Enzymatic Reduction of S-Sulfoglutathione in Rat Liver

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Since the discovery of S-sulfoglutathione ($GSSO_3H$) in calf lens [1] little work on its biochemistry has been reported. Its presence in rat intestine has been demonstrated,[2] and an enzyme catalyzing its reduction by NADPH has been purified from pea tissues.[3] This communication describes the enzymatic reduction of $GSSO_3H$ by rat liver homogenates.

Table 1. Reduction of S-sulfoglutathione by rat liver homogenates.

The reaction mixture contained in a final volume of 2 ml: 0.5 ml of a 20 % rat liver homogenate in 0.14 M KCl; phosphate buffer 50 mM, pH 7.5; $GSSO_3H$ 2.9 mM; and (where indicated) 2.3 mM NADPH. After incubation at 30° for 60 min, the reaction was stopped by the addition of 1 ml of 10 % metaphosphoric acid. An aliquot of the centrifuged sample was passed through a Dowex 50 (H^+) column and reduced by an electrolytical procedure.[4] After bubbling with nitrogen for 15 min, the formed GSH (equivalent to the $GSSO_3H$ in the sample) was determined with 5,5′-dithiobis-(2-nitrobenzoate).[5] Boiling completely abolished the activity.

Experiment	Remaining $GSSO_3H$ (mM)
1.	2.6
2. (not incubated)	2.5
3. (*plus* NADPH)	0.6
4. (*minus* $GSSO_3H$)	0.04

The assay used was based on the determination of the $GSSO_3H$ consumption in the system. This was accomplished by removing formed GSH from the reaction mixture by ion-exchange chromatography, followed by reduction of the remaining $GSSO_3H$ to GSH, which was then determined. This procedure would not generally differentiate between an oxidative degradation (to give, *e.g.*, the sulfonic acid, GSO_3H) and the proposed reduction of $GSSO_3H$. However, it has been demonstrated that $GSSO_3H$ consumption is paralleled by a concomitant formation of GSH (to be published).

Since glutathione reductase from yeast or porcine erythrocytes does not catalyze the reduction of $GSSO_3H$ (B. Eriksson, unpublished experiments), it is probable that the reductive destruction of $GSSO_3H$ shown in Table 1 is due to an enzymatic activity distinct from glutathione reductase.

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Preparation of Sodium Polysulfides by Solid and Molten State Reactions

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In connection with the recent interest in kraft pulping in the presence of sodium polysulfides, a number of different methods for the preparation of polysulfides have been considered. These are: dissolution of elemental sulfur in aqueous sodium sulfide,[1] oxidation of aqueous sodium sulfide either electrolytically,[2] or with air in the presence of alkaline lignin degradation products.[3] The possibility of making polysulfides by processing at elevated temperatures the sodium-sulfur compounds available in the recovery system of a kraft pulp mill (Na_2SO_4, Na_2S, $Na_2S_2O_3$) has not previously been considered. It is, however, known that polysulfides can be obtained