

SUPPLEMENTARY MATERIAL – BJFT 002/2024

A design of experiment strategy for quality control of specialty coffee drink based on sensory analysis and statistical tools

Table 1S: Experimental design table with the grades attributed by the six Q-grade evaluators for forty-three samples and two types of quality assessment and the respectively grade for the 516 experiments.

Experiment	Evaluator	Sample	Type of quality assessment	Grade
1	1	1	Traditional	79.75
2	2	1	Traditional	80
3	3	1	Traditional	85.5
4	4	1	Traditional	83.5
5	5	1	Traditional	84.25
6	6	1	Traditional	81
7	1	2	Traditional	73.75
8	2	2	Traditional	83
9	3	2	Traditional	81.75
10	4	2	Traditional	81
11	5	2	Traditional	88.75
12	6	2	Traditional	80.5
13	1	3	Traditional	80.25
14	2	3	Traditional	86.25
15	3	3	Traditional	79.75
16	4	3	Traditional	81.75
17	5	3	Traditional	83
18	6	3	Traditional	84.5
19	1	4	Traditional	82.25
20	2	4	Traditional	80
21	3	4	Traditional	79
22	4	4	Traditional	78.5
23	5	4	Traditional	80.75
24	6	4	Traditional	80.5

25	1	5	Traditional	78.5
26	2	5	Traditional	76.5
27	3	5	Traditional	79
28	4	5	Traditional	82.25
29	5	5	Traditional	81
30	6	5	Traditional	74.5
31	1	6	Traditional	79
32	2	6	Traditional	81
33	3	6	Traditional	80
34	4	6	Traditional	79.5
35	5	6	Traditional	82.25
36	6	6	Traditional	79.375
37	1	7	Traditional	73.25
38	2	7	Traditional	79.25
39	3	7	Traditional	77.75
40	4	7	Traditional	81
41	5	7	Traditional	81.5
42	6	7	Traditional	80.25
43	1	8	Traditional	71
44	2	8	Traditional	71
45	3	8	Traditional	72
46	4	8	Traditional	74
47	5	8	Traditional	72
48	6	8	Traditional	70
49	1	9	Traditional	82.25
50	2	9	Traditional	82.75
51	3	9	Traditional	82
52	4	9	Traditional	83.5
53	5	9	Traditional	85.5
54	6	9	Traditional	81.5
55	1	10	Traditional	80.1
56	2	10	Traditional	81
57	3	10	Traditional	82
58	4	10	Traditional	79.5
59	5	10	Traditional	86

60	6	10	Traditional	80
61	1	11	Traditional	82.5
62	2	11	Traditional	80.1
63	3	11	Traditional	80.25
64	4	11	Traditional	79
65	5	11	Traditional	83.75
66	6	11	Traditional	81.75
67	1	12	Traditional	82.25
68	2	12	Traditional	78.75
69	3	12	Traditional	80
70	4	12	Traditional	83.25
71	5	12	Traditional	82.75
72	6	12	Traditional	80.75
73	1	13	Traditional	82.25
74	2	13	Traditional	79
75	3	13	Traditional	76.25
76	4	13	Traditional	77
77	5	13	Traditional	80.5
78	6	13	Traditional	81
79	1	14	Traditional	79
80	2	14	Traditional	77.75
81	3	14	Traditional	77.75
82	4	14	Traditional	79.5
83	5	14	Traditional	79.25
84	6	14	Traditional	76.25
85	1	15	Traditional	78.25
86	2	15	Traditional	85
87	3	15	Traditional	71.5
88	4	15	Traditional	80
89	5	15	Traditional	83.75
90	6	15	Traditional	84.5
91	1	16	Traditional	79.75
92	2	16	Traditional	78.35
93	3	16	Traditional	72
94	4	16	Traditional	76

