sequence of alteration zones viz. sericite-biotite-chlorite schist ± carbonates (ankerite + calcite) at the immediate contacts of the gold-quartz veins followed by biotite-chlorite schist, chlorite-biotite schist, tremolite-chlorite schist. The dominant sulphide phase is pyrrhotite-pyrite assemblage with little amount of arsenopyrite, chalcopyrite and sphalerite. Gold occurs only in the native state. Occasionally, it occurs in spectacular visible form.

Chemical changes of major elements in the alteration zones of gold-quartz-sulphide reefs of Mangalur are characteristically marked by appreciable gain of K_2O (3.65%) and volatile contents (LOI = 10.12%), and loss of Na_2O (0.28%) and SiO_2 (34.48%) towards the gold-quartz veins as compared to their regional background values in the least altered amphibolites of Mangalur greenstone belt (K_2O = 0.33%, LOI = 2.38%, Na_2O = 2.54% and SiO_2 = 51.05%[2]). Many of the trace elements like Ag, As, Mn, Cu, Zr, Sb, Co, Ni, Pb, V and Y show gradual enrichment towards the gold-quartz veins of the reefs. Reefs analyse higher concentrations of elements like Ti (480 ppm), Ni (32 ppm), Cu (44 ppm), Mo (10 ppm), Zn (38 ppm), Cr (120 ppm), Ba (40 ppm) and Rb (47 ppm). The presence of such trace elements and relic host amphiboles in quartz veins reveals the important role 'metasomatic processes' played in the formation of these gold-quartz veins.

Mineralogical and geochemical features of gold-quartz-sulphide reefs of Mangalur deposit have shown that the gold and other gangue elements initially present in the basic volcanic rocks were mobilized by metamorphically derived hydrothermal solutions and concentrated in suitable tectonic structures and chemical traps during metamorphic overprinting to form the gold-quartz-sulphide reefs.

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EFFECT OF INCREASING CO_2 CONCENTRATION ON PHOTOSYNTHESIS AND PHOTORESPIRATION IN WHEAT LEAF

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Growth rates of plants under laboratory conditions can be accelerated by enriching the air with CO_2. This increase in the growth rate is mainly due to the increase in the rate of CO_2 fixation. It has been reported[1] that in some plants, having C_3 carbon metabolism, the rate of photosynthesis is doubled by doubling the level of atmospheric CO_2. By increasing the CO_2 level photorespiration becomes insignificant and thereby photosynthesis increases to a maximum[2]. The present investigation reports the level of enhancement in photosynthesis and the changes in the products of photorespiration due to the CO_2 enrichment on wheat leaf.

Wheat plants (winter wheat cv. Augusta) were grown in a growth cabinet under 1000 $\mu E\ m^{-2}\ sec^{-1}$ at 20°C. When the plants were 20-day-old, the third fully expanded leaf was excised and dipped into water before placing in a photosynthetic chamber (112 ml capacity). The leaf was then exposed to light (800 $\mu E\ m^{-2}sec^{-1}$) from one side and to an atmosphere of air with different CO_2 concentrations. The concentrations of 100, 340, 600, 1000, 3,400 and 10,000 ppm were employed in the present work. The desired level of CO_2 was generated in a 5 gallon reservoir by acidifying a known amount of $CaCO_3$. The enriched air from the reservoir was supplied to the photosynthetic chamber by displacing the air. The leaf was initially preincubated with the desired level of CO_2 for 30 min by flushing it with 0.5 l/min of the gas from the reservoir[3]. After this photosynthetic pretreatment, the leaf was exposed to $^{14}CO_2$ by releasing it from $Ba^{14}CO_3$ from the side arm of the chamber. The added $^{14}CO_2$ did not significantly change the total CO_2 concentration. After 5 min of incubation, the leaf was killed by boiling it in 80% (v/v) ethanol for 10 min, reextracted in boiling water. The radioactivity of the combined extract was counted in a liquid scintillation counter. An aliquot of the extract was run for two-dimensional paper chromatography and the labelled products were identified using a co-chromatograph[3]. The radioactivity was counted after eluting the spots by boiling ethanol.

Photosynthetic activity of wheat leaf increased rapidly with increase in CO_2 concentration from 100 to 600 ppm (table 1). With further increase in the level of CO_2, the increase in the rate of photosynthesis was marginal till 3,400 ppm. At 10,000 ppm the rate of photosynthesis started declining. In other C_3 plants also it has been shown that net photosynthesis increases at higher CO_2 level under green house[4]. In wheat leaves photosynthetic rate was doubled when CO_2 concentration was increased from 100 ppm to ambient 340 ppm and from 340 ppm to 600 ppm. Although the decline in photosynthesis occurred at a much higher level, the rate was still higher than that at 340 ppm. This suggests that if the CO_2 level becomes higher than ambient level, the photosynthetic rate of wheat would increase up to 3,400 ppm.

Increasing the level of CO_2 also caused considerable changes in the products of photosynthesis and photorespiration (table 1). At 100 ppm no starch was labelled by the added $^{14}CO_2$. But as the level of CO_2 increased, the content of starch increased reaching a maximum at 10,000 ppm. On the other hand, glycine-serine content showed a gradual decline. At 10,000 ppm the production of glycine-serine was almost untraceable. It is interesting to note that while starch content increased due to increase in CO_2 level, the levels of both sucrose and sugar phosphates remained almost unchanged even after much higher level of CO_2. Thus it appears that additional reduced carbon provided by CO_2 enrichment was stored in the starch and not available for transport as sucrose. The triose-phosphate produced under high CO_2 was diverted towards starch production.

The present study also showed that as photosynthetic incorporation of CO_2 increased due to increase in CO_2 level, the production of glycine-serine declined indicating reduction in photorespiration. However, it may be noted that some amount of photorespiration still occurred at 3,400 ppm. Thus it appears that photorespiration could not be eliminated completely even if the concentration of CO_2 increases beyond the ambient level.

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Table 1 *Photosynthetic rate and percentage distribution of labelled products in wheat leaves after feeding with $^{14}CO_2$ under different levels of CO_2*

	CO_2 level (ppm)					
	100	340	600	1,000	3,400	10,000
Photosynthetic rate (dpm 10^4/dm^2/min)	28	62	123	135	152	140
Labelled products						
Sucrose	59.2	54.9	51.2	53.3	53.3	55.3
Glycine-serine	5.90	6.74	6.06	5.00	2.08	-
Starch	-	1.59	1.89	1.92	2.10	4.83
Sugar phosphate	30.0	34.0	36.5	37.1	36.1	36.3

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TWO INTERESTING LICHEN TAXA NEW TO INDIA

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DURING the course of investigations on Indian lichens the following two taxa of lichens have been found to be new reports from India, exhibiting interesting distribution.

1. *Pyrgillocarpon indicum* (Krempelh.) Nadv. Stud. Bot. Cech. 5:125(1942).–*Tylophoron indicum* Krempelh., Nuov Giorn. Bot. Ital. 7:11(1875), tab. 1, fig. 28. Type collection: Borneo, Sarawak, 1866, O. Beccari 16 (holotype: M!)

The taxon had been known so far from the type collection from Borneo, though the specific epithet used by Krempelhuber was '*indicum*'. The taxon is characterized by a corticolous, cartilaginous, crustose, ± smooth to rimulose yellowish thallus with verrucial, subglobose to irregularly oblong apothecia to about 1(2) mm tall, and 1.5 mm in diameter, expanded and thicker at base and somewhat narrow-