

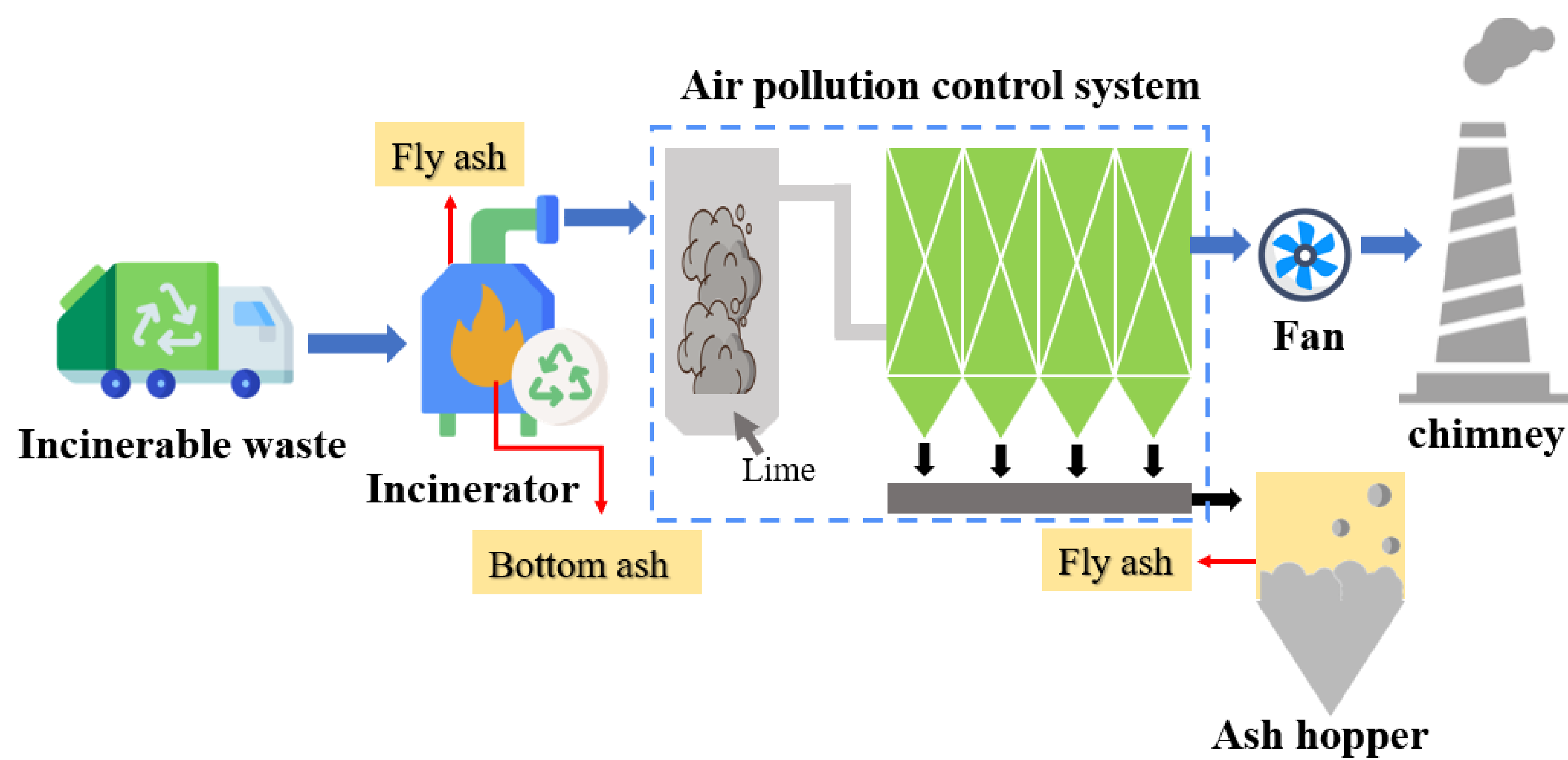
Comparative study on the heavy metals stabilization performance of different organic chelating agents in municipal solid waste incineration fly ash

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Introduction & Objective

Municipal solid waste incineration fly ash (MSWI FA) has been identified as hazardous waste, and its output has increased year by year.



- MSWI FA contains a significant amount of hazardous wastes, including chlorides, persistent organic pollutants, and toxic heavy metals (Pb, Cr, Cd, As, Hg, etc.).
- Heavy metal pollution in China, with a high potential for leaching and pollution.

Objective

- To investigate the stabilization effect of three chelating agents on heavy metals in FA.
- Determine the best adding proportion of chelating agent.

