

Prophylactic *Sargassum duplicatum* inhibit joint damage in adjuvant arthritic rats exposed to cold stress through inhibition of NF- κ B activation

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Abstract: Activation of NF- κ B play important roles in inflammatory process of rheumatoid arthritis (RA). Cold stress cause increased body heat production by thermogenesis achieved by accelerating uncoupling oxidative phosphorylation. We aimed to investigate whether *Sargassum duplicatum* was able to reduce the extent of joint damage through inhibition of NF- κ B activation in adjuvant arthritis an animal model of RA.

Male adjuvant arthritic rats (age=10-12 wk; n=10/group) were exposed to cold stress (5°C for 15 min/day for 7 days) with/without *Sargassum duplicatum* extract (400 mg/kg BW/day po) given from 7 days prior to cold stress until the end of the experiment. The control group did not receive either cold exposure or *Sargassum duplicatum*. At the end of the experiment plasma malondialdehyde (MDA) level as biomarker of oxidative stress was measured using spectrophotometry method, joint NF- κ B level was measured by counting NF- κ B positive cells in immunohistochemistry and the severity of joint damage was measured by the histopathological scoring system.

The results showed that cold stress significantly increased plasma MDA level (4.2666±0.1940 μ M vs. 2.9297±0.1499 μ M; p≤0.05; p≤0.005), increased joint NF- κ B level (58.8±10.871 vs. 43.5±6.223; p≤0.001), and increased joint histopathological score (median: 4vs3; p≤0.001). *Sargassum duplicatum* extract administration in cold stress treated group significantly decreased plasma MDA level (2.2569±0.0792 μ M vs. 4.2666±0.1940 μ M; p≤0.001), joint NF- κ B positive cells (24.3±4.832 vs. 58.8±10.871; p≤0.001) and joint histopathological score (median: 3vs4; p≤0.001).

Conclusion: Prophylactic *Sargassum duplicatum* extract significantly reduced joint damage through inhibition of NF- κ B expression and reduction of oxidative stress in adjuvant arthritic rats exposed to cold stress.

Key words: *Sargassum duplicatum*, adjuvant arthritis, MDA, NF- κ B, cold stress.