95	5	16	Traditional	76
96	6	16	Traditional	76
97	1	17	Traditional	82
98	2	17	Traditional	83
99	3	17	Traditional	70
100	4	17	Traditional	80.5
101	5	17	Traditional	84.5
102	6	17	Traditional	76.25
103	1	18	Traditional	82.25
104	2	18	Traditional	81.25
105	3	18	Traditional	86
106	4	18	Traditional	81.75
107	5	18	Traditional	85.5
108	6	18	Traditional	76
109	1	19	Traditional	75.25
110	2	19	Traditional	82
111	3	19	Traditional	80
112	4	19	Traditional	80.5
113	5	19	Traditional	80.5
114	6	19	Traditional	85.25
115	1	20	Traditional	74
116	2	20	Traditional	83.5
117	3	20	Traditional	83.5
118	4	20	Traditional	83.25
119	5	20	Traditional	77.75
120	6	20	Traditional	85.25
121	1	21	Traditional	79
122	2	21	Traditional	82.75
123	3	21	Traditional	82.75
124	4	21	Traditional	79
125	5	21	Traditional	84
126	6	21	Traditional	76
127	1	22	Traditional	75.5
128	2	22	Traditional	78
129	3	22	Traditional	77

130	4	22	Traditional	75
131	5	22	Traditional	78
132	6	22	Traditional	79
133	1	23	Traditional	79.5
134	2	23	Traditional	84.2
135	3	23	Traditional	80.25
136	4	23	Traditional	82
137	5	23	Traditional	82.25
138	6	23	Traditional	85
139	1	24	Traditional	80
140	2	24	Traditional	82.5
141	3	24	Traditional	84
142	4	24	Traditional	83.5
143	5	24	Traditional	84
144	6	24	Traditional	86
145	1	25	Traditional	79.25
146	2	25	Traditional	76
147	3	25	Traditional	77.75
148	4	25	Traditional	79
149	5	25	Traditional	80
150	6	25	Traditional	78
151	1	26	Traditional	66.5
152	2	26	Traditional	69
153	3	26	Traditional	75
154	4	26	Traditional	78
155	5	26	Traditional	76.5
156	6	26	Traditional	75.25
157	1	27	Traditional	79.5
158	2	27	Traditional	78.5
159	3	27	Traditional	78
160	4	27	Traditional	79.5
161	5	27	Traditional	79.5
162	6	27	Traditional	79
163	1	28	Traditional	63
164	2	28	Traditional	71.25

165	3	28	Traditional	70
166	4	28	Traditional	79
167	5	28	Traditional	78.25
168	6	28	Traditional	75.75
169	1	29	Traditional	78.75
170	2	29	Traditional	84.25
171	3	29	Traditional	84.25
172	4	29	Traditional	83.75
173	5	29	Traditional	84
174	6	29	Traditional	87.25
175	1	30	Traditional	78.5
176	2	30	Traditional	84
177	3	30	Traditional	86
178	4	30	Traditional	80
179	5	30	Traditional	77.6
180	6	30	Traditional	85.75
181	1	31	Traditional	78
182	2	31	Traditional	79
183	3	31	Traditional	76
184	4	31	Traditional	79
185	5	31	Traditional	80
186	6	31	Traditional	79
187	1	32	Traditional	80.5
188	2	32	Traditional	85
189	3	32	Traditional	85
190	4	32	Traditional	81.75
191	5	32	Traditional	83
192	6	32	Traditional	87.5
193	1	33	Traditional	75
194	2	33	Traditional	81.25
195	3	33	Traditional	74
196	4	33	Traditional	77
197	5	33	Traditional	84.75
198	6	33	Traditional	86.5
199	1	34	Traditional	75.5

200	2	34	Traditional	83.5
201	3	34	Traditional	83.5
202	4	34	Traditional	79.25
203	5	34	Traditional	84
204	6	34	Traditional	85
205	1	35	Traditional	75.25
206	2	35	Traditional	76
207	3	35	Traditional	78.25
208	4	35	Traditional	76.5
209	5	35	Traditional	76.5
210	6	35	Traditional	86
211	1	36	Traditional	72.75
212	2	36	Traditional	82
213	3	36	Traditional	88
214	4	36	Traditional	82
215	5	36	Traditional	85.75
216	6	36	Traditional	74.5
217	1	37	Traditional	79.75
218	2	37	Traditional	79.5
219	3	37	Traditional	76
220	4	37	Traditional	78.25
221	5	37	Traditional	81.75
222	6	37	Traditional	76.5
223	1	38	Traditional	73.25
224	2	38	Traditional	73.75
225	3	38	Traditional	81.75
226	4	38	Traditional	84.25
227	5	38	Traditional	83.5
228	6	38	Traditional	85.25
229	1	39	Traditional	75.5
230	2	39	Traditional	82
231	3	39	Traditional	88
232	4	39	Traditional	81.75
233	5	39	Traditional	84.25
234	6	39	Traditional	75

