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## Therapeutic Properties of Saponins

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### Abstract

Saponins are glucosides that are well known for their foaming aptitude. its biochemical properties depend on their polarity, hydrophobicity and nature of the reactive groups. Saponins exhibits diuretic, cardiac stimulant, anti-catarthal, anti-inflammatory, antioxidant, aphrodisiac, emmenagogue, antispasmodic, expectorant, hepatoprotective, hormone modulating and adrenal adaptogenic effects.

**Keywords:** Sapogenin; Sapotoxin; Horse yams; Anemarrhena asphodeloides; Hypoglycemic; Cucurbitanes.

### Introduction

The word saponins has its origin in the Latin and has been traditionally used as a soap because of their foaming properties [1]. Saponins are glucosides in nature that is found in chestnut, soybeans, quinoa, peas, starfish, chickpeas, tomatoes, horse yams, and sea cucumbers [2]. The foaming aptitude of saponins is by means of a hydrophobic sapogenin and a hydrophilic sugar part in its structure [3,4]. Saponins have an unpleasant taste but exhibits antimicrobial, anti-inflammatory and immunomodulatory properties [5,6]. Some saponins are known to be toxic such as sapotoxin [7]. Biochemical properties of saponins depends on their polarity, hydrophobicity and nature of the reactive groups which makes their isolation difficult [8,9]. In floras saponins are found in plant upper dermis where it forms a waxy protective covering and it is also reported to be a chief part of the plants immune system where it functions as a natural antibiotic [10,11]. Saponins have almost eleven classes of including lanostanes, dammaranes, hopanes, oleananes, cucurbitanes, taraxasteranes, ursanes, lupanes, cycloartanes, tirucallanes and steroids [12,13,14].

### Therapeutic Properties of Saponins:

Some of the therapeutic benefits of saponins are as follows:

- Saponins possess antioxidant activity which reduces risk of cancer and cardiac diseases [15].
- Studies revealed that steroidal saponins isolated from *Anemarrhena asphodeloides*, have a protective role in bone loss [16].
- Saponins have antitumor and anti-cancerous activities which inhibits the growth of cancerous cells by reacting with the cholesterol rich membranes of cancer cells thereby limiting their viability [17]. In addition, it also induces apoptosis in leukemia cells by causing mitotic arrest [18].
- Saponins were also reported to exhibit antifungal properties against *Candida* species [19] and anti-bacterial spectrum against bacteria associated with oral cavities [20].
- Besides saponins have been reported to be effective against depression, bone loss, kidney or urinary stones, diabetes etc [21,22].
- Saponins stimulates T-cells production to boost immunity against pathogens [23].

- Saponins also promotes detoxification process in the liver and mimics endogenous hormones for hormonal regulation <sup>[24, 25]</sup>.
- It is reported that saponins also inhibit the formation of fatty tissue and suppress appetite which plays a beneficial role in weight loss and in the treatment of obesity <sup>[26]</sup>.
- Saponins isolated from spinach and oats increases calcium and silicon absorbtion in the body to aid in digestion process <sup>[27]</sup>.
- Saponins have been used in vaccine formulations to regulate immune function <sup>[28]</sup>.
- Hypoglycemic property of saponins enables it to maintain normal blood sugar level <sup>[29]</sup>

Moreover, inhibition of lipase secretion results in low fat absorbtion resulting in low cholesterol level in the blood <sup>[30]</sup>

Toxicity Effects of Saponins:

#### Some toxic effects of saponins are given below:

- Might have irritating effects on the mucous membrane of respiratory and digestive tract which causes bloating, sneezing, nausea, gastroenteritis vomiting and diarrhea <sup>[31, 32]</sup>.
- Saponins if swallowed can cause urticaria <sup>[33]</sup>.
- Due to their hemolytic properties, saponins can disband red blood cell's wall and causes disruption. However, when administered orally poses no threat since they are not absorbed in the body <sup>[34]</sup>.

### Conclusion

Thus, saponins offers numerous therapeutic benefits for the treatment of different ailments.

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