**Highlights**

Anticancer compounds in *Hizikia fusiformis* have not been identified

Saringosterol acetate (SA) were successfully isolated from *H. fusiformis* extract by CPC.

SA induced apoptosis related proteins and sub-G1 phase cell cycle arrest in A549 cell.

SA induces A549 cell apoptosis via a Bid- and caspase-8-dependent pathway