235	1	40	Traditional	82.25
236	2	40	Traditional	81.85
237	3	40	Traditional	75.75
238	4	40	Traditional	86
239	5	40	Traditional	84.25
240	6	40	Traditional	81
241	1	41	Traditional	81
242	2	41	Traditional	80
243	3	41	Traditional	82
244	4	41	Traditional	79
245	5	41	Traditional	81.5
246	6	41	Traditional	80
247	1	42	Traditional	79.75
248	2	42	Traditional	84
249	3	42	Traditional	83.75
250	4	42	Traditional	85.25
251	5	42	Traditional	84.5
252	6	42	Traditional	87.25
253	1	43	Traditional	74
254	2	43	Traditional	64
255	3	43	Traditional	72.5
256	4	43	Traditional	69.5
257	5	43	Traditional	72.75
258	6	43	Traditional	75
259	1	44	Traditional	73.25
260	2	44	Traditional	76.25
261	3	44	Traditional	80
262	4	44	Traditional	79
263	5	44	Traditional	79
264	6	44	Traditional	75
265	1	1	Guided	82.25
266	2	1	Guided	79.5
267	3	1	Guided	79
268	4	1	Guided	80.1
269	5	1	Guided	80.05

270	6	1	Guided	80
271	1	2	Guided	82.75
272	2	2	Guided	79.5
273	3	2	Guided	85
274	4	2	Guided	82
275	5	2	Guided	86.75
276	6	2	Guided	80
277	1	3	Guided	79.5
278	2	3	Guided	83.5
279	3	3	Guided	70
280	4	3	Guided	76
281	5	3	Guided	83.25
282	6	3	Guided	86.5
283	1	4	Guided	85.25
284	2	4	Guided	82
285	3	4	Guided	83.5
286	4	4	Guided	83.5
287	5	4	Guided	85.25
288	6	4	Guided	74
289	1	5	Guided	82
290	2	5	Guided	80
291	3	5	Guided	74
292	4	5	Guided	84.5
293	5	5	Guided	82.75
294	6	5	Guided	83.58
295	1	6	Guided	87.25
296	2	6	Guided	81.25
297	3	6	Guided	84
298	4	6	Guided	82
299	5	6	Guided	86.5
300	6	6	Guided	85.5
301	1	7	Guided	81.5
302	2	7	Guided	77.75
303	3	7	Guided	78.5
304	4	7	Guided	80.5

305	5	7	Guided	81
306	6	7	Guided	77
307	1	8	Guided	66
308	2	8	Guided	71
309	3	8	Guided	69
310	4	8	Guided	68
311	5	8	Guided	72
312	6	8	Guided	70
313	1	9	Guided	85
314	2	9	Guided	84.5
315	3	9	Guided	82
316	4	9	Guided	85.5
317	5	9	Guided	87.25
318	6	9	Guided	86
319	1	10	Guided	85.25
320	2	10	Guided	83.75
321	3	10	Guided	79
322	4	10	Guided	82.4
323	5	10	Guided	82.75
324	6	10	Guided	79.8
325	1	11	Guided	87.25
326	2	11	Guided	78.25
327	3	11	Guided	79
328	4	11	Guided	84
329	5	11	Guided	86
330	6	11	Guided	81.5
331	1	12	Guided	81.5
332	2	12	Guided	82
333	3	12	Guided	79
334	4	12	Guided	82
335	5	12	Guided	84.75
336	6	12	Guided	81
337	1	13	Guided	80
338	2	13	Guided	74.5
339	3	13	Guided	70

