

An executive summary of the report of work done on the Minor Research Project of Dr. SN Raghavendra, entitled "Assessment of Phyto-Ingredients for the Preparation of Natural Health Drink", sanctioned by UGC, vide sanction letter No. 1435-MRP/14-15/KAMA002/UGC-SWRO, dated: 4.2. 2015.

Executive Summary Report

Plant: *Spinacia oleracea*

The natural drugs are always a better substitute of synthetic drugs. Thus numerous drugs have entered the I.P through ethno botany and traditional medicine. The medicinal value of plant lies on bioactive phytochemical constituents that produce definite physiological action on the body. The most important of these bioactive constituent of plants are tannin, flavonoid, carbohydrates, glycosides, steroids, terpenoids, lignins and fats.

Result and Discussion:

Phytochemical analysis:

In aqueous extract showed positive result for carbohydrate, phenolic compound, flavonoid, tannin, steroid, saponin, essential oil and Vitamin C whereas protein, amino acid, glycoside and fatty oil are absent. In methanolic extract showed positive result for carbohydrate, amino acid, glycoside, phenolic compound, flavonoid, tannin, steroid, saponin, essential oil whereas protein, anthraquinone, fatty oil and Vitamin C is absent.

Well diffusion method: antibacterial susceptibility assay was performed for the ethanol, methanol and aqueous extract against four different test organism (*Proteus vulgaris*, *Staphylococcus aureus*, *Bacillus subtilis* and *Klebsiella spp.*). In ethanol extract it can be seen that the maximum zone of inhibition was seen against *Bacillus* (24mm) followed by *Klebsiella* (20mm), *Staphylococcus* (10mm) and *Proteus* (1mm). In methanol extract it can be seen that the maximum zone of inhibition was seen against *Bacillus* (20mm) followed by *Klebsiella* (9mm), *Staphylococcus* (8mm) and *Proteus* (6mm). In aqueous extract it can be seen that the maximum zone of

inhibition was seen against *Bacillus* (13mm) followed by *Staphylococcus* (10mm), *Klebsiella* (9mm) and *Proteus* (4mm).

Disc diffusion method: antibacterial susceptibility assay was performed for the ethanol, methanol and aqueous extract against four different test organism (*Proteus vulgaris*, *Staphylococcus aureus*, *Bacillus subtilis* and *Klebsiella spp.*) and different organisms showed maximum zone of inhibition at different concentration of dilution (100%, 75%, 50%, 25%). In ethanol and methanol extract *Staphylococcus* showed maximum zone of inhibition followed by *Proteus vulgaris*, *Klebsiella* and *Bacillus*. In aqueous extract *Staphylococcus* showed maximum zone of inhibition followed by *Klebsiella* and *Bacillus*. There is no zone of inhibition in *Proteus vulgaris*.

Conclusion:

The presence of phytoconstituent make the plant useful for treating different ailment and have a potential of providing useful drugs of human use. It has been found that most of the biological active phytochemicals were present in the methanol, ethanol and aqueous extract of Spinaceae oleracea. Since the methanol extract of *Spinacia oleracea* contain more constituent it can be considered beneficial for further study. The present study shows the antimicrobial activity of the leaf extract of *Spinacia oleracea* against test organisms (*Proteus vulgaris*, *Staphylococcus aureus*, *Bacillus subtilis* and *Klebsiella spp.*). The plant leaves were used for extraction of antimicrobial metabolites using ethanol, methanol and aqueous. Out of three extract ethanol and methanol was more effective so spinach can be tool for fighting against the pathogen which are gaining resistance to the drug available in the market.

Plant: *Piper betel*

The betel leaf is widely used as a post meal mouth freshener and the crop is extensively grown in India, Srilanka, Malaysia and other Southeast Asian countries. Due to strong pungent aromatic flavour betel leaves are used as masticator by the Asian people. Its common names are 'Betel' in English, 'Paan' in Hindi. Grown abundantly in many parts of India, betel is an evergreen dioecious herb that needs warm and moist growth condition for its growth. The plant has got large number of biomolecules which show diverse pharmacological activity. *Piper betel* is used to

treat alcoholism, bronchitis, asthma, leprosy and dyspepsia. It was reported that fresh leaves contains protein, carbohydrate, minerals, fat, essential oil, tannin, alkaloids, vitamin A, thiamine, riboflavin, iodine, potassium and iron.

Result and Discussion:

Phytochemical analysis:

Preliminary phytochemical screening of the leaf ethanolic extract of *Piper betel* showed positive result for the presence of carbohydrate, amino acid, glycoside, protein, phenolic compound, flavonoid, tannin, steroid, saponin, alkaloid and essential oil whereas, anthraquinone, fatty oil and Vitamin C completely absent in ethanolic extract. In aqueous extract showed positive result for carbohydrate, phenolic compound, flavonoid, tannin, steroid, saponin, alkaloid and essential oil whereas protein, amino acid, glycoside, fatty oil, anthraquinone and Vitamin C are absent. In methanol extract showed positive result for carbohydrate, protein, glycoside, phenolic compound, flavonoid, tannin, steroid, saponin, essential oil whereas anthraquinone, fatty oil, amino acid and Vitamin C is absent.

Well diffusion method: antibacterial susceptibility assay was performed for the ethanol, methanol and aqueous extract against four different test organism (*Pseudomonas*, *Staphylococcus aureus*, *Bacillus subtilis* and *E.coli*). In ethanol extract it can be seen that the maximum zone of inhibition was seen against *Bacillus* (6mm) followed by *E.coli* (4mm), *Staphylococcus* (2mm) and *Pseudomonas* (2mm). In methanol extract it can be seen that the maximum zone of inhibition was seen against *Bacillus* (10mm) followed by *E.coli* (8mm), *Pseudomonas* (4mm) and *Staphylococcus* (2mm). In aqueous extract it can be seen that the maximum zone of inhibition was seen against *Staphylococcus* (3mm) and no zone of inhibition seen in *Bacillus*, *Pseudomonas* and *E.coli*.

Disc diffusion method: Antibacterial susceptibility assay was performed for the ethanol, methanol and aqueous extract against four different test organism (*Pseudomonas*, *Staphylococcus aureus*, *Bacillus subtilis* and *E.coli*) and different organisms showed maximum zone of inhibition at different concentration of dilution (100%, 75%, 50%, 25%). In ethanol extract *Pseudomonas* showed maximum zone

of inhibition followed by *E.coli*, *Staphylococcus* and *Bacillus subtilis*. In methanol extract *Bacillus subtilis* showed maximum zone of inhibition followed by *Pseudomonas*, *Staphylococcus* and *E.coli*. In aqueous extract *Bacillus subtilis* showed maximum zone of inhibition followed by *Staphylococcus*, *E.coli* and *Pseudomonas*.

Conclusion:

The presence of phytoconstituent make the plant useful for treating different ailment and have a potential of providing useful drugs of human use. It has been found that most of the biological active phytochemicals were present in the methanol, ethanol and aqueous extract of Piper betel. Since the ethanol extract of Piper betel contain more constituent it can be considered beneficial for further investigation. Piper betel is a nutraceutical medicine plant. This study shows the antimicrobial activity of the leaf extract of Piper betel against test organisms (*Pseudomonas*, *Staphylococcus aureus*, *Bacillus subtilis* and *E.coli*). the plant leaves were used for extraction of antimicrobial metabolites using ethanol, methanol and aqueous. Out of three extract ethanol and methanol was more effective so spinach can be tool for fighting against the pathogen which are gaining resistance to the drug available in the market.