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Formulation of Effervescent Powder of Folic Acid and Field Evaluation of their Plant Growth Promotion Activity

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Abstract : The aim of present research work was to evaluate plant growth promotion activity of folic acid in Wheat grass, Baheda, Aloe vera, Shirish, Senna. The present research work was performed to produce stable effervescence formulation, to make immediate release formulation and to study plant growth promoting effect in effervescence powder formulation. The folic acid formulation was prepared in effervescent powder form with the use of ingredients like tartaric acid, sodium bicarbonate and citric acid. The plant growth promotion activity were determined after diluting folic acid powder equivalent to 6 mg dose with 15 litre of water. This diluted solution was applied to the plant for Soil Application as well as foliar application for flowering stimulant activity. This plant growth promotion activity were compared against blank water without any folic acid to nullify response of water for the plant growth. All the formulation were evaluated for appearance, bulk density, tapped density, Hausner's ratio, Carr's index, Angle of repose, effervescent time, solubility after dilution of formulation in 15 litre of water. It was concluded from the results of studies that folic acid had excellent plant growth promotion effect as well as flowering stimulant effects.
Keywords :- folic acid, plant growth promotion, flowering stimulant, effervescence formulation, wheat grass.

Introduction and Experimental

Folic Acid Powder is a water soluble essential nutrient vitamin material, very beneficial for the growth of plant. These are yellow-orange in colors and can be seen in dark green leafy vegetables. Folic acids are considered as the highly effective agents for plant hormones and vitamins, essential for their healthy growth[1-4].Effervescent powder is dissolved or dispersed in water before administration. Effervescent Powder preparation having many benefits like masking taste of drug, fast onset of action, ease of manufacturing, and better stability against liquid formulations[-7].Materials used in research work were folic acid as active ingredient (vitamin), sodium bicarbonate as source of CO_2, tartaric acid and citric acid as acidifying agents.The API (Folic acid) & excipients (sodium bicarbonate, citric acid, tartaric acid) were simply blended & mixed together to prepare effervescent powder formulations[5-8].

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In this experiment the plant growth promotion activity were determined after diluting folic acid powder equivalent to 6 mg dose with 15 litre of water. This diluted solution was applied to the plant for Soil Application as well as foliar application for flowering stimulant activity. This plant growth promotion activity were compared against blank water without any folic acid to nullify response of water for the plant growth.

Formulation for Effervescent Powder of Folic Acid

Table 1. Composition of Different Formulations								
Composition of Different Formulations (mg)								
	F1	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**
Folic Acid	6	6	6	6	6	3	9	12
Sodium bicarbonate	50	50	100	100	50	50	50	50
Citric Acid	25	50	50	100	25	25	25	25
Tartaric Acid	25	50	50	100	25	25	25	25

Evaluation of Effervescent Powder

Formulation batches (F1 to F4) were evaluated for appearance, bulk density, tapped density, Hausner's ratio, Carr's index, Angle of repose, Effervescent time, solubility after dilution of formulation in 15 liter of water.

Formulation Batches (F5-F8) were evaluated for plant growth promotion activity in wheat grass plant. For study of plant growth promotion activity, each formulation were first diluted with 15 liter of water then applied to the plant (Soil Application).

Formulation Batches F8 was further studied for plant growth promotion effect in various plants like Baheda, Aloe Vera, Shirish, Senna[2,5,6,9-13].

Results and Discussion

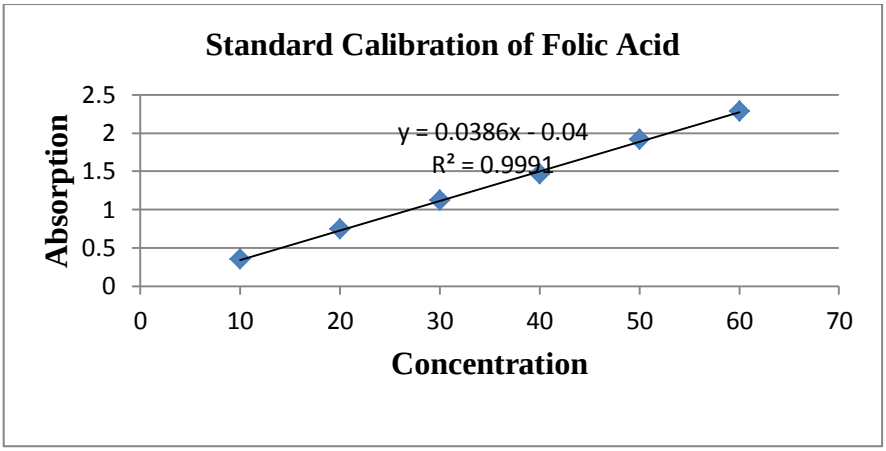

Figure 1.Standard Calibration Curve of Folic Acid

Table 2. Results of Evaluation Parameters for Batch (F1-F4)