340	4	13	Guided	79.75
341	5	13	Guided	80.5
342	6	13	Guided	72
343	1	14	Guided	80
344	2	14	Guided	77
345	3	14	Guided	78
346	4	14	Guided	75
347	5	14	Guided	79
348	6	14	Guided	77
349	1	15	Guided	83.5
350	2	15	Guided	83
351	3	15	Guided	75
352	4	15	Guided	82.25
353	5	15	Guided	84.5
354	6	15	Guided	85.25
355	1	16	Guided	80
356	2	16	Guided	79
357	3	16	Guided	78
358	4	16	Guided	77
359	5	16	Guided	76
360	6	16	Guided	78
361	1	17	Guided	77
362	2	17	Guided	84.5
363	3	17	Guided	75
364	4	17	Guided	86
365	5	17	Guided	82.5
366	6	17	Guided	86.35
367	1	18	Guided	85.5
368	2	18	Guided	82
369	3	18	Guided	85
370	4	18	Guided	80.5
371	5	18	Guided	82.75
372	6	18	Guided	79.5
373	1	19	Guided	81.25
374	2	19	Guided	82.25

375	3	19	Guided	79
376	4	19	Guided	80
377	5	19	Guided	85.75
378	6	19	Guided	74.5
379	1	20	Guided	86.5
380	2	20	Guided	83.5
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386	2	21	Guided	80.25
387	3	21	Guided	80
388	4	21	Guided	85.5
389	5	21	Guided	84.5
390	6	21	Guided	80.25
391	1	22	Guided	80.5
392	2	22	Guided	80.5
393	3	22	Guided	72.5
394	4	22	Guided	78.5
395	5	22	Guided	79.5
396	6	22	Guided	79.25
397	1	23	Guided	85.5
398	2	23	Guided	84.25
399	3	23	Guided	85.5
400	4	23	Guided	87.25
401	5	23	Guided	83.25
402	6	23	Guided	82.5
403	1	24	Guided	83.25
404	2	24	Guided	83
405	3	24	Guided	86
406	4	24	Guided	87
407	5	24	Guided	84.25
408	6	24	Guided	85
409	1	25	Guided	79

410	2	25	Guided	79
411	3	25	Guided	76.5
412	4	25	Guided	78.75
413	5	25	Guided	78
414	6	25	Guided	78
415	1	26	Guided	68
416	2	26	Guided	60
417	3	26	Guided	68
418	4	26	Guided	69
419	5	26	Guided	68
420	6	26	Guided	70
421	1	27	Guided	80.75
422	2	27	Guided	78.75
423	3	27	Guided	79.5
424	4	27	Guided	79.5
425	5	27	Guided	74.25
426	6	27	Guided	79
427	1	28	Guided	76.25
428	2	28	Guided	75.5
429	3	28	Guided	76
430	4	28	Guided	75
431	5	28	Guided	79
432	6	28	Guided	76
433	1	29	Guided	88
434	2	29	Guided	87
435	3	29	Guided	87.5
436	4	29	Guided	85.5
437	5	29	Guided	86.25
438	6	29	Guided	88.25
439	1	30	Guided	87
440	2	30	Guided	85
441	3	30	Guided	84
442	4	30	Guided	82.5
443	5	30	Guided	80.75
444	6	30	Guided	84.05

445	1	31	Guided	79.75
446	2	31	Guided	81.75
447	3	31	Guided	79.25
448	4	31	Guided	78
449	5	31	Guided	83.25
450	6	31	Guided	77.5
451	1	32	Guided	88.75
452	2	32	Guided	88.25
453	3	32	Guided	88
454	4	32	Guided	87.5
455	5	32	Guided	86
456	6	32	Guided	88.5
457	1	33	Guided	84.75
458	2	33	Guided	84.5
459	3	33	Guided	82.5
460	4	33	Guided	82
461	5	33	Guided	83.5
462	6	33	Guided	86.75
463	1	34	Guided	87.75
464	2	34	Guided	87
465	3	34	Guided	86
466	4	34	Guided	86.25
467	5	34	Guided	83.5
468	6	34	Guided	87.5
469	1	35	Guided	82
470	2	35	Guided	76.25
471	3	35	Guided	71
472	4	35	Guided	80.25
473	5	35	Guided	83
474	6	35	Guided	80
475	1	36	Guided	79
476	2	36	Guided	83.25
477	3	36	Guided	84
478	4	36	Guided	84
479	5	36	Guided	87

