Spices are a group of esoteric food adjuncts that have been used for thousands of years to enhance the sensory quality of foods and as preservatives. Much health benefit attributes of these common food adjuncts in animal studies include digestive stimulant action, antioxidant, anti-inflammatory and antihepatotoxic properties. Among these, the gastronomic and antioxidant properties of a few specific spices have far-reaching nutraceutical value. The present study was carried out to evaluate antiulcerogenic property of fennel “Foeniculum vulgare” Mill. (Fam.: Umbelliferae) in Wistar albino rats. An aqueous suspension of fennel (a common dosage form used in folk medicine practice). The suspension was used in two doses (250 and 500 mg/kg body weight, orally) in all experiments except in Shay rat model. Gastric acid secretion studies were undertaken using pylorus ligated (Shay) rats. Gastric lesions in the rats were induced by noxious chemicals including ethanol, strong alkalis and indomethacin. The levels of gastric wall mucus (GWM), nonprotein sulfhydryls (NP-SH) and malondialdehyde (MDA) were also measured in the glandular stomach of rats following ethanol administration. The gastric tissue was also examined histologically. In pylorus-ligated Shay rats, the suspension of fennel significantly reduced the basal gastric acid secretion, titratable acid and ruminal ulceration (64%, 39% and 100%), respectively. The suspension significantly (P < 0.001, P < 0.01 and P < 0.01) attenuated gastric ulceration induced by necrotizing agents (80% ethanol, 0.2 mol/L NaOH, 25% NaCl) respectively and indomethacin was found to be (P < 0.01). The cytoprotective and antiulcer effect was further confirmed histologically. Furthermore, the suspension significantly replenished the ethanol-induced depleted levels of GWM (P < 0.001), NP-SH (P < 0.05) and diminished (P < 0.01) (MDA) concentration of the rats’ stomach. The data obtained confirmed the use of fennel suspension in various gastric ailments including stomach ulcers. Fennel reported to contains bio-active phytochemical substances, which might increase endogenous prostaglandins and mucus synthesis and exert its gastroprotective activity through its antioxidant, antisecretory and cytoprotective properties in rats.