

An Effective Bioactive Microbial Compound against Gastroenteritis is Gallic Acid

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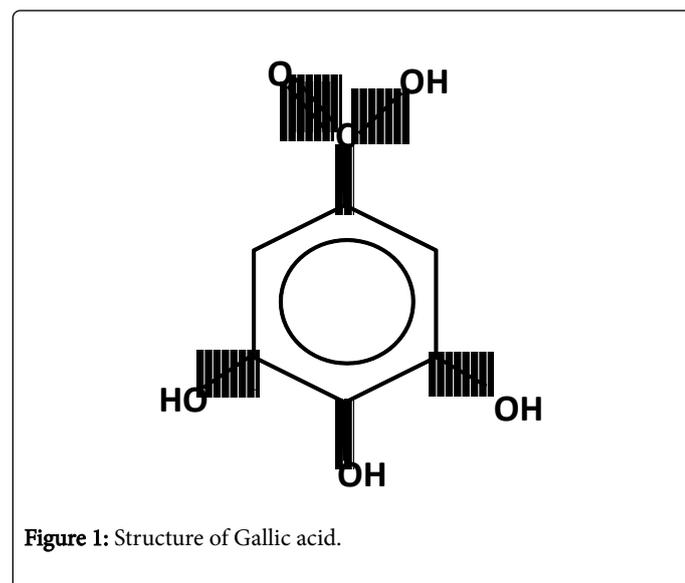
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Editorial

Gallic acid a phenolic compound also known as 3, 4, 5-trihydroxybenzoic acid (Figure 1) is produced by various microorganisms. It is found both free and as part of hydrolysable tannins and acts as a precursor to particularly gallo and ellagitannins. Hydrolysable tannins break down on hydrolysis to give gallic acid with the help of tannase enzyme. Since gallic acid contains a phenolic group, it is used as a standard for many pharmaceutical industries to determine the phenol content using the Folin- Ciocalteu assay. *Corynebacterium* sp., *Klebsiella pneumonia* and *Aspergillus* sp. are reported to produce gallic acids [1]. Norovirus is the cause in about 18% of all cases. *Campylobacter jejuni* is the primary cause of bacterial gastroenteritis, with half of these cases associated with exposure to poultry [2]. The name gallic acid is derived from oak galls, which were historically used to prepare tannic acid. Different concentrations of gallic acid are found in many foodstuffs especially in berry fruits as well as teas, cloves, and vinegars. Banana also contains some amount of gallic acid.



It is reported that gallic acid can be used to treat gastroenteritis. Gastroenteritis, is the inflammation of the gastrointestinal tract, diarrhoea, vomiting, and abdominal pain, fever, lack of energy, and dehydration are some of the common signs and symptoms to suspect gastroenteritis. The diseases can be caused either by viruses, bacteria, parasites, and fungus. Rotavirus, norovirus, adenovirus, and astrovirus

are known to cause gastroenteritis. Viruses cause about 70% of episodes of infectious diarrhoea in the paediatric age group. Rotavirus is a less common cause in adults due to acquired immunity. In neonates and infants, the common bacterial agents for this disease are *Escherichia coli*, *Salmonella* sp., *Shigella* and *Campylobacter species* [3,4]. *Clostridium difficile* is an important causal agent of diarrhoea that occurs more often in the elderly. Gastroenteritis can also be caused by few parasites such as *Giardia lamblia*, *Entamoeba histolytica*, *Cryptosporidium spp.*, comprise about 10% of cases in infants.

Gallic acid alters the charge and permeability of plasma membrane of bacteria. So the hydrophobicity of plasma membrane is changed and results in formation of local pores in plasma membrane. The biosynthesis of gallic acid starts from 3-dehydroshikimate to produce 3, 5-didehydroshikimate which is catalysed by enzyme shikimate dehydrogenase [5]. Release of intracellular essential constituents take place leading to the death of microbes or bacteria. This is the probable mechanism of gallic acid established against microbes. It is also reported that use of AuNP-GA (gold nanoparticles tagged gallic acid) enhances the process plasma membrane disturbances to produce pores. Gallic acid can be isolated many plants other than oak like land plant parasitic plant *Cynomorium coccineum*, the aquatic plant *Myriophyllum spicatum*, and the blue-green alga *Microcystis aeruginosa* [6]. So various types of nano particles can be conjugated with gallic acid and tested for its efficacy towards the pathogenic bacteria which causes gastroenteritis. Its bactericidal property ensures many biomedical applications of gallic acid. Gallic acid has also been implicated as antimicrobial, antimutagenic, anticarcinogenic, antiangiogenic and anti-inflammatory agents.

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