

**API Services offered by Crystal Pharmatech**

| UPDATED  |                      | 28-Mar-17           |  |   |  |
|--|----------------------|---------------------|--|---|--|
| Testing /Services  | Material requirement | Turnaround Time (d) | Price Per Test NJ USD                                  | Price Per Test Suzhou (China) USD                     | Comments   |
| XRPD   | 5-20mg               | 2                   | \$300.00   | \$200.00  | FAST request form submission for NJ*   |
| TGA  | 2-5mg                | 2                   | \$250.00   | \$175.00  | FAST request form submission for NJ*   |
| DSC or mDSC  | 2-5mg                | 2                   | \$250.00   | \$175.00  | FAST request form submission for NJ*   |
| DVS (Hygroscopicity / water sorption)  | 10-20mg              | 2 to 5              | \$700.00   | \$500.00  | FAST request form submission for NJ*, XRPD analysis before and after                                     |
| PSD by SLS (static light scattering); laser diffraction                        | 50mg                 | 2                   | \$300.00   | \$200.00  | FAST request form submission for NJ*   |
| Particle size and morphology – size, shape, optical microscopy                 | 2-10mg               | 2                   | \$150.00   | \$100.00  | FAST request form submission for NJ*   |
| Hot Stage microscopy   | 10mg                 | 2                   | \$300.00   | N/A   | FAST request form submission for NJ*   |
| HPLC Purity  | 10-20mg              | 3                   | \$300.00   | \$200.00  | FAST request form submission for NJ, HPLC method provided by client, price per run, minimum order \$1500 |
| HPLC Assay   | 10-20mg              | 3                   | \$200.00   | \$150.00  | FAST request form submission for NJ, HPLC method provided by client, price per run, minimum order \$1000 |
| KF (water content)   | 100mg                | 2                   | \$200.00   | \$150.00  |  |
| Solution NMR   | 10-20mg              | 3                   | \$200.00   | \$150.00  |  |
| Solid State NMR  | 200-500mg            | 7                   | \$200/h (1st), \$175/h (up to 16h), \$150/h after 16h. | \$150/h (1st), \$100/h (up to 16h), \$75/h after 16h. |  |
| Partition coefficient (log P, log D)   | 20mg                 | 4                   | \$1,800.00   | \$1,250.00  |  |
| Solubility in biorelevant SGF, FaSSIF, FeSSIF                                  | 100mg                | 4                   | \$1,800.00   | \$1,250.00  | XRPD analysis of wetcakes  |
| pH solubility (pH 1.2; 4.5; 6.8)   | 100mg                | 4                   | \$1,800.00   | \$1,250.00  | XRPD analysis of wetcakes  |
| Ionization constant (pKa) and other relevant info on charged state of molecule | 20mg                 | 4                   | \$800.00   | \$550.00  |  |
| *Additional data processing may incur a \$200 additional processing fee        |                      |                     |  |   |  |

