

# Effect of Sumac on Human DNA

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**Abstracts:** For a long time, *Rhus coriaria* has been used as a spice by grinding the dried fruits with salt, and it has also been widely used as a medicinal herb in traditional medicine for its athero protective effect and its ability to treat eye diseases, wounds, bowel disorders, ring worms and skin disorders. In addition, *Rhus coriaria* has recently shown to have hepatoprotective, anti-ischemic, antimicrobial as well as hypoglycemic, anti-tumor and hyperlipidemic effects. Volatile substances, flavonoids, tannins and xanthenes have been reported from this plant. Due to its easy collection and the remarkable biological activities, *Rhus coriaria* has been used both as food and medicine in some parts of the world especially in Iran. Tannin extracted from Sumac possesses potent antimigratory activity. Sumac yield tannin a substance used in vegetable tanning. Effect of TANNIN (plant polyphenolic compound) on DNA extract from HUMAN BLOOD has been studied. Tannin is extracted by using acetone extraction where DNA is extracted by ethanol precipitation. The effect of tannin on DNA was studied by using different concentrations (10% to 30%) of tannin. The Optical density(O.D.) values of DNA decreased over incubation time indicating reduction in density upon addition of tannin which may be protective by repairing DNA or preventing DNA damage.

**Key words:** *Rhus coriaria* (SUMAC), atheroprotective effect, hepatoprotective, antimicrobial, Tannin, Optical density.

## 1. Introduction

Sumac is any one of about 35 species of flowering plants in the genus *Rhus* and related genera, in the family Anacardiaceae. Sumacs grow in subtropical and temperate regions throughout the world, especially in Africa and North America. Sumacs are shrubs and small trees that can reach a height of 1–10 m (3.3–32.8 ft). The flowers are in dense panicles or spikes 5–30 cm (2.0–11.8 in) long, each flower very small, greenish, creamy white or red, with five petals. The fruits form dense clusters of reddish drupes called sumac bobs. The dried drupes of some species are ground to produce a tangy crimson spice. (Ref. no.2).

### Spice and beverage flavoring

The fruits (drupes) of the genus *Rhus* are ground into a reddish-purple powder used as a spice in Middle Eastern cuisine to add a lemony taste to salads or meat. In Arab cuisine, it is used as a garnish on meze dishes such as hummus and is added to salads in the Levant. In Iranian(Persian and Kurdish) cuisines, sumac is added to rice or kebab. In Jordanian and Turkish cuisines, it is added to salad-servings of kebab and lahmacun. *Rhus coriaria* is used in the spice mixture za'atar. (Ref.no.2).

### Toxicity

Some species formerly recognized in *Rhus*, such as poison ivy (*Toxicodendron radicans*), poison oak (*Toxicodendron diversilobum*) and poison sumac (*Toxicodendron vernix*), have the allergen urushiol and can cause severe allergic reactions. Poison sumac may be identified by its white drupes, which are quite different from the red drupes of true *Rhus* species. (Ref.no.2).

### Tannins

Tannins are secondary metabolites of plants, non-nitrogenous, phenolic in nature. They have a property to tan animal skin to convert to leather or hide. Conversion imparts resistance to water, heat, abrasives. They can be extracted

using water-acetone/alcohol mixture. They have a property to precipitate gelatin & heavy metals. (Ref .no.3). So far there are few studies done. The aim of the study was the investigation of its DNA-protective effects in humans and animals. Prevention of the formation of strand breaks and oxidized DNA bases as well as the protection against H2O2- and (±)- anti-benzo[a]pyrene-7, 8-dihydroxy-diol-9, 10-epoxide (BPDE)-INDUCED dna-damage were monitored in human lymphocytes in a placebo controlled trial (N=8/group) with ethanolic extract of sumac in single cell gel electrophoresis assays.

Furthermore, DNA-protective effects of sumac were monitored in different inner organs of rats under identical condition. (REF.no.4).

