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Study on Antitumor, Antioxidant and Immunoregulatory activities of the Purified Polyphenols from Pinecone of *Pinus koraiensis* on Tumor-bearing S180 mice *in vivo*

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Highlights

- An efficient purification method of polyphenols of *Pinus koraiensis* pinecone is developed.
- *In vivo* antitumor activities of the PPP-40 against xenograft Sarcoma 180 tumor cells were evaluated firstly.
- The mechanism of the antitumor activities of the PPP-40 were investigated by TUNEL technique and immunohistochemical method for apoptosis-related proteins Bcl-2, Bax and Caspase-3.
- Pinecone polyphenols are bioactive dietary constituents that enhance health and help prevent and treat cancer through improving antioxidant and immunomodulatory activities.
- *Pinus koraiensis* pinecone was proved to be a potential antitumor resource of polyphenols.

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