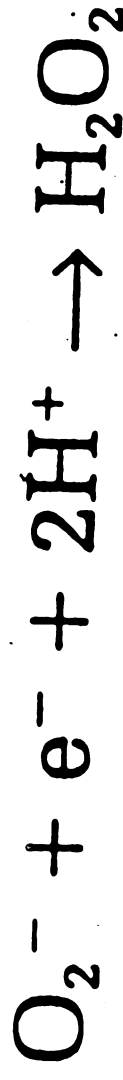
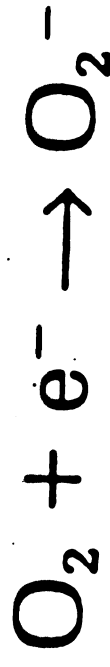


Table 9-5 Electronic States of Oxygen

Form	Formula	Simplified Electronic Structure	Spin of Outer Electrons	
Triplet oxygen (normal atmospheric form)	$^3\text{O}_2$	$\dot{\text{O}}-\dot{\text{O}}$	\uparrow	\uparrow
Singlet oxygen	$^1\text{O}_2$	$\dot{\text{O}}-\dot{\text{O}}$	$\downarrow\uparrow$	\circ
Superoxide free radical	O_2^-	$\ddot{\text{O}}-\dot{\text{O}}$	$\downarrow\uparrow$	\uparrow
Peroxide	O_2^{2-}	$\ddot{\text{O}}-\ddot{\text{O}}$	$\downarrow\uparrow$	$\downarrow\uparrow$

Table 9-6 Bacterial Enzymes that Protect the Cell Against Toxic Forms of Oxygen

Microorganism	Catalase	Superoxide Dismutase
Aerobe	+	+
Facultative anaerobe	+	+
Microaerophile	-	+
Obligate anaerobe	-	-



catalase



peroxidase



superoxide dismutase

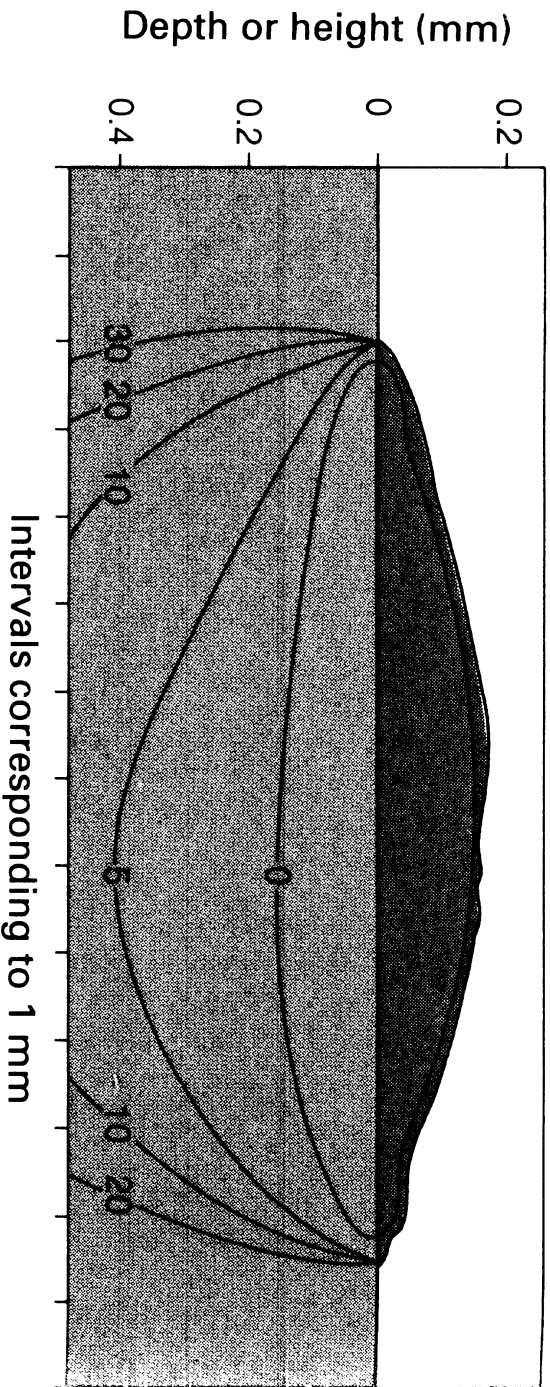


Fig. 6.3. *Oxygen distribution under and inside a colony of Escherichia coli after growth on complex agar.*

Partial pressures of oxygen after three days' incubation at 30 °C were determined by means of an oxygen microelectrode. Values are expressed

as percentage of the partial pressures obtained in air-saturated agar.