

**Opinion of the Scientific Panel on Food Additives,
Flavourings, Processing Aids and Materials in Contact with Food
(AFC) on a request from the Commission related the use of
mineral oils in jute and sisal bags**

Question No EFSA-Q-2003-072

Adopted on 7 December 2004

SUMMARY

The Scientific Panel on Food Additives, Flavourings, Processing Aids and Materials in Contact with Food (AFC) has been asked to give an opinion on the use of mineral oils in jute bags. The Panel has chosen to include in its assessment the use of these oils in sisal bags as well.

Jute and sisal bags are used to transport raw materials, plants and fruit used for food production. In the manufacturing of jute and sisal bags, the use of batching oils is needed to soften the fibres before spinning. When semivolatile mineral hydrocarbons are present in batching oils, these may be transferred from the fibres to the food transported in the bags by evaporation and recondensation.

The International Jute Organisation (IJO) currently recommends that batching oil shall only contain non-toxic ingredients and it shall not contain compounds that produce off-flavours or off-tastes in food. The IJO also specifies limits for the presence of unsaponifiable material in the bags (less than 1250 mg/kg jute fibre). If these specifications for unsaponifiable residues in the bags are followed, the use of mineral oils as batching oils, and thus contamination of food, is effectively ruled out and the release of semivolatile mineral hydrocarbons from jute and sisal bags is expected to be significantly reduced. If the proposed specifications are followed, human exposure to semivolatile mineral hydrocarbons from jute and sisal bags is estimated to be well below the temporary Acceptable Daily Intake (ADI) for mineral hydrocarbons set by the Scientific Committee on Food in 1995. Adherence to the specifications can be monitored in the producing countries with simple laboratory equipment.

Adherence to the IJO specifications would result in a major reduction of human exposure to mineral hydrocarbons from food packaged in jute and sisal bags and in this aspect no further purity criteria are necessary.

The use of edible rice-bran oil or palm oil would not result in food contamination with semivolatile mineral hydrocarbons. However, more detailed specifications on batching

oils said to be “based on” rice-bran oil or palm oil are needed for a full assessment of potential effects of such oils on human health.

KEY WORDS

Palm oil, rice bran oil, mineral hydrocarbons, food contamination, jute bags, sisal bags

BACKGROUND

Jute and sisal bags are used for packaging and transporting of dry foods, such as nuts, cocoa and coffee beans, rice and oil seeds. They are manufactured from jute or sisal fibres, which need to be softened before spinning. Softening is achieved by what is called a "batching oil". Usually, 50 g of batching oil is applied to each kg of jute or sisal fibres. After airing, the remaining residue amounts to 1 – 3 % of the fibre weight. Traditionally, mineral oils have been utilised as batching oil. The sources of the mineral oils included refined and waste mineral oils. The main producers of jute fibres and bags are Bangladesh, India and China, those of sisal bags Africa and South America. Jute and sisal bags fall under the scope of the Framework Directive 1935/2004/EEC on materials and articles intended to come into contact with foodstuff. Article 2 of this Directive states that the food contact article shall neither endanger human health nor change the properties of the foodstuff in an unacceptable way.

The problem of mineral batching oils transferred from jute and sisal bags to foods is a well-known and documented issue since 1988. Residues of mineral oil have been found in oil seeds and vegetable oils, cocoa beans and chocolate, rice, coffee, as well as in hazel nuts and other nuts. In 1998, the International Jute Organisation (IJO) adopted “Special criteria for the manufacture of jute bags used in the packaging of selected food materials (cocoa beans, coffee beans and shelled nuts)”. The oil shall only contain non-toxic ingredients and it shall not contain compounds that produce off-flavours or off-tastes in food. Unsaponifiables should be less than 1250 mg/kg jute fibre determined according to British Standard 3854. In the jute bag, no undesirable odours shall be present determined according to EN 767. Before 1998, virtually all jute and sisal bags were made of fibres batched with mineral oil material. Today, a majority of them no longer contain mineral batching oils. As an alternative to mineral oils, batching oils based on rice bran oil and palm oil have been developed. They fulfil the IJO criteria and are now the standard processing technique in the main jute producing countries.

Recently, the Austrian food legislation enforcement “Lebensmitteluntersuchungsanstalt (LMUA) des Landes Vorarlberg” detected between 20 and 320 mg/kg mineral paraffins in 8 samples of peanut oil. The analytical method applied was designed for paraffins, i.e. other semivolatile components possibly transferred from the jute bags to food could not be detected. The mineral hydrocarbons observed in these samples contained 15 – 30 carbon atoms. The source was identified as the jute bags in which the peanuts were packaged. In the peanuts, the mineral hydrocarbon content amounted to 150 – 340 mg/kg

and in the bags to 1000 – 20000 mg/kg. By a separate analysis, aromatic hydrocarbons, including benzo(a)pyrene, could be identified.

TERMS OF REFERENCE

The Commission asks the EFSA to issue an opinion on mineral oils in jute bags. In doing so, the Authority is asked to address and answer the following questions:

1. *Is it safe for human health to use as batching oil in the processing of jute bags for food contact mineral oils fulfilling the criteria of the IJO? Is it necessary to set other/further purity criteria and if yes, which?*
2. *Is it safe for human health to use as batching oil in the processing of jute bags for food contact rice bran oil fulfilling the criteria of the IJO?*

ASSESSMENT

Use and production of jute and sisal bags

The assessment covers batching oils for both jute and sisal bags. Sisal bags have a market share of up to 20 %. The majority of the jute bags is produced for the local markets in Africa and Asia, and batching oils based on mineral hydrocarbons are still used for these products. Some producers have specialized in production for the European market, while others are switching batching oils between production for the different markets. Carryover may occur if the equipment to produce the bags is not properly cleaned between production runs.

Mineral hydrocarbons as batching oils

Conventional mineral batching oils used for jute and sisal bags typically contain mineral hydrocarbons with a chain length of 15 to 40 carbon atoms. They also may contain a wide spectrum of other hydrocarbons such as alkylated aromatics of 1-6 rings. From these oils, semivolatile mineral hydrocarbons in the range of C15 to C25 are most efficiently transferred to food by evaporation and recondensation. Other components with similar volatility (eg. aromatic hydrocarbons) are also expected to be transferred by the same mechanism. Concentrations of semivolatile mineral hