This study investigated the effects of fermentation and germination on the physicochemical, nutritional, functional, and bioactive quality attributes of samh seeds.Fermentation and germination increased lightness and yellowness (L*, b*), foaming capacity, oil absorption capacity (OAC), water absorption capacity (WAC), swelling power, microbial counts, antioxidant activity, total flavonoid content (TFC), total phenolic content (TPC), in vitro protein digestibility, protein efficiency ratio, and total essential amino acids and reduced water solubility, emulsion stability, tannin, and phytate contents compared to raw samh seeds (p0.05).Germination increased the redness (a*), moisture content, essential and non-essential amino acids, potassium, zinc, phosphorous, stearic acid, and oleic and unsaturated fatty acids and reduced total solids, fat content, iron, zinc, calcium, magnesium, sodium, palmitic acid, and total saturated fatty acids of the samh seeds compared to the raw ones.Fermentation increased the total solid, acidity, fat, protein, calcium, magnesium, sodium, phosphorous, iron, zinc, palmitic acid, and total saturated fatty acids and reduced the a* value, moisture, non-essential amino acids, and total unsaturated fatty acids of the samh seeds compared to the raw ones.Regardless of the processing treatment, samh seeds were found to be a rich source of phenolic compounds, namely gallic acid (79.6–96.36 mg/100 g dry weight (DW), catechol (56.34–77.34 mg/100 g DW), and catechin (49.15–84.93 mg/100 g DW), and they possessed high DPPH (2,2-Diphenyl-1-picrylhydrazyl) antiradical activity (65.27–78.39%).The reported information facilitates strategies towards the application of these .underutilized seeds in foods