SUMMARY
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*Withania somnifera* contains many biologically active components but the withanolides are the major active constituent. In the present study withanolides fraction (W-1) was isolated from the leaves of *W. somnifera* and purified by chromatography and crystallisation. The identity of the withanolide fraction was confirmed by physical, chemical and spectroscopic studies and purity by spectrophotometric analysis.

Total alcoholic extract (WS) and the withanolide fraction (W-1) isolated from *W. somnifera* have been assessed pharmacologically, particularly for their effects on haemopoietic system, central nervous system, cardiovascular system, reproductive system, for anti-inflammatory, hepatoprotective, antioxidant, wound healing activity and toxicity. A brief account of the effects observed is as under:

1. WS (1gm/kg) and W-1 (50mg/kg) produced a positive response on haemopoietic system. Both WS and W-1 produced an increase in RBC count and haemoglobin levels. On the bone marrow both produced hypercellularity, with an increase in erythroid series and reversed the M:E ratio. Both WS and W-1 were found to be non-toxic to haemopoietic system.

2. WS and W-1 produced significant anti-inflammatory effect in subacute models of inflammation. Both WS and W-1 also decreased the levels of products of lipid peroxidation with concomitant increase in the antioxidant enzymes indicating that withanolides possess antioxidant activity.
3. WS (1gm/kg) and W-l (50mg/kg) produced significant protection against carbontetrachloride (CCl₄) induced acute hepatotoxicity. The hepatoprotective effect was observed by decrease in the levels of various enzymes (SGOT, SGPT and SALP), decrease in levels of lipid peroxidation products, increase in levels of antioxidant enzymes (GSH, CAT, SOD and GST) and near normalization of pentobarbitone induced sleeping time. The hepatoprotection could be due to the antioxidant activity of both WS and W-l. The protective effects were also confirmed by histopathological examination of liver tissue.

4. WS (1gm/kg) and W-l (50mg/kg) were studied for antioxidant activity in brain and liver. It was observed that both WS and W-l improved the levels of antioxidant enzymes in the brain and liver, thereby indicating that both WS and W-l possess antioxidant activity.

5. WS and W-l were studied for their effects on central nervous system. WS produced a mild depressant effect on central nervous system in rats. The pentobarbitone induced sleeping time was also prolonged by WS. However W-l did not produce any significant effect on the pentobarbitone induced sleeping time. Both WS and W-l were observed to be devoid of analgesic activity. However WS was found to be effective against both maximal electroshock and pentylene tetrazole induced convulsions. In the PTZ induced convulsions model, the antioconvulsant effect of WS was blocked by prior administration of Flumazenil (a GABA receptor blocking agent), indicating that WS might be acting via GABA-ergic system and the anticonvulsant activity observed in MES model indicate that WS in addition might be slowing the rate of recovery of voltage-activated sodium channels from inactivation.
6. WS and W-1 were studied for their effect on blood pressure in dogs. The alcoholic extract produced hypotensive, bradycardiac and respiratory stimulant effect. The hypotensive response was blocked by atropine. After atropinization the extract produced a hypertensive response, which was blocked by pentolinium tartarate indicating it to be a nicotinic response. The withanolide fraction also produced a hypotensive response, which was blocked by atropine. In the rabbit langendorff's heart preparation both WS and W-1 produced myocardial depressant effect but in perfused frog heart it produced mild positive ionotropic and chronotropic response.

7. WS and W-1 were evaluated for wound healing activity. However, both WS and W-1 did not promote healing of wounds. The lack of wound healing property could be attributed to the steroidal structure of withanolides, which form major constituents of W. somnifera.

8. Alcoholic extract and the withanolide fraction were assessed for their effect on reproductive system. It was observed that in male reproductive system both WS and W-1 improved the sperm count and motility, increased the organ weights, increased the protein content and decreased the cholesterol levels in the testis. In the female reproductive system both WS and W-1 produced increase in organ weight with a simultaneous increase in protein content in the ovaries and uterus. The observations justify the traditional use of the plant for infertility both in males and females.

9. The WS and W-1 were assessed for acute and subacute toxicity. No significant toxic effects were observed with either of them, thereby indicating the plant to have a safe profile.
The present study reveals that the withanolides, a group of steroidal lactones, are present in *W. somnifera*. These were assessed for various biological activities and were found to possess haematinic, anti-inflammatory, hepatoprotective, antioxidant and gonadotropic effects. The effects observed with withanolides might be contributing towards various properties of the plant *W. somnifera*. However, it has been observed that the withanolides lack the central effects and neither WS nor W-l promote wound healing. The effects on the CNS observed with the extract, could be due to other constituents in the plant such as alkaloids. Therefore, the various fractions i.e. alkaloids and withanolides can be isolated and utilized in formulations for specific purposes. In addition the withanolides can be further fractionated and utilized for various specific activities.