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A Comparison of *Fumaria parviflora* Lam. and *Momordica balsamina* Linn. Hepatoprotection

Mehmet Ozaslan

Department of Biology, Gaziantep University, Gaziantep, Turkey

Plants are important part of traditional medicine and are widely used to treat various humans and animals health problems (Sohail *et al.*, 2011; Karim *et al.*, 2011). The extracts of whole plant, roots, leaves, inflorescence, fruits, seeds, stems etc. are used for this purpose (Rahmatullah *et al.*, 2010). Their remedial uses often include skin and stomach protection, while they are also used to treat diabetes, jaundice, constipation, diarrhea, insects and snake bites etc. These plants are constituted by curative agents, which provide protection to body by inducing healthy effects on immune and other cells (Siriwan *et al.*, 2011). As sesquiterpene lactones of yacon leaves showed the chemoprotective effects on Raji cells and inhibit tumor formation. Moreover, these plants have plenty of antioxidants (flavonoids and phenols), which provide considerable protection from oxidative stress as compared to synthetic antioxidant drugs (Pourmorad *et al.*, 2006). The oxidative stress is vigorously induced by various toxic or health degrading agents. For example carbon tetrachloride (CCl₄) causes liver damage by oxidation of lipids and proteins (Aranda *et al.*, 2010). Moreover, it also causes protein carbonylation, membranes rigidity and death of various liver cells, thus liver is strongly affected by the CCl₄ caused oxidative stress. This hepatotoxicity also results in increased levels of various liver enzymes like Serum Glutamate Oxaloacetate Transaminase (SGOT), Alkaline phosphatase (ALP) etc. (Prakash *et al.*, 2008). But this elevation can be reduced by the use of plants e.g., *Embllica officinalis* and *Zingiber officinale* in combination with some other plants can reduced rat's liver toxicities. Thus plants can help in protecting liver from non-healthy elevation of oxidative products and enzymes.

Momordica balsamina is an important medicinal plant, which is native to many countries and is important source of nutrients (Thakur *et al.*, 2009). Its medicinal importance is due to its flavonoids, alkaloids, steroids, terpenes etc., which gave it antioxidant, anti-inflammatory, hypoglycemic, antiviral and various other properties. Thus, these remedial properties may enable it to treat liver disorders. Another plant from folk medicines *Fumaria parviflora* also has antioxidant activity and nowadays

studied as hepatoprotective agent (Tripathi *et al.*, 2011). Thus both these plants showed potential to treat liver disorders and Alqasoumi *et al.* (2009) analyzed their hepatoprotective role against CCl₄ induced oxidative stress in Wistar albino rats. According to them liver exposures to CCl₄ caused a significant increase in liver's abnormal fats deposition, inflammation, necrosis and irregular shape of hepatocytes. But rats treated with ethanolic extracts of both plants (*F. parviflora* and *M. balsamina*) showed significant recovery from these malformations, relatively at higher concentrations. As animals treated with 500 mg kg⁻¹ of *F. parviflora* aerial parts extracts showed only minor signs of inflammation than its lower dose (250 mg kg⁻¹). On the other hand 500 mg kg⁻¹ of *M. balsamina* leaves extracts was more efficient in maintaining these anatomical parameters. As liver necrosis, fats deposition, abnormal cell shape etc. was significantly disappeared in *M. balsamina* treated animals. Other than anatomical variations CCl₄ exposures caused a significant increase in enzymes; SGOT, Serum Glutamate Pyruvate Transaminase (SGPT), ALP and total bilirubin levels. These levels were also maintained by applying plants extracts, more significant results were produced by 500 mg kg⁻¹ *M. balsamina* extracts. As it caused 37.5, 39.1, 23.2 and 52.7% decrease in SGOT, SGPT, ALP and bilirubin levels, respectively. These suppressions were notably higher than 24.3, 21.6, 20.5 and 11.3% decrease caused by *F. parviflora* 500 mg kg⁻¹ in SGOT, SGPT, ALP and bilirubin levels, respectively. Moreover, *M. balsamina* low dose (250 mg kg⁻¹) was also effective in decreasing these elevated levels more efficiently than *F. parviflora* 250 mg kg⁻¹. As, 250 mg kg⁻¹ of *M. balsamina* lowered the levels of all studied parameters, while *F. parviflora* 250 mg kg⁻¹ did not decreased the bilirubin level. Thus, at lower concentrations *F. parviflora* was unable to inhibit CCl₄ induced hepatotoxicity and in order to get significant results its high dosage is required. Whereas, *M. balsamina* was effective at lower concentrations but its higher concentrations gave more appreciable results. Hence, both the plants showed hepatoprotective activity in concentration dependant manner and their efficiencies increased with an increasing extracts concentration.

From centuries plants played a great role in protecting human lives from several diseases. Due to their phytochemical composition they are able to play number of health benefiting roles e.g. hepatoprotection. Alqasoumi *et al.* (2009) studied two plants *F. parviflora* and *M. balsamina* of folk medicinal importance against CCl₄ induced liver toxicities. Both the plants brought anatomical and physiological improvements in rat's liver and they found *M. balsamina* more effective in this regard. But there is need of more scientific studies on *M. balsamina* hepatoprotective and phytochemical role, which will help in its useful and cost effective application.

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