

Effect of butylated hydroxyanisole on electron transport in rat liver mitochondria

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The effects of butylated hydroxyanisole (BHA), a commonly used food antioxidant, on oxygen consumption, ATPase activity, and the redox state of some electron carriers of rat liver mitochondria have been studied. It was observed that BHA slightly stimulated state 4 respiration but strongly inhibited ADP- and uncoupler-stimulated respiration on NAD⁺- and FAD-linked substrates. ATPase activity and vectorial H⁺ ejection were affected only slightly by BHA, suggesting that BHA predominantly inhibits mitochondrial electron flow. Experiments to determine its site of action showed that BHA did not noticeably affect electron flow through cytochrome oxidase; in contrast, NADH:ubiquinone reductase activity and electron flow through ubiquinone-cytochrome b-cytochrome c complex were inhibited strongly because the oxidation of ubiquinol was affected markedly. The BHA block of electron transport was bypassed by both N,N,N',N'-tetramethyl-p-phenylenediamine and 2,6-dichlorophenolindophenol. Also, the