Brines generated during the last marination step in the production of marinated herring (Clupea harengus) were chemically characterized and analyzed for antioxidant and enzyme activities. The end-products were vinegar cured, spice cured and traditional barrel-salted herring with either salt or spices. The chemical characterization encompassed pH, dry matter, ash, salt, fatty acids, protein, polypeptide pattern, iron and nitrogen. The antioxidant activity was tested with three assays measuring: iron chelation, reducing power and radical scavenging activity. The enzymatic activity for peroxidase and protease were also tested. Results revealed that the brine can contain up to 56.7 mg protein/mL, up to 20.1 mg fatty acid/mL, good antioxidant activity, high amounts of the antioxidative amino acids lysine, alanine, and glycine, and high enzymatic activity. The potential of using the protein-rich fraction with biological activity from brines from the marinated herring production was demonstrated in this work.