## 2. Materials and Methods

### Tannin extraction from Sumac

Two grams of dry Sumac were ground using a mortar and pestle. To dissolve tannin in solvent; the ground Sumac was transferred to 50 mL Falcon tubes and 20 mL of acetone and water (7:3 ratio) was added. The collected tannin extracts were sonicated for 30 minutes at 4°C to break down additional materials associated with tannin. To pellet the additives and salts, the sonicated tannin extracts were centrifuged for 10 min at 2,500 rpm. The supernatant was separated from pellet (the pellet was discarded). The supernatant was subjected to rota-evaporator to separate tannin from acetone. The extracted tannin was filtered and stored at 4°C until its not in use. (Ref.no.1).

### DNA extraction from human blood

DNA extracted from human blood was provided by the company "PARAM SCIENCE AND TECHNOLOGY". (Ref.no.5). The extracted Tannin was then exposed to pure DNA sample at 10% and 30% concentrations at different time intervals. Then the Optical density values were taken

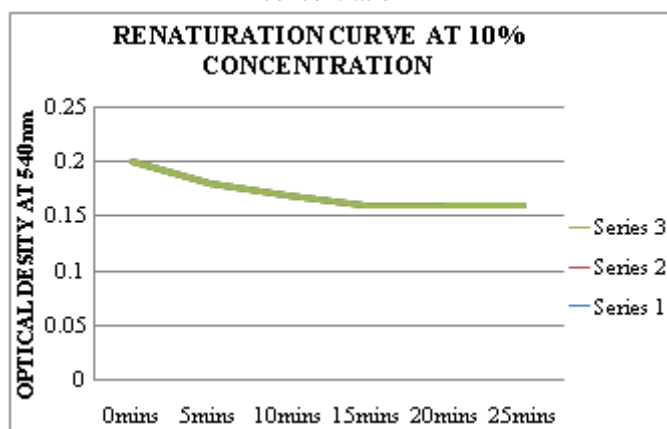
using Colorimeter at 540nm. The following observations were made;

**For 10% concentration:**

**Table 1(a):** Optical density values for 10% concentration

Times In Minutes	Optical Density
0mins	0.20
5mins	0.18
10mins	0.17
15mins	0.16
20mins	0.16
25mins	0.16

**Table 1(b):** Graph showing renaturation curve at 10% concentration

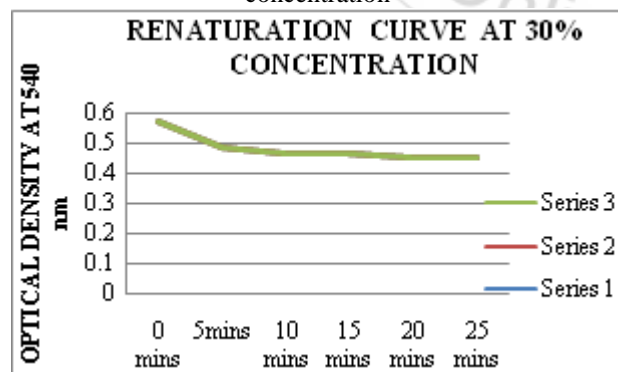


**For 30% concentration**

**Table 2(a):** Optical density values for 30% concentration

0 mins	0.57
5 mins	0.48
10 mins	0.46
15 mins	0.46
20 mins	0.45
25 mins	0.45

**Table 2(b):** Graph showing renaturation curve at 30% concentration



**3. Result and Discussion**

The above observation from this experiment gives us a picture of the renaturation effect of sumac on the pure human DNA extract. The above graph of (Table 2(b)) 30% concentration shows more renaturation effect on human DNA then the graph of (Table1 (b)) 10% concentration. So,

the 30% concentrations of tannin were more effective then 10% concentration of tannin when exposed to DNA. The above graphs shows decreased in Optical density with increase in time of exposure of sumac on DNA which indicates that the DNA has undergone repair and renaturation.

**4. Acknowledgement**

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The company "PARAM SCIENCE & TECHNOLOGY"