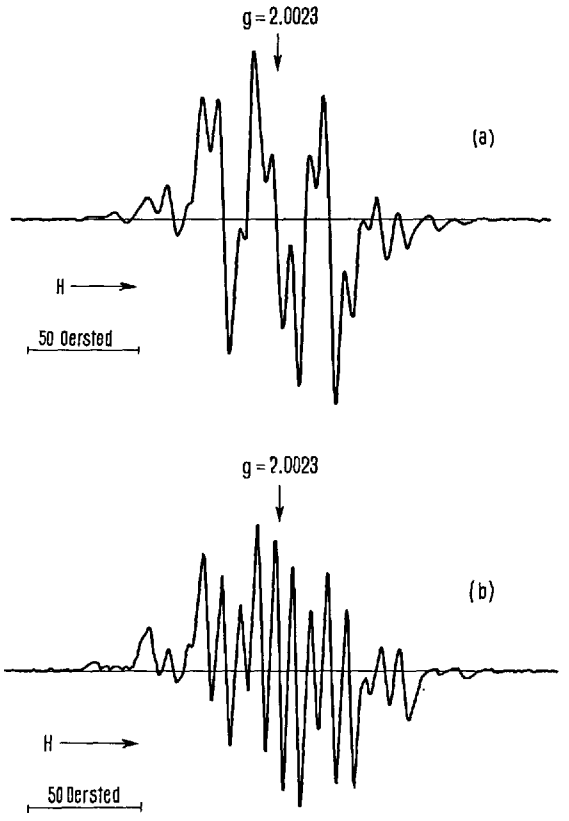
probable that changes in the crystal structure are responsible for the observed effect.

From the results obtained it may be concluded that the intermolecular radical transfer which was found by Box et al.[4] is not terminated by warming up the sample to room temperature. In this case a mixed spectrum is obtained at room temperature. A complete transfer of the unpaired electron from α- to β-position is obtained only if the temperature is further raised. On the contrary, we must assume that, in the case of UV irradiation, radicals of type (II) must be quenched faster than those of type (I). Quenching processes of X-ray induced radicals by UV irradiation are already known in the case of glycine[6], alanine[7] and methionine[8]. Further investigations pertaining to a different microwave saturation behaviour of the 2 types of radicals will be published elsewhere[9,10].



Electron spin resonance spectra of X-irradiated polycrystalline DL-valine at room temperature before (*a*) and after heat-treatment for 3 h at 353 °K (*b*).

Polycrystalline DL-valine (Schuchardt, Munich) was X-irradiated in air with a 50-kV source (half-value layer: 0.05 mm aluminium, dose-rate: 0.21 Mrad/min, dose 1 Mrad). The UV irradiation was carried out with a mercury low-pressure lamp NN 15/44 (Quarzlampengesellschaft Hanau, Germany) emitting mainly the resonance line 254 nm. The measured total intensity at the sample amounted to 3×10^4 erg cm^{-2} sec^{-1}. Both the irradiations and the measurements of electron spin resonance were carried out at room temperature. The electron spin resonance spectra were determined on an X-band Varian spectrometer.

Zusammenfassung. Nach Röntgenbestrahlung von polykristallinem DL-Valin bei Zimmertemperatur ergibt sich ein ESR-Spektrum ohne aufgelöste Hyperfeinstruktur. Erwärmt man die bestrahlte Substanz auf 353 °K, so zeigt das Spektrum mehrere gut aufgelöste Tripletts. Demnach ist die intermolekulare Radikalwanderung bei Zimmertemperatur noch nicht abgeschlossen, sondern erst nach weiterer Temperaturerhöhung.

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Some Enzymes Present in Marine Mollusca of the Canary Island of Lanzarote

In 1967, a marine biological expedition was organized to the Canary Island of Lanzarote. The main aim of the expedition was to study the benthic ecology of the island using SCUBA diving techniques. Part of the research was aimed at elucidating the feeding habits of the marine mollusca and, to help in this, an investigation was made of some of the digestive enzymes present in the species previously found to be common on the island[1]. Apparently no similar study had been made on most of the species involved[2]. The enzymes studied were: α-amylase, laminarinase, cellulase, acid phosphatase and acid esterase.

All extracts were made from live molluscs, none of which had been kept longer than overnight following collection from their natural habitat. The normal period between collection and extraction was 4–5 h. The molluscs were extracted in water by homogenization in a Potter-Elvehjem glass homogenizer. The small molluscs, *Tricolia pullus*, *Rissoa costulata*, *Bittium reticulatum* and *Cantharidus exasperatus* were homogenized in their shells. After homogenization by hand at room temperature for 15 min, insoluble materials were removed by centrifuging in an MSE bench centrifuge. The supernatant, of which the pH was in every case between 7 and 7.4, was decanted and used as the enzyme extract. Apart from *Conus betulinus* and *Aplysia ocellata*, of which single specimens were extracted, at least 5 specimens were used for each result. In the case of the very small molluscs, 50–100 specimens were used.