Table.2. Evaluation parameters for batch (F1-F4)				
Evaluation Parameters	**F1**	**F2**	**F3**	**F4**
Appearance	Yellowish coarse powder	Yellowish coarse powder	Light yellow	Light yellow
Bulk Volume	5.3	6.7	8.8	11
Bulk Density	0.943	0.746	0.56	0.454
Tapped Volume	4.5	5.4	7.4	8.8
Tapped Density	1.11	0.925	0.675	0.56
Hausner's ratio	1.17	1.23	1.2	1.23
Carr's index	15.31	19.35	17.03	18.92
Angle of repose	25.1	24.82	25.17	23.9
Effervescent time	1 sec	1 sec	1 sec	1 sec
Solubility after dilution	Excellent	Good	Good	Good

Results of Field Evaluation of F5-F8 Batches on Wheat Grass Plant Control blank

Fig 2. Study of Water Wheatgrass Plant(Application of 250ml of water)

Batch F5

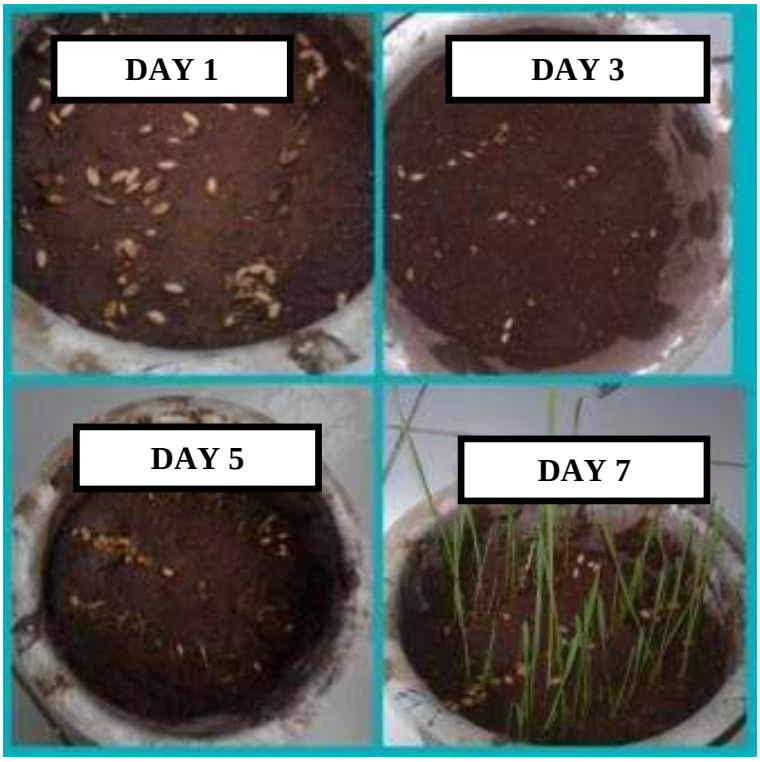

Fig.3. Study on Wheatgrass Plant for Formulation Batch F5 (Application of 250ml of prepared formulation in soil)