Materials & Methods

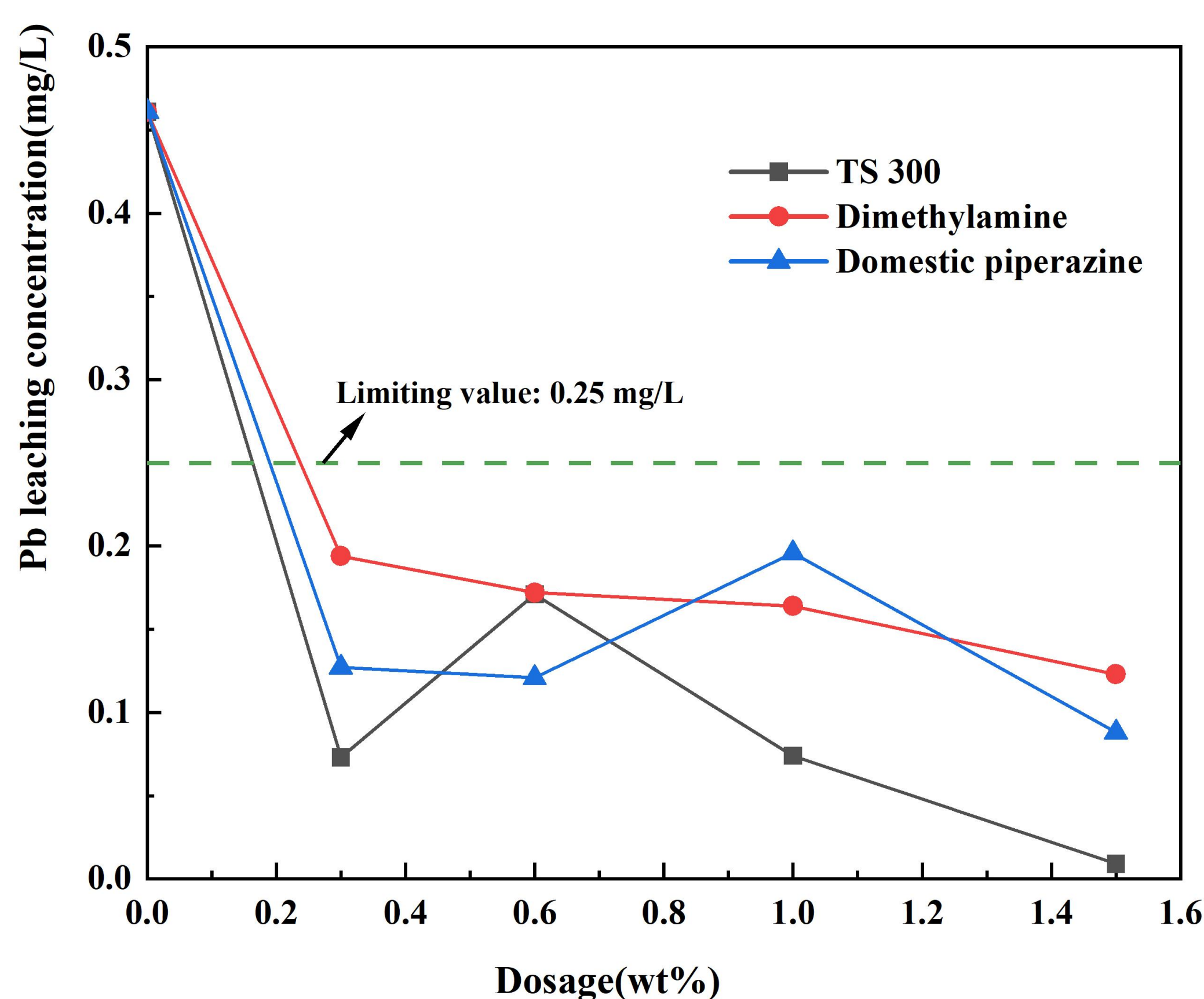
- **FA:** Chengdu, China
- **Chelating agent:** TS300, Dimethylamine, Domestic piperazine
- **The total heavy metal contents:** Microwave digestion method
- **Leaching toxicity:** The Solid Waste Leaching Toxicity Leaching Method Acetic Acid Buffer Solution Method (HJ/T 300 - 2007)
- **Heavy metal forms:** The modified BCR method