480	6	36	Guided	85
481	1	37	Guided	79
482	2	37	Guided	80
483	3	37	Guided	79
484	4	37	Guided	79
485	5	37	Guided	78
486	6	37	Guided	79
487	1	38	Guided	85.25
488	2	38	Guided	83
489	3	38	Guided	83.25
490	4	38	Guided	83
491	5	38	Guided	83.25
492	6	38	Guided	88.5
493	1	39	Guided	85
494	2	39	Guided	82.25
495	3	39	Guided	84.25
496	4	39	Guided	85
497	5	39	Guided	86.5
498	6	39	Guided	87.3
499	1	40	Guided	85
500	2	40	Guided	84.25
501	3	40	Guided	80
502	4	40	Guided	85
503	5	40	Guided	86.25
504	6	40	Guided	84.1
505	1	41	Guided	81.75
506	2	41	Guided	80
507	3	41	Guided	79.75
508	4	41	Guided	83
509	5	41	Guided	82.25
510	6	41	Guided	81
511	1	42	Guided	85.5
512	2	42	Guided	84.25
513	3	42	Guided	84
514	4	42	Guided	84

515	5	42	Guided	86
516	6	42	Guided	83.75
517	1	43	Guided	75
518	2	43	Guided	75.5
519	3	43	Guided	72.5
520	4	43	Guided	76
521	5	43	Guided	79
522	6	43	Guided	79
523	1	44	Guided	75
524	2	44	Guided	76.25
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526	4	44	Guided	78.5
527	5	44	Guided	78
528	6	44	Guided	79.75

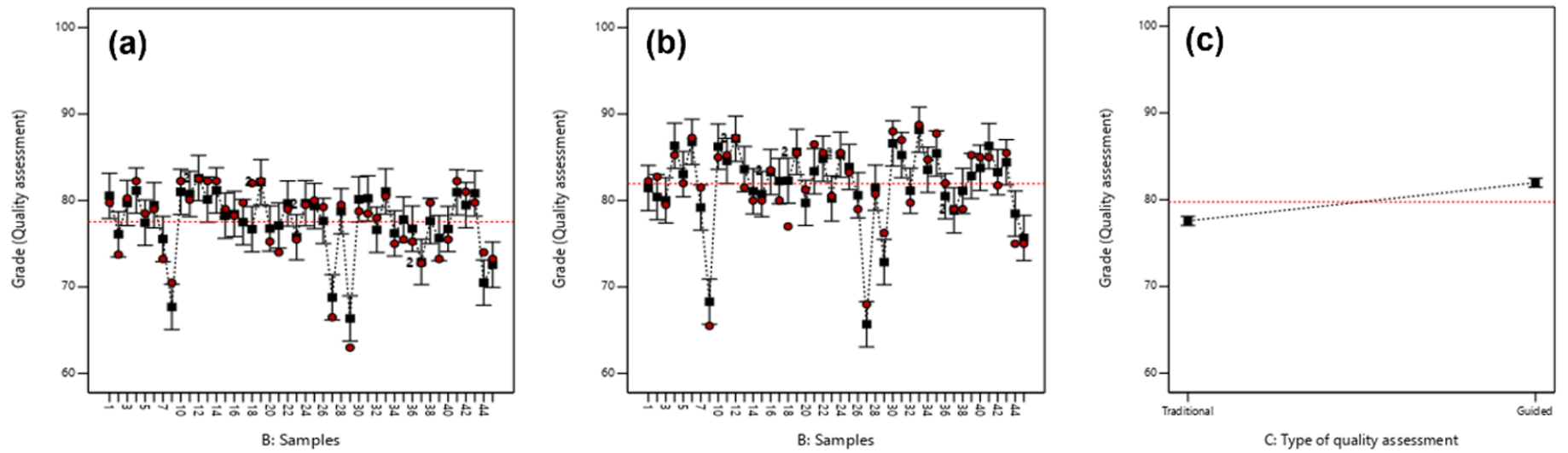


Figure 1S: Grade attributed for the samples by the evaluators using traditional (a) and guided (b) type of quality assessment. The statistical comparison between the way the grade was calculated for each evaluator using the average values for the samples and the t hypothesis test (c).