BATCH F6

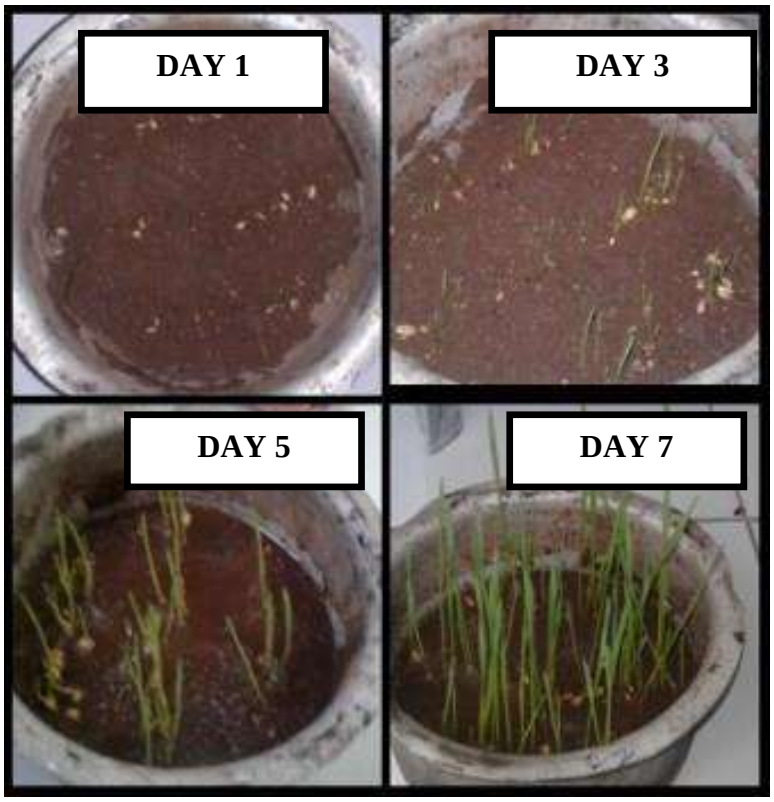

Fig.4. Study on Wheatgrass Plant for formulation Batch F6 (Application of 250ml of prepared solution in soil)

BATCH F7

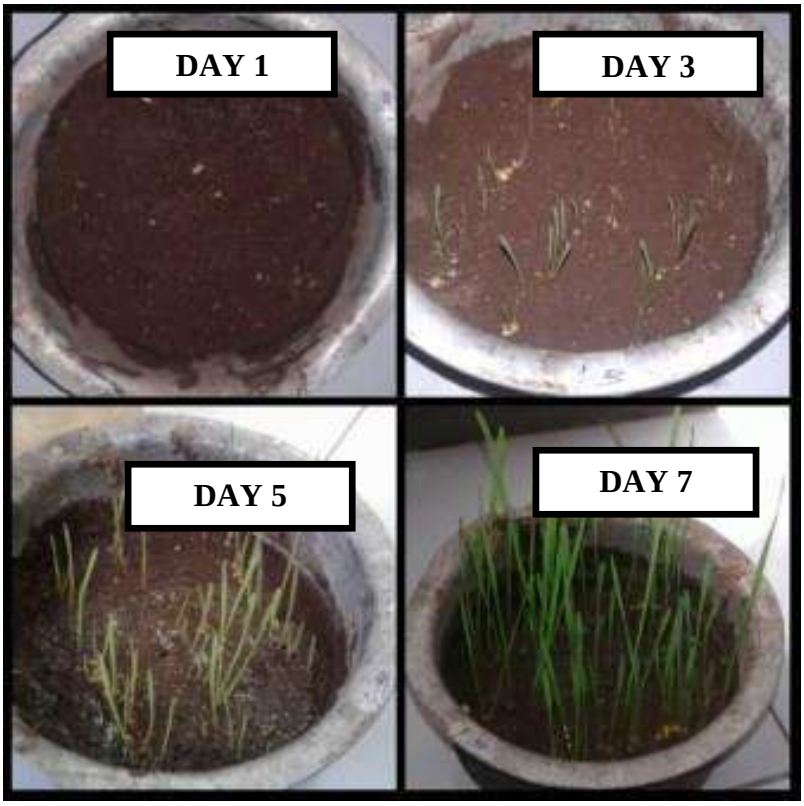

Fig.5. Study on Wheatgrass Plant for Formulation Batch F7 (Application of 250ml of prepared formulation in soil)