Results & Discussion

Table 1 Heavy metals leaching and total amount of raw FA

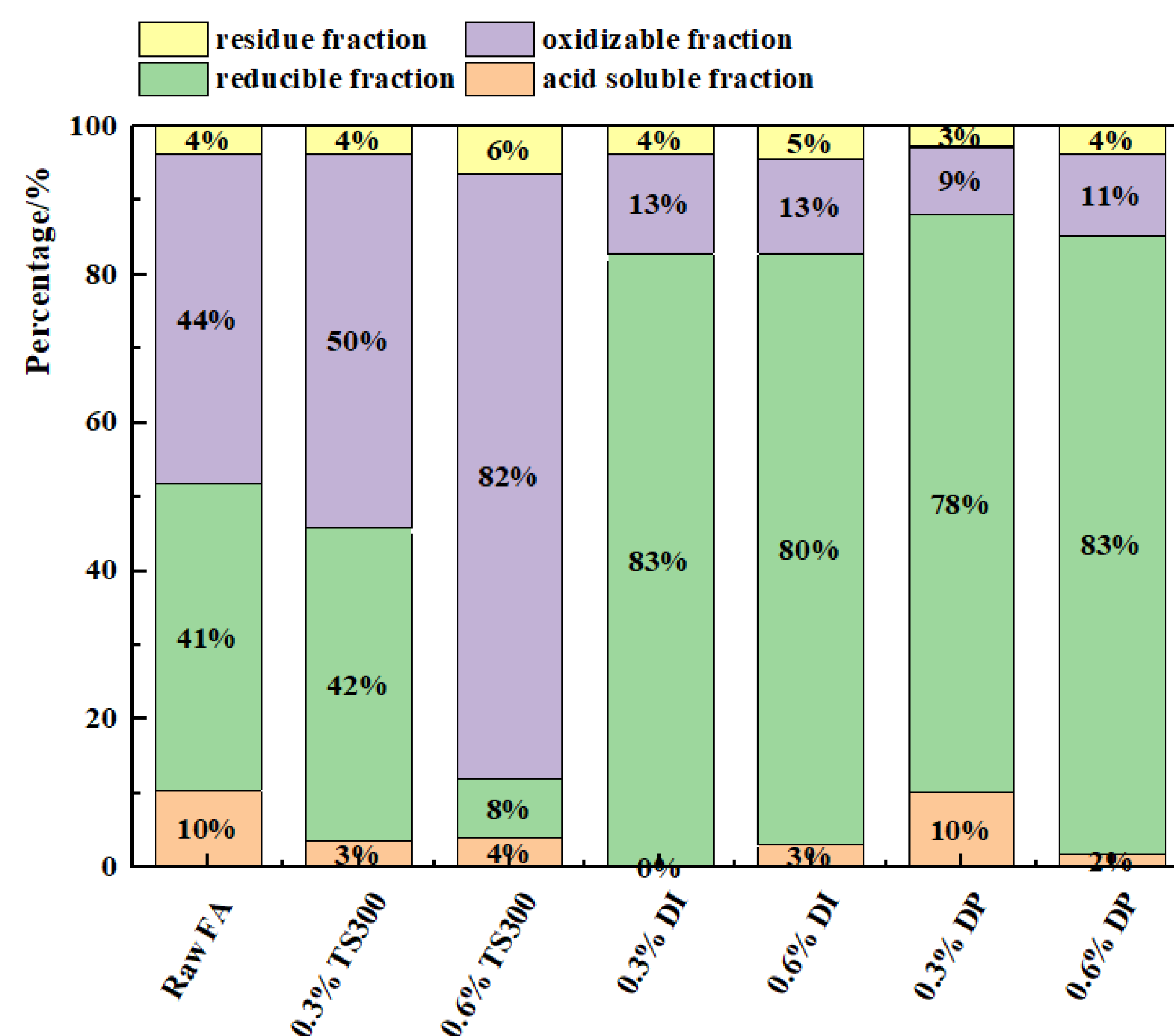
	HJ/T 300 (mg/L)	Total contents (mg/kg)
As	0.005	170
Zn	0.345	4770
Pb	0.461	740
Ni	0.004	350
Cd	0.013	220
Cr	0.021	10
Cu	0.030	405

Fig.1 Pb leaching toxicity with different CA and dosages



- ✓ The three chelating agents used at a **0.3%** concentration have a lower leaching concentration of Pb than the standard limit value given in GB 16889-2008.

Fig 2 Speciation distribution of Pb with different CA



- ✓ The percentage of F1 and F2 fraction reduced by a combined 33% for TS300 when the addition amount was raised from 0.3% to 0.6%.
- ✓ F1 of Pb in the FA treated with the other two chelating agents was reduced, but its F2 fraction was significantly increased.

Summary

- ◆ All three chelating agents in this study could meet the landfill limits at a **0.3wt% addition**, and the leaching amount of TS300 is the lowest.
- ◆ The F1 and F2 components of Pb treated with TS300 accounted for the least when the addition amounts were the same.
- ◆ The treatment effect of **TS300** was better than the other two chelating agents.