

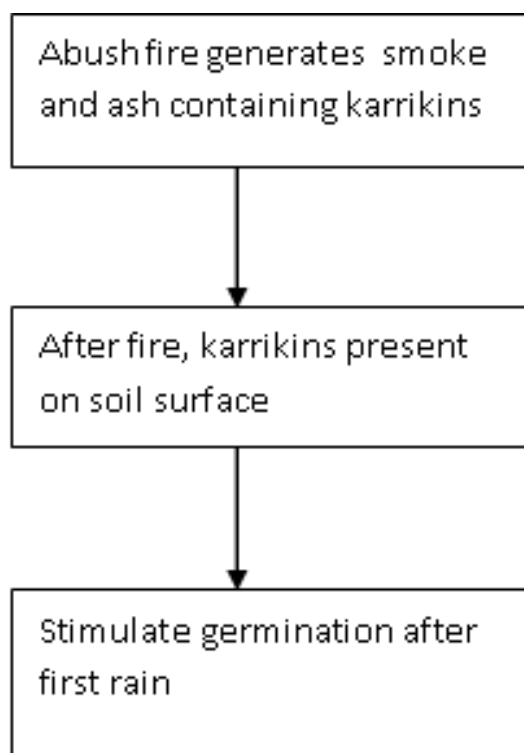
# Karrikins-The Life Regenerator

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Karrikins is a chemically defined family of plant growth regulators found in smoke of burning plant material. They are remarkable because they can stimulate the seeds of many plant species to germinate. Some plants will grow immediately after bushfires or wildfires because their seeds remain dormant in the soil until a fire generates Karrikins that will bind to soil particles. Then, once the karrikins are washed into the soil by rainfall, they stimulate the seeds to germinate. Karrikins was identified (KAR1: 3-methyl- 2H-furo [2, 3-c] pyran-2- one) in smoke. Karrikins is derived from the word 'karik'- the term used for smoke in 'Noongar Aboriginals' language of South-west Australia. KAR 1 was first compound as the potent germination stimulant present in plant derived smoke.



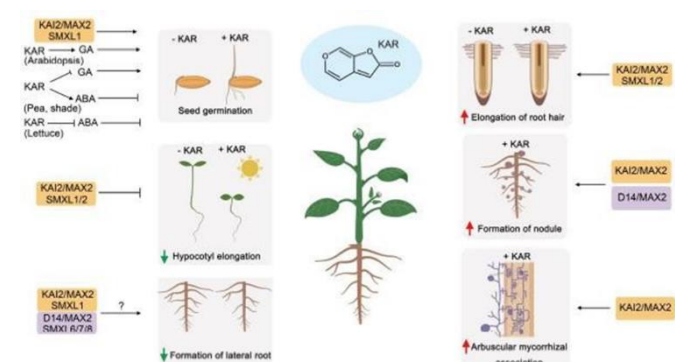
**Fig 1: Role of karrikins in revegetation after a fire**

Exposure to smoke made from plants has a favorable and stimulating effect on the morphological, physiological, and biochemical characteristics of plants. In contrast to prolonged PDS exposure, short-term plant-derived smoke exposure is more suitable and exhibits a significant effect. By accelerating ABA biosynthesis and inhibiting GA biogenesis, KARs



postponed soybean seed germination. Surprisingly, KARs only prevented soybean seed germination when it was shaded, not in white light or in the dark. The characteristics of karrikins include inhibiting hypocotyl elongation, promoting cotyledon expansion and chlorophyll accumulation, enhancing seedling survival, vigour and photomorphogenesis.

It imitates strigolactones, another type of plant hormone and it also interacts with other phytohormones. While GA is necessary for KAR to increase seed germination, ABA has a detrimental effect on KAR activity. IAA response genes' expression is suppressed by KARs. It is crucial for maintaining seed dormancy in abiotic stresses, preventing germination when under abiotic stress, and promoting germination when the environment is favorable.



**Fig 2: Role of KAR in plant development**

Karrikins is emerging as a ubiquitous, multifaceted feature of plant development hence a lot of discovery is required in this hormone. Genomic approaches are the next step forward to uncovering

the mode of action. The discovery of Karrikins establishes an exciting nexus between fire ecology, plant evolution and molecular plant physiology.

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