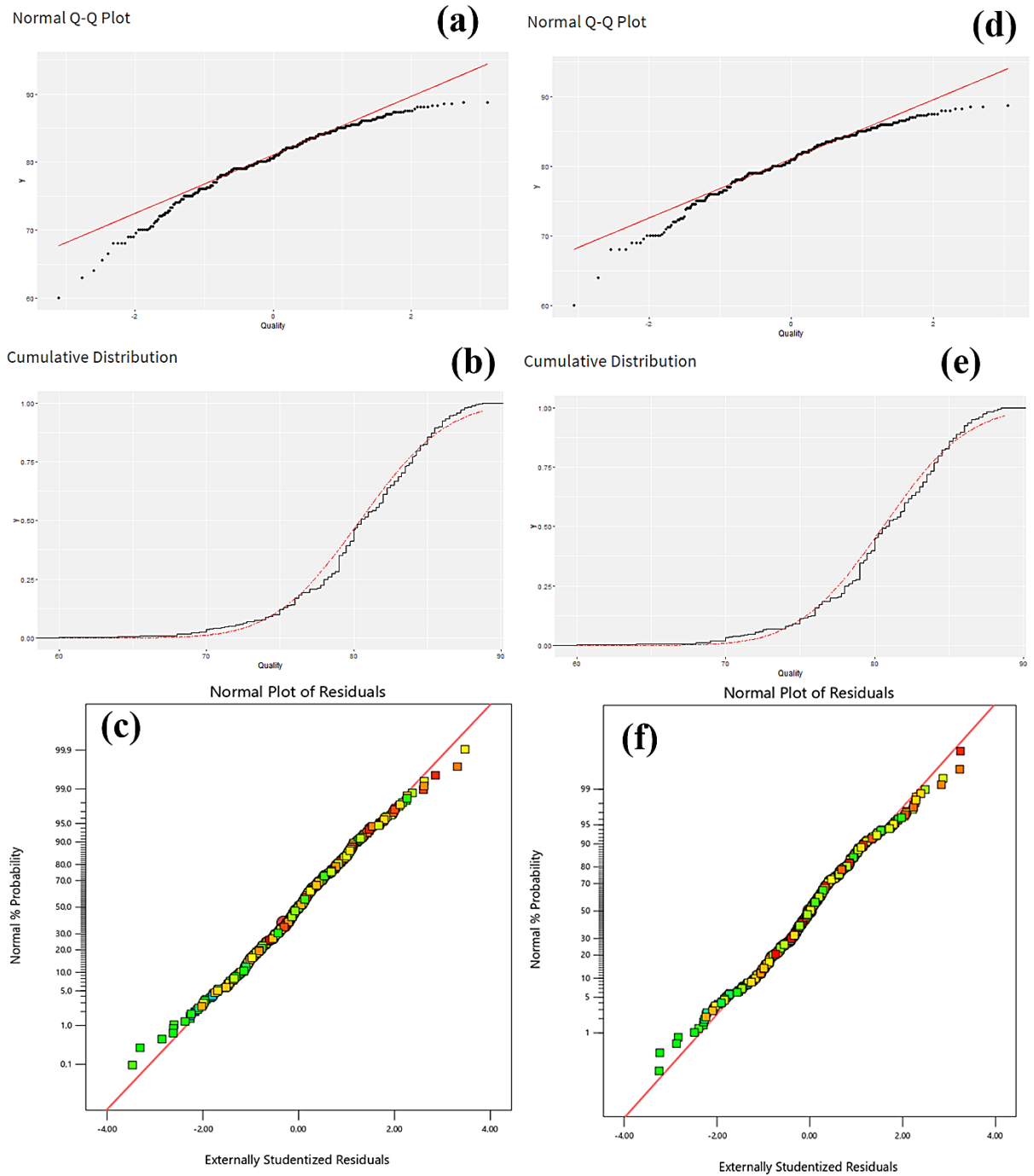


Figure 2S: Normal qq-plot (a,d) and cumulative distribution (b,e) for the raw data, qq-plot for for the DOE model residue (c,f), built with the grades attributed by all the Q-graders (a, b, c) and without the Q-grader that present biased grades (d, e, f).