

# *Euphorbia* *peplus*

## Petty Spurge, Radium Weed

Petty Spurge, or *Euphorbia peplus*, is a rather nondescript garden weed, common in gardens throughout Australia. However, for many older Australians, its white milky sap was well-known as a *grandmother's remedy* for numerous skin blemishes, including warts, corns, sun spots and ulcers, but now, thanks to a very determined Australian chemist, backed up by CSIRO, a key component has been sussed out, patented, approved and commercialised for some skin cancer treatments.

So, what is it, and where does it come from? Petty Spurge is an annual plant, native to Europe, north Africa and western Asia, where it characteristically grows disturbed areas of gardens and farmlands, actually in much the same habitats that it invades elsewhere in the world, including Australia. The flowers are quite unremarkable, and easily overlooked as they lack the colourful bracts (modified leaves) of many other species of *Euphorbia*.



*Euphorbia peplus* flowers Photo: Rasbak / CC BY-SA (<https://creativecommons.org/licenses/by-sa/3.0>)

The story of the man and the research behind the end product is quite remarkable. Australian biochemist Dr Jim Aylward relates that in 1976, his mother cut out an article from the *Melbourne Sun*: “Plant sap ‘cures’ man’s skin cancer” and badgered him to investigate the weed growing in her garden that she used as a home remedy for sunspots. In 1997, he began studies



Dr Jim Aylward - Photo: couriermail.com.au

of *Euphorbia peplus* but in 1998 he was made redundant from his position at CSIRO. At that time he was 50 years of age, with a mortgage, so no wonder this research became of particular economic importance to him. He soon discovered it was toxic to rapidly replicating human tissue and was able to demonstrate that the sap had a significant effect on melanoma cells grown in vitro.

He lodged a provisional patent application but then the pressure was on to find the active ingredient within 12 months to meet the requirements of the patent application. By day, he worked in CSIRO laboratories, separating the chemicals in the sap, and at night at the Queensland Institute of Medical Research, testing the separated chemicals for anti-melanoma activity. CSIRO were not interested in his work, but he was allowed use of their laboratories for 6 months, on condition that he *buy his own chemicals* and *not touch the phones!* It was tough, and initially, he used his own redundancy money and worked with an investment partner to fund his research.

Finally, Dr Aylward was successful in the extraction and purification of the active ingredients found in the sap, including *acetyl ingenol angelate*, and was able to claim the patent for a family of ingenol angelates including *ingenol mebutate*.

Since then, clinical trials of ingenol mebutate gel derived from Petty Spurge sap have been shown to be effective in the treatment of actinic keratosis and non-melanoma skin cancer. The gel, marketed as *Picato*, has been developed as a short-course topical therapy for these skin cancers. In 2012, *Picato* was approved by the US FDA and the European Commission, and in 2013 by the Australian Therapeutic Goods Administration.

However, this is not a treatment to be tried at home. Most gardeners will have experienced the pain and burning sensation if the sap accidentally gets into an eye, and skin contact with the sap can cause pain and blistering. It isn't possible to manage a home remedy dosage either, as the concentration of active ingredient in the sap differs from plant to plant.

**How it works:** *Ingenol mebutate* causes primary necrosis (death) of the mitochondria of cancer cells, causing the mitochondria to swell and burst. *Ingenol mebutate* also activates a protein responsible for inflammatory responses leading to an increase in the number of neutrophils (a type of white blood cells and an essential part of the immune system), which kill cancerous cells.





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Wikipedia: [https://en.wikipedia.org/wiki/Euphorbia\\_peplus](https://en.wikipedia.org/wiki/Euphorbia_peplus)



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