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## Indian Journal of Pharmacology

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Isolation, characterization and study of enhancing effects on nasal absorption of insulin in rat of the total saponin from *Acanthophyllum squarrosum*Sajadi Tabassi, S.<sup>a</sup>, Hosseinzadeh, H.<sup>b</sup>, Ramezani, M.<sup>b</sup>, Moghipour, E.<sup>b</sup>, Mohajeri, S.<sup>b</sup><sup>a</sup> Pharmacological Research Center of Medicinal Plants, School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran<sup>b</sup> Pharmaceutical Research Center, Mashhad University of Medical Sciences, P O Box 1365-91775, Mashhad, Iran

## Abstract

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Objective: Isolation of the total saponins from *Acanthophyllum squarrosum* Boiss. and investigation of its surface activity, haemolytic effects on human erythrocytes, as well as enhancing potentials on intranasal insulin absorption in rat as compared to two other enhancers, i.e. Quillaja total saponin (QTS) and sodium cholate (SC). Materials and Methods: The decrease in blood glucose levels in five fasting rats following nasal administration of regular insulin solutions in the presence or absence of enhancers was determined by glucometric strips and used as an indication of insulin absorption. Results: The results showed that *Acanthophyllum* total saponin (ATS) decreased surface tension of water to about 50 dyne/cm and caused complete haemolysis of human RBCs at a concentration of 250 µg/ml. Following the instillation of solutions containing insulin and different absorption enhancers into the right nostril of rats, the percentage decrease in initial blood glucose was as follows: 72.46% (±2.39%) for ATS, 63.22% (±11.06%) for QTS and 60.06% (±14.93%) for SC. Percentage lowering of initial blood glucose concentrations against time showed that ATS exerts a stronger effect than the two other enhancers, although the difference was not statistically significant ( $P > 0.05$ ). Conclusion: ATS has a considerable absorption enhancing effect and can possibly be used to increase insulin bioavailability via the nasal route. However, the potential toxic effects of this saponin on nasal mucosa should be further evaluated.

## Reaxys Database Information

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## Author keywords

Absorption enhancers; *Acanthophyllum*; Insulin; Saponin

## Indexed Keywords

EMTREE drug terms: *Acanthophyllum squarrosum* extract; *acanthophyllum* total saponin; cholic acid; herbaceous agent; insulin; saponin; unclassified drugEMTREE medical terms: *Acanthophyllum squarrosum*; animal experiment; animal model; article; bioavailability; controlled study; diet restriction; drug absorption; drug analysis; drug effect; erythrocyte; extraction; glucose blood level; hemolysis; human; human cell; human tissue; isolation procedure; male; medicinal plant; nonhuman; nose cavity; nose mucosa; Quillaja; rat; statistical significance; surface tension; toxicity

Chemicals and CAS Registry Numbers: cholic acid, 32500-01-9, 361-09-1, 81-25-4; insulin, 9004-10-8; saponin, 8047-15-2

Manufacturers: Drug manufacturer: Braun, Germany; Novo, Denmark.

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