

variability of the sensitivities of major identifiable subgroups of consumers, including infants and children. The nature of the toxic effects caused by pelargonic acid (nonanoic acid) are discussed in this unit.

A. Acute Toxicity

As a result of a number of acute toxicity studies, technical pelargonic acid is placed in the following Toxicity Categories: Primary eye irritation (Toxicity Category II), primary eye irritation (Toxicity Category II), acute oral toxicity (Toxicity Category IV), acute dermal and inhalation toxicity (Toxicity Category III). Sensitization test results showed that pelargonic acid cannot be considered a dermal sensitizer.

B. Subchronic and Chronic Toxicity

In an oral toxicity study (conducted for 14-days), no systemic toxicity was observed with either sex even at the highest dose tested, 20,000 parts per million (ppm) (1,834 milligrams/kilogram/day (mg/kg/day)). In addition, pelargonic acid showed no adverse effects on survival, clinical signs, body weight gain, food consumption, hematology, clinical chemistry or gross pathology. For each dose, three animals per sex were tested. However, the study did not report organ weights and histopathology. This was considered a deficiency in this study. Nevertheless, the Agency determined that because no toxic effects were observed at a very high level of ~ 2,000 mg/kg, a 90-day oral study was not necessary.

A 28-day dermal toxicity study conducted on rabbits was submitted to the Agency under TSCA section 8(e). Five male and five female New Zealand white rabbits were dermally treated with pelargonic acid present in mineral oil. In all, 10 applications were made (5 per week) at a dose level of 500 mg/kg/day. A 2-week recovery period was allowed for selected rabbits. During the first and second week of treatment, slight body weight loss and decreased food consumption were observed. One female rabbit showed ocular discharge and hypoactivity during the second week of treatment. All rabbits dermally treated with pelargonic acid by day 14 showed signs of severe erythema and moderate edema. Dermal reactions consisting of moderate desquamation, moderate fissuring, eschar, exfoliation and necrosis were also observed at day 14. By day 29, all dermal reactions had reversed. It was evident that at the treatment level of 500 mg/kg/day of pelargonic acid, significant dermal signs of toxicity were observed but no significant systemic reaction.

A supplemental study on chronic toxicity/carcinogenicity in mice was conducted for 80 weeks. A dose of 50 mg of pelargonic acid was dermally applied to each mouse twice/day for 80 weeks. Histopathology showed no non-neoplastic or neoplastic lesions on skins and internal organs of mice. The Agency concluded that this study although not exactly conducted according to guideline, adequately assesses the chronic toxicity and the carcinogenic potential of pelargonic acid via the dermal route.

C. Developmental Toxicity

A development toxicity was conducted on a group of 22 pregnant Crl:COBS CD(SD)BR rats. These rats were treated with pelargonic acid in corn oil at a dose of 1,500 mg/kg on gestation days 6 through 15 (both days inclusive). Maternal body weight was not significantly affected during the treatment. Only 1 out of 22 animals showed signs of clinical toxicity. No significant histopathology signs were observed in the maternal animals. Pelargonic acid treatment did not have any significant effect on cesarean section observations. Four fetuses in one litter showed a higher incidence of cleft palate compared to the control mean. For maternal toxicity, the Agency has determined the no observed adverse effect level (NOAEL) to be greater than 1,500 mg/kg/day. Because fetal effects were observed at 1,500 mg/kg/day, the NOAEL for developmental toxicity was not determined. The Agency has determined that this dose is in excess of the Agency's limit dose for toxic effects. The type and level of exposure expected from the use of this chemical is much lower than the dose level shown in the study.

D. Mutagenicity/Carcinogenicity

Ames Test (Salmonella/reverse mutation assay) showed pelargonic acid to be non-mutagenic. Similarly, *in vivo* cytogenetics study using micronucleus assay gave a negative result. In a mouse lymphoma forward mutation study, pelargonic acid appears to induce a weak mutagenic response at or higher than 50 milligrams/milliliter (mg/mL) level. This was observed in the presence of increasing toxicity, and may be an indication of gross chromosomal changes or damage and not actual mutational changes within the thymidine kinase gene locus.

As described above, a summary of the results of a dermal carcinogenicity study in mice with pelargonic acid was submitted. Fifty mice were treated twice-weekly with 50 mg doses of undiluted pelargonic acid for 80 weeks.

No evidence of severe dermal or systemic toxicity was seen. Histopathology revealed no tumors of the skin or the internal organs

E. Exposure Assessment

In examining aggregate exposure, FFDCA section 408 directs EPA to consider available information concerning exposures from the pesticide residue in food and all other non-occupational exposures, including drinking water from ground water or surface water and exposure through pesticide use in gardens, lawns, or buildings (residential and other indoor uses). The Agency has considered available information on the aggregate exposure levels of consumers (and major identifiable subgroups of consumers) to the pesticide chemical residue of pelargonic acid (nonanoic acid) and to other related substances. In these considerations, the Agency has included dietary exposure under the tolerance exemption and all other tolerances or exemptions in effect for pelargonic acid's chemical residue and exposure from non-occupational sources. The Food and Drug Administration has cleared pelargonic acid as a synthetic food flavoring agent (21 CFR 172.515), as an adjuvant, production aid and sanitizer to be used in contact with food (21 CFR 178.1010(b)) and in washing or to assist in lye peeling of fruits and vegetables (up to 1%) (21 CFR 173.315). Pelargonic acid is also exempt from the requirement of a tolerance when used in or on all food commodities, as a plant regulator on plants, seeds, or cuttings after harvest in accordance with GAP. It is also exempt from a tolerance when used as a herbicide on all plant food commodities provided that allocations are not made directly to the food commodity except when used as a harvest aid or dessicant to any root or tuber vegetable, bulb, or cotton (40 CFR 180.1159). Applications of the proposed end-use products containing pelargonic acid will not directly contact edible portions of food commodities.

1. *Food.* For the proposed sanitizer uses, a worst case dietary exposure estimate has been calculated, assuming that all food consumed by an adult or child has contacted a sanitized surface using pelargonic acid, that a 1 mg/cm² sanitizer residue remains on the surface, and that 100% of the residue (170 ppm) is transferred to the food from the surface. Using these assumptions, in which all food contacts 4,000 cm² of sanitized non-porous food-contact surfaces a worst case dietary exposure of 680 µg/day is calculated. For a 70 kg adult this becomes 9.7 µg/kg/day and for