BATCH F8

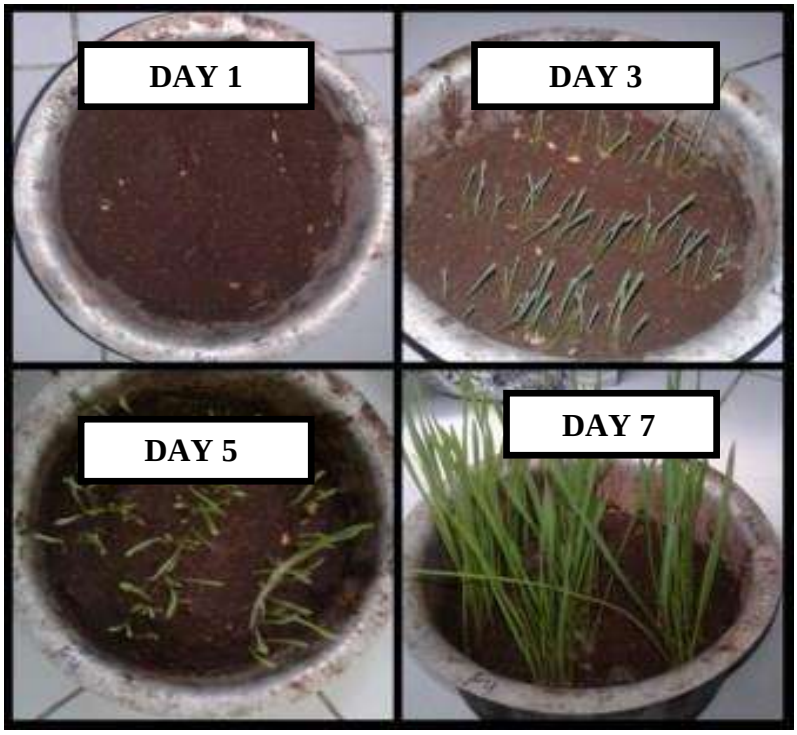

Fig.6. Study on Wheatgrass Plant for Formulation Batch F8 (Application of 250ml of prepared formulation in soil)

No. of Days- 7

Water	Prepared formulation
Volume-250ml in soil	Volume- 250ml in soil (0.2 mg folic acid)
Spraying solution – 5ml	Spraying solution- 5ml (0.004mg folic acid)

Fig.7. Study performed on plant Bahedafor Formulation F8

	Day7 (Water)	**Day7 (Drug)**
Total Length	120cm	128cm
New leaves	20	24

Fig.8. Study performed on plant Aloe Vera for Formulation F8

	Day7(Water)	**Day7(Drug)**
Length after study duration	30 22 20 10	34 25 24 15

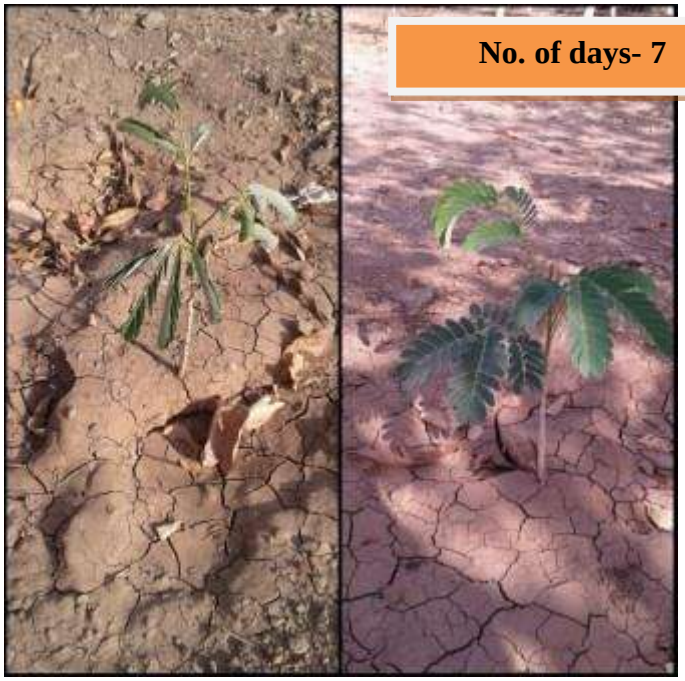

Fig.9. Study performed on plant Shirishfor Formulation F8

	Day7(Water)	**Day7(Drug)**
Total length	21cm	32cm
Total branches	13	17

Fig.10. Study performed on plant Sennafor Formulation F8

	Day7 (Water)	**Day7(Drug)**
No. of flowers	15 flowers	26 flowers

Conclusion

It was concluded that effervescent powder formulation of folic acid showing significant effect as a plant growth promoter. The prepared formulation was used to get different plant growth promotion activity like increase in flowering, increase in length of the plant & overall growth of the plant.

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