| Services (need Proposal)   | Material requirement | Turnaround Time (d) | Price, NJ, USD    | Price, Suzhou (China), USD |   |
|--|----------------------|---------------------|-------------------|----------------------------|---|
| Salt screening of API  | 2-5g                 | 20                  | \$24,000-\$50,000 | \$17,000-\$35,000          | Desire >97% purity. Pricing depends on number of hits scaled up and amount of evaluation needed. Salt screening: Full characterization of starting material, Multi-tiered screening (class 1 and 2 salts formers), Scale-up and evaluation of 0-3 hits, Salt Selection (based on solubility/stability accelerated conditions, hygroscopicity). Polymorphism Screening of selected salt (slurries, evaporation, antisolvent, thermal, etc.), Scale-up and evaluation of 0-3 hits, Determination of hit origin (i.e. hydrate/solvate/anhydrate) Determination of critical water activity between most stable anhydrate and hydrate. |
| Polymorph screening  | 2-5g                 | 20                  | \$18,000-\$42,000 | \$13,000-\$30,000          | Desire >97% purity. Pricing depends on number of hits scaled up and if thermodynamic stability needed. Polymorphism Screening: Full characterization of starting material, Multi-tiered screening (slurries, evaporation, antisolvent, thermal, etc.), Scale-up and evaluation of 0-3 hits, Determination of hit origin (i.e. hydrate/solvate/anhydrate) Determination of critical water activity between most stable anhydrate and hydrate.  |
| Salt screening in combination with polymorph screening                 | 5-10g                | 30                  | \$38,000-\$70,000 | \$27,000-\$49,000          | Desire >97% purity - have different levels of screening based on specific project needs. Salt screening: Full characterization of starting material, Multi-tiered screening (class 1 and 2 salts formers), Scale-up and evaluation of 0-3 hits, Salt Selection (based on solubility/stability accelerated conditions, hygroscopicity). Polymorphism Screening of selected salt (slurries, evaporation, antisolvent, thermal, etc.), Scale-up and evaluation of 0-3 hits, Determination of hit origin (i.e. hydrate/solvate/anhydrate) Determination of critical water activity between most stable anhydrate and hydrate.         |
| Forced degradation study (oxygen, light, acid, base, temperature)      | 0.2-0.5g             | 10                  | \$9,400.00        | \$6,600.00                 | Forced degradation will be carried out on the compound in solution 0.1-1 mg/mL in 0.1 and 0.01 N HCl and NaOH, Oxidation (hydrogen Peroxide, radical) Photolysis (UV/White Light). Also, thermal (solid at 40 and 60 °C). HPLC Stability method will be used or developed.  |
| Amorphous solid dispersion (small scale)                               | 1-2g                 | 30                  | \$10,000.00       | \$7,000.00                 | Conduct solubility screening of API, API characterization (XRPD, DSC, TGA) Spray dry up a SDD formulations on the small scale spray dryer (typically fixed drug loading, e.g. 25% SDD). Analyze formulations for potency, crystallinity. Conduct performance testing in biorelevant media (FaSSIF, FeSSIF, and SGF) – in vitro dissolution data, 1 or 2 week physical/chemical stability under accelerated conditions.  |
| Crystallization Development  | 5-100g               | 30                  | \$45000-65000     | \$32000-\$46,000           | A optimized crystallization process will be developed and the key attributes include: Process yields uniform crystalline form, Yield, productivity, and purity is acceptable for Client. Specific deliverables around the crystallization process include: A comprehensive selection, A sound understanding of the crystallization kinetics supported with fundamental data, Detailed process description, Design and control strategies for process, A Detailed report and documentation of process demonstration at ~1 L scale to support tech transfer to a CMO for multi kilo scale process., Crystallization of a demo batch |
| Chiral Separation/Crystallization Development                          | 2-10g                | 30                  | \$30,000-45,000   | \$21,000-\$31,500          | Chiral crystallization screening with chiral salt formers and cocrystals formers. Process understanding (data generation and analysis) to design the crystallization process. Process design and demonstrated at ~1-10 grams. Provide a representative sample of pure desired enantiomer for further characterization Report detailing purification routes tested with results and analytical data as well as a detailed description of the recommended route and rationale for its selection including sourcing and some testing of raw materials.   |
| Flow properties – any relevant indices(Carr index, Hausner ratio etc.) | 1g                   | 5                   | \$1,200.00        | \$850.00                   |   |
| Formulation for preclinical studies (including GLP TOx)                | TBD                  | TBD                 | TBD               | TBD                        | Oral or Injectable- (target mg/mL determined by client). Test 6 vehicles solubility and bio-relevant dilution. Chemical (HPLC) and physical stability in top vehicle visually by checking for precipitation (ppt). PPT will be analyzed by XRPD   |

**General Terms & Conditions:**

FAST Service: payment due when report is sent

Proposal: 50% when proposal is approved, 50% when report is sent.