We study the phenomenological limits on inflationary models due to possible vector field production during inflation. In the first part of the talk we show that an axion inflaton with a decay constant of the order of $10^{16}$ GeV gives rise to a large non-gaussianity of the primordial perturbations, to observable chiral gravity waves at interferometers, and to a large amount of primordial black holes. In the second part of the talk we discuss a different model (first studied by Ratra in the context of magnetogenesis), characterized by a dilation-like kinetic coupling between the inflaton and a vector field. This model results in non-gaussianity and broken statistical isotropy of the primordial perturbations at a level which typically exceeds the observational bounds.