

**RESIDUES OF SODIUM METABISULPHITE IN FROZEN  
SHRIMP, *Penaeus monodon* IN RELATION TO TREATMENT  
PRACTICES ADOPTED BY SHRIMP PROCESSORS  
IN SRI LANKA**

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## ABSTRACT

Sodium metabisulphite dip treatment is used to control melanosis, the post harvest discolouration of shrimp, which lowers the market value of shrimp products. However, maximum permissible limits are specified by exporting countries on residue sodium metabisulphite level in shrimp, as ingestion of sulphiting agents in shrimp may precipitate allergic-type reactions in hypersensitive asthmatics.

Hence, the present study was conducted to assess the residual levels of sodium metabisulphite and organoleptic quality changes during frozen storage at  $-18^{\circ}\text{C}$  in tiger shrimp (*Penaeus monodon*) processed for export from Sri Lanka. Further, the effects of different sodium metabisulphite treatment concentrations on organoleptic quality of ice stored head-on shrimp and the effects of ice storage and frozen storage on residue levels of sodium metabisulphite in shrimp treated with 1.25 % solution of sodium metabisulphite for a one minute were also investigated.

The results revealed that the residues of sodium metabisulphite in edible portion of block frozen shrimp processed by six shrimp processors during the period June to December 2001 for export market were well below the maximum limit specified (i.e. 100 mg/kg expressed as  $\text{SO}_2$ ) by main shrimp exporting countries. However, as the residue levels of sodium metabisulphite had exceeded 10 mg/kg, head-on shrimp exported from all six

processors, require a declaration on the label of food that indicating the presence of sulphiting agents in shrimp when exporting to USA.

Despite variations in residual sodium metabisulphite level according to the treatment practices, the treatment practices adopted by six processors had no significant effect on organoleptic quality of the block frozen shrimp reducing shelf life on frozen storage at  $-18\text{ }^{\circ}\text{C}$ . However, the treatment of sodium metabisulphite is required to keep the storage life of block frozen shrimp for more than 12 months. The treatment practice of two processing plants that were using the lowest sodium metabisulphite concentration while the treatment followed at all washing steps, reported the lowest sodium metabisulphite residue content and was effective enough to control melanosis in shrimp. Therefore, adoption of the sodium metabisulphite treatment practice of these two processing plants is recommended in order to minimize residue levels of sodium metabisulphite in shrimp without affecting the organoleptic quality.

The residue levels of sodium metabisulphite in shrimp treated with 1.25 % solution of sodium metabisulphite had decreased to a negligible level of less than 10 mg/kg as  $\text{SO}_2$  by the 5<sup>th</sup> day when the shrimp were kept under ice whereas the residue levels of sodium metabisulphite in block frozen shrimp had no change over frozen storage. Dip treatment of shrimp with 0.625 % and 1.25 % of sodium metabisulphite had extended the shelf life of ice stored shrimp up to 12 and 14 days respectively in comparison to the 7 days storage period of untreated controls. It was also found that there is a possibility to reduce the dip treatment concentration of sodium metabisulphite than 0.625 % level for

the shrimp intended to be processed into frozen products while keeping the adequate control over melanosis in shrimp after reviewing the actual practices such as ice storage conditions and possible delays in the production process of individual processing plant. However, if the shrimp is intended to be presented to the market as fresh, 1.25 % dip concentration of sodium metabisulphite is required to achieve the storage life of 14 days in ice storage.