We claim:

1. A vaccine composition for prophylaxis against Hand Foot and Mouth Disease caused by Enterovirus -71 (EV71) and Coxsackievirus A16 (CVA16) comprising:
    a. a vaccine antigen, that is a synthetic construct selected from recombinant protein sequences as represented by SEQ ID No. 2 (named as MEV1) or SEQ ID No. 4 (named as MEV2);
    b. at least one adjuvant;
    c. at least one stabilizer; and
    d. a physiologically acceptable buffer selected from a phosphate or a citrate buffer;

wherein the said vaccine composition is stable for at least 2 years at 5 ±3^{o}C and up to 2 weeks at 37^{o}C.

2. The vaccine composition according to claim 1, wherein SEQ ID 2 is obtained from a codon optimized gene sequence as represented by SEQ ID No. 1.

3. The vaccine composition according to claim 1, wherein SEQ ID 4 is obtained from a codon optimized gene sequence as represented by SEQ ID No. 3.

4. The vaccine composition according to claim 1, wherein the at least one adjuvant is alum, a squalene-based adjuvant, a montanide, a RIBI adjuvant, a complete Freud's adjuvant, an incomplete Freud's, MPL, muramyl dipeptide, an oil-in-water emulsion, a TLR ligand-based adjuvant, a CpG oligonucleotide, a non-CpG oligonucleotide, a saponin, a vitamin, or an immunomodulant.

5. The vaccine composition according to claim 1, wherein the at least one stabilizer is a sugar or a sugar alcohol.

6. The vaccine composition as claimed in claim 1, wherein the said vaccine antigens SEQ ID No. 2 or SEQ ID No. 4 is prepared by a process comprising:
    a. expression of protein sequences SEQ ID No. 2 or SEQ ID No. 4 from codon optimized gene sequences, namely SEQ ID No. 1 and SEQ ID No. 3 respectively with 0.2-0.75 mM IPTG between 15 ^{o}C-37^{o}C, as inclusion bodies in a suitable host selected from *E. coli* BL21 (DE3) cells or Rosetta cells;

b. centrifugation at 10,000 rpm for 5 minutes to obtain MEV-1 or MEV-2 in a cell pellet;

c. wherein preparing the vaccine antigen SEQ ID No.2 comprises the steps of:

i) suspending the cell pellet of step (b) with a lysis buffer-I, the lysis buffer-I for MEV1 comprising 50mM Na_2HPO_4, 0.3M NaCl, 1% TritonX-114, 0.5mg/ml lysozyme, 1mM AEBSF, simultaneously performing freeze thaw cycles for at least 3 times followed by ultrasonication for 20 seconds thrice with at least 30 seconds intervals in between;

ii) undergoing cell lysis with a lysis buffer-II for MEV1, the lysis buffer-II for MEV1 comprising 3-6M Urea, 5-10mM imidazole, 50mM Na_2HPO_4, 0.3M NaCl, and 1mM AEBSF at 4ºC for 3-16 hours to recover at pH 7.4 an insoluble protein for MEV1 to obtain a denatured protein solution of MEV1;

iii) adding the denatured protein solution of MEV1 of step (ii) above to a Ni-NTA Immobilized Metal Affinity Chromatography column followed by washing with a Wash Buffer-I comprising 50mM Na_2HPO_4, 0.3M NaCl, 1mM AEBSF, 3M urea at pH 7.4 with 0.1% Triton X-114 and 5-10 mM Imidazole;

iv) washing the column from step (iii) with a Wash Buffer–II comprising 50mM Na_2HPO_4, 0.3M NaCl, 1mM AEBSF, 3-6M urea at pH 7.4 with 0.1% Triton X-114 and 20mM imidazole; followed by washing by a Wash Buffer–III, the Wash Buffer-III comprising 50 mM Na_2HPO_4, 0.3 M NaCl, 1 mM AEBSF additionally with 20mM imidazole with decreasing concentrations of urea;

v) eluting MEV1 from the column in step (iv) with an elution buffer, the elution buffer comprising 50mM Na_2HPO_4, 0.3M NaCl, 1mM AEBSF by using increasing concentrations of imidazole (250-500 mM) optionally with 3-6 M urea;

vi) undergoing dialysis of washed Ni-NTA column-based affinity purified protein MEV-1 against phosphate buffer saline using 10 kDa cutoff, membrane and refolding with a refolding buffer comprising 0.1-0.3M NaCl, 10% glycerol and 0.2-0.5 M Arginine or 0.2-0.5 M Arginine-HCl optionally followed by size exclusion chromatography to obtain MEV-1 with at least 92% to 96% purity;

d) wherein preparing the vaccine antigen SEQ ID No.4 comprises the steps of:

i) suspending the cell pellet of step (b) undergoing lysis with lysis buffer-I for MEV2, comprising 50 mM Tris, 0.3 M NaCl, 1% Triton X114, 0.5 mg/ml lysozyme, 1mM AEBSF at pH 8-8.5;

ii) or, alternatively, suspending the cell pellet of step (b) undergoing cell lysis with lysis buffer-II for MEV2, the lysis buffer-II for MEV2 comprising 50 mM Tris, 0.3 M NaCl, 1 mM AEBSF in presence of 6M urea and 10-20 mM DTT;

iii) undergoing refolding of MEV-2 after step (ii) above in decreasing concentration of urea and DTT concentration in the presence of 0.2-1M Arginine or Arginine-HCL, redox pair reagents selected from Cysteine/Cystine, GSSG/GSH, oxidized DTT/reduced DTT or cystamine/cysteamine with concentration between 0.05mM to 10mM to obtain MEV-2 with at least 96% purity.

e) optionally storing MEV1 or MEV2 in a solution comprising polyols or sugars selected from 5-40% Glycerol, 5-60% Sucrose, 5-40% Trehalose or 5-40% Sorbitol at -20 degree C wherein the solution protects MEV1 or MEV2 from thermal stress.

