Claims

1. A method of single-stranded RNA purification comprising the steps:
   - applying a sample containing single-stranded RNA to a solid phase comprising a surface bearing both primary and secondary amino groups under conditions sufficient to bind at least predominantly the single-stranded RNA,
   - eluting the single-stranded RNA adsorbed on the surface of the solid phase from the solid surface by means of an elution buffer having a pyrophosphate concentration in the range of 1 mM to 1000 mM,
   wherein the molar ratio of primary amino groups to secondary amino groups is in the range of 1/10 to 10/1.

2. The method of claim 1 wherein after applying the sample and prior to eluting of the single-stranded RNA at least one step of washing of the solid phase is provided with a washing buffer comprising non-pyrophosphate salts at a higher ionic strength compared to the ionic strength of the elution buffer.

3. The method of claim 1 wherein the molar ratio of primary amino groups to secondary amino groups is in the range of 2/10 to 10/2, or 3/10 to 10/3, or 4/10 to 10/4, or 5/10 to 10/5.

4. The method of any one of the claims 1 to 3 wherein the sample contains double-stranded RNA and the method further comprising desorbing the double-stranded RNA adsorbed on the surface of the solid phase from the solid surface is achieved by means of a buffer having a lower concentration of pyrophosphate anions than needed for eluting single-stranded RNA.

5. The method of any one of the claims 1 to 4 wherein eluting of the single stranded RNA from the solid phase occurs at a pyrophosphate concentration in the range of 1 mM to 500 mM, or 1 mM to 200 mM, or preferably in the range of 1 mM to 100 mM.

6. The method of any one of the claims 1 to 5 wherein the pyrophosphate is applied in a buffer as a gradient from a lower value to a higher concentration.

7. The method of any one of the claims 1 to 6 wherein a chelating agent is present in the sample.
8. The method of any one of the claims 1 to 7 wherein a chelating agent is present in an environment of the surface of the solid phase prior to the contacting of the sample.
9. The method of any one of the claims 7 or 8 wherein the chelating agents are independently selected from the group consisting of ethylenediaminetetraacetic acid (EDTA), ethylene glycol-bis(2-aminoethylether)-N,N,N',N'-tetraacetic acid (EGTA), tris(2-aminoethyl)amine, phosphoric acid, citric acid, and combinations thereof.
10. The method of any one of the claims 2 to 9 wherein the ionic strength of the washing buffer is in the range of 0.5 M to 12 M, or 1 M to 12 M, or 2 M to 12 M, or 4 M to 12 M, or 6 M to 12 M.
11. The method of claim 10 wherein the washing buffer comprises a chaotropic salt, in particular selected from the group consisting of guanidinium salts, thiocyanates, perchlorates and combinations thereof.
12. The method of any one of the claims 1 to 11 wherein the desired single-stranded RNA is of size in the range of 1000 bases to 25,000 bases.
13. Use of a solid phase comprising a surface bearing both primary and secondary amino groups for single-stranded RNA purification, wherein the molar ratio of primary amino groups to secondary amino groups is in the range of 1/10 to 10/1,

further for separating double-stranded RNA from single-stranded RNA in a mixture containing both double-stranded RNA and single-stranded RNA, which separating employs soluble pyrophosphate anions.

14. A method of single-stranded RNA purification comprising the steps:

- applying a sample containing single-stranded RNA at a pH in the range of 5.5 to 8.5 to a solid phase comprising a surface bearing both primary and secondary amino groups,

- eluting the single-stranded RNA adsorbed on the surface of the solid phase from the solid surface by means of an increasing gradient of an elution buffer having a pyrophosphate concentration in the range of 10 mM to 150 mM.

15. The method of claim 14 further comprising using an elution buffer that has a higher pH than the sample.

16. The method of claim 14 wherein after applying the sample and prior to eluting of the single-stranded RNA at least one step of washing of the solid phase is provided with a washing buffer comprising non-pyrophosphate salts at a higher ionic strength compared to the ionic strength of the elution buffer.