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Relative activities of digestive enzymes in marine molluscs of Lanzarote

Mollusc	α-Am.[a]	Cell.[b]	Lam.[c]	A.P.[d]	A.E.[e]
Bittium reticulatum	+	?	–	–	
Cantharidus exasperatus	+	+	?	–	
Cerithium vulgatum	+++		–	+++	++
Conus betulinus	+	++	?	++	–
Conus mediterraneus	–	++	++	++++	
Haliotis tuberculata	+++	+++	++++	++	–
Littorina striata	++	+++	++	?	–
Monodonta turbinata	+	++	++	?	–
Pusia tricolor	++	+	–	+	–
Rissoa costulata	++	++	++	–	–
Thais haemastoma	++	–	++	+++	–
Tricolia pullus	+++	++	+	+	–
Turbo rugosum	++++	++++	+	++	?
Chiton canariensis	++	+++	++	++	
Arca lactea	++	+	–		
Pinna rudis	+++		++	++	–
Aplysia ocellata	+++	+	?	+	
Polycera webbii	+		–	++	–

+, Trace activity; ++, moderate activity; +++, high activity; ++++, very high activity; –, no activity; ?, slight activity within margin of error.

Value of symbols above

Symbol	α-AM.[a]	Cell.[b]	Lam.[c]	A.P.[d] + A.E.[e]
+	0–5	0–0.5	0–0.05	0–0.5
++	5–15	0.5–2.0	0.05–0.20	0.5–1.0
+++	15–25	2.0–4.0	0.20–0.40	1.0–1.5
++++	Above 25	Above 4.0	Above 0.40	Above 1.5

[a] α-Amylase (IDC units/g fresh weight). [b] Carboxymethyl cellulase (Δ ε sp/g fresh weight). [c] Laminarinase (OD Units/g fresh weight). [d] Acid Phosphatase (OD units/g fresh weight). [e] Acid Esterase (OD units/g fresh weight).

All enzyme assays were carried out at 26 °C α-amylase[3], laminarinase[4], acid phosphatase[5] and acid esterase[5] were assayed by standard techniques. Cellulase activity was determined by a simplified viscometric technique. To 4 ml of 0.16% carboxymethyl cellulose was added 2 ml of enzyme extract, diluted with water where necessary. After shaking, 5 ml of the mixture was transferred to a U-tube viscometer and the viscosity measured at 10 min intervals. The rate of fall in specific viscosity gives a measure of the enzyme activity.

From the results (Table) it can be seen that all species studied except *Conus mediterraneus* have α-amylase activity. Cellulase too is present in all species with one exception, *Thais haemastoma*. This may be a reflection of the carnivorous habit of this particular species. Laminarinase is not nearly so widespread but it is at present impossible to place any satisfactory interpretation on its distribution. The same applies to acid phosphatase. The presence of acid esterase in *Cerithium vulgatum* in quantity appears to be unique. Again it is difficult to correlate this with its feeding habit but it may be a fact of some taxonomic interest[6].

Résumé. Les quantités de α-amylase, laminarinase, cellulase, acide phosphatase et acide esterase ont été estimées par l'examen des extraits de dix-huit expèces de mollusques marins récoltés dans l'île canarienne de Lanzarote.

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Deamination by 'Transformed' Mitochondrial Amine Oxidase of the ε-Amino Group of Lysine and Selective Inhibition of this Reaction by β-Aminopropionitrile

Although the significance for desmosine and isodesmosine biosynthesis of deamination of the ε-amino group of lysine is well recognized[1] enzymes catalyzing this reaction in animal tissues are still unknown[2]. There are no data on deamination of lysine by pig plasma amine oxidase[3]; a closely related enzyme – beef plasma amine oxidase – does not catalyse any measurable oxidation of lysine[4].

A phenomenon operationally defined as 'transformation' of mitochondrial monoamine oxidase into an enzyme resembling diamine oxidases (including those of plant origin which do oxidize lysine[5]) is observed in vitro in liver mitochondria treated under certain conditions by oxidized oleic acid[6,7] and is also possible in vivo[8].

If a hypothesis[7] on participation in cross-link formation and in pathogenesis of experimental lathyrism of the 'transformed' mitochondrial amine oxidase deserves further consideration, one would expect that the enzyme will deaminate ε-amino group of lysine and that this reaction will be inhibited selectively by low concentrations of a potent lathyrogen-β-aminopropionitrile[9].

Methods used for isolation of rat and beef liver mitochondria, preparation of 'transformed' mitochondrial amine oxidase, assay of amine oxidase activity were described previously[6,7,10].

The data presented in Table I suggest that while L-lysine and its derivatives possessing substituted α-amino group are readily deaminated by 'transformed' mitochondrial amine oxidase (with rates comparable to those found in experiments with other ω-amino acids or amines), substitution of ε-amino group of L-lysine prevents its