7. A method of preparing the vaccine antigens SEQ ID No. 2 or SEQ ID No. 4 of claim 1 comprising the steps of:
   a. expressing protein sequences SEQ ID No. 2 or SEQ ID No. 4 from codon optimized gene sequences, namely SEQ ID No. 1 and SEQ ID No. 3 respectively with 0.2-0.75 mM IPTG between 15 ^{o}C-37^{o}C, as inclusion bodies in a suitable host selected from *E. coli* BL21 (DE3) cells or Rosetta cells;
   b. centrifuging at 10,000 rpm for 5 minutes to obtain MEV1 or MEV2 in a cell pellet;
   c. wherein preparing the vaccine antigen SEQ ID No.2 comprises the steps of:

      i) suspending the cell pellet of step (b) with a lysis buffer-I, the lysis buffer-I for MEV1 comprising 50mM Na_2HPO_4, 0.3M NaCl, 1% TritonX-114, 0.5mg/ml lysozyme, 1mM AEBSF, simultaneously performing freeze thaw cycles for at least 3 times followed by ultrasonication thrice for 20 seconds with at least 30 seconds intervals in between;

ii) undergoing cell lysis with a lysis buffer-II for MEV1, the lysis buffer-II for MEV1 comprising 3-6M Urea, 5-10mM imidazole, 50mM Na_2HPO_4, 0.3M NaCl, and 1mM AEBSF at 4ºC for 3-16 hours to recover at pH 7.4 an insoluble protein for MEV1 to obtain a denatured protein solution of MEV1;

iii) adding the denatured protein solution of MEV1 of step (ii) to a Ni-NTA Immobilized Metal Affinity Chromatography column followed by washing with a wash buffer-I comprising 50mM Na_2HPO_4, 0.3M NaCl, 1mM AEBSF, 3M urea at pH7.4 with 0.1% Triton X-114 and 5-10 mM Imidazole;

iv) washing the column from step (iii) with a Wash Buffer–II comprising 50mM Na_2HPO_4, 0.3M NaCl, 1mM AEBSF, 3-6M urea at pH7.4 with 0.1% Triton X-114 and 20mM imidazole; followed by washing with a Wash Buffer – III, the Wash Buffer-III comprising 50 mM Na_2HPO_4, 0.3 M NaCl, 1 mM AEBSF additionally with 20mM imidazole with decreasing concentrations of urea;

v) eluting the MEV1 from the column in step (iv) with an elution buffer, the elution buffer comprising 50mM Na_2HPO_4, 0.3M NaCl, 1mM AEBSF by using increasing concentrations of imidazole (250-500 mM) optionally with 3-6 M urea;

vi) undergoing dialysis of MEV-1 against a phosphate buffer saline using 10 kDa cutoff, membrane and refolding with a refolding buffer comprising 0.1-0.3M NaCl, 10% glycerol and 0.2-0.5 M Arginine or 0.2-0.5 M Arginine-HCl optionally followed by size exclusion chromatography to obtainMEV-1 with at least 92% to 96% purity;

d) wherein preparing the vaccine antigen SEQ ID No.4 comprises the steps of;

i) suspending the cell pellet of step (b) undergoing lysis with a lysis buffer-I for MEV2 comprising 50 mM Tris, 0.3 M NaCl, 1% Triton X114, 0.5 mg/ml lysozyme, 1mM AEBSF at pH 8-8.5;

ii) or, alternatively undergoing cell lysis with lysis buffer-II for MEV2, the said lysis buffer-II for MEV2 comprising 50 mM Tris, 0.3 M NaCl, 1 mM AEBSF in presence of 6M urea and 10-20 mM DTT;

iii) undergoing refolding of MEV-2 after step (ii) above in decreasing concentration of urea (from 6 M to 0.1 M) and DTT concentration (from 20 mM to 0.1 mM) in presence of 0.2-1M Arginine or Arginine-HCL, redox pair reagents selected from Cysteine/Cystine,

GSSG/GSH, oxidized DTT/reduced DTT or cystamine/cysteamine with concentration between 0.05mM to 10mM to MEV-2 with at least 96% purity.

e) optionally storing MEV1 or MEV2 in a solution comprising a polyol or a sugar, selected from 5-40% Glycerol, 5-60% Sucrose, 5-40% Trehalose or 5-40% Sorbitol at -20 degree C to protect MEV1 or MEV2 from thermal stress.

8. A composition comprising a multi-epitope synthetic protein sequence as disclosed in SEQ ID No. 2 with at least 92% - 96% purity.

9. A composition comprising a multi-epitope synthetic protein sequence as disclosed in SEQ ID No. 4 with at least 96 % purity.

10. The immunogenic composition of claim 4, wherein the alum is aluminium hydroxide or

11. The immunogenic composition of claim 4, wherein the saponin is QS-1, ISCOM, or ISCOMATRIX.

12. The immunogenic composition of claim 4, wherein the immunomodulant is a cytokine.

13. The immunogenic composition of claim 4, wherein the squalene-based adjuvant is MF59.

14. The immunogenic composition of claim 5, wherein the sugar is 5-60% sucrose or 5-40% trehalose.

15. The immunogenic composition of claim 5, wherein the sugar alcohol is 5-40% glycerol or 5-40% sorbitol.