Practical methods to measure the potency of new influenza vaccines are needed as alternatives for the standard single radial immunodiffusion (SRID) assay. VaxArray assays for influenza hemagglutinin (HA) and neuraminidase (NA) have been developed to address this need. In this report, we evaluate the use of these assays to assess the potency of HA and NA of an A/H3N2 subunit vaccine by determining the correlation between the amounts measured by VaxArray and the immunogenicity in mice. The antibody response after one and two doses of five formulations of the vaccine ranging from 5 µg/mL to 80 µg/mL of HA, was measured by hemagglutination inhibition (HAI) and neuraminidase inhibition (NAI) assays. For hemagglutinin, vaccine potency determined by VaxArray was equivalent to potency measured SRID and these amounts were predictive of immunogenicity, with excellent correlation between potency measured by VaxArray and the HAI geometric mean titers (GMT). Likewise, the amount of NA measured by VaxArray was predictive of the NAI GMT. The VaxArray NA assay reported non-detectable levels of intact NA for a sample that had been heat degraded at 56°C for 20 hours, demonstrating that the assay only measures the native, active form of NA. Similarly, the HA potency measured by VaxArray in this heat-treated sample was very low when a monoclonal antibody was used to detect the amount of antigen bound. Importantly, the force degraded sample induced low HAI titers and the NAI titers were not measurable, supporting the conclusion that the VaxArray HA and NA assays measure the immunogenic forms of these A/H3N2 antigens. The VaxArray platform can therefore be used to assess the potency of HA and NA components of subunit A/H3N2 vaccines.