Seaweed as a resilient food solution in nuclear winter

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Abrupt sunlight reduction scenarios such as a nuclear winter, an asteroid impact or an eruption of a supervolcano would decimate agriculture as it is practised today. We therefore need resilient food sources for such an event. One promising candidate is seaweed, as it can grow quickly in a wide range of environmental conditions. To explore the feasibility of seaweed in a nuclear winter, we simulate the growth of seaweed on a global scale using an empirical model based on \textit{Gracilaria tikvahiae} forced by nuclear winter climate simulations. We assess how quickly global seaweed production could be scaled to provide a significant fraction of global food demand. We find seaweed can be grown in tropical oceans, even in nuclear winter. The simulated growth is high enough to allow a scale up to an equivalent of 70 \% of the global human caloric demand, while only using a small fraction of the global ocean area. The results also show that the growth of seaweed increases with the severity of the nuclear war, as more nutrients become available due to upwelling. This means that seaweed has the potential to be a viable resilient food source for abrupt sunlight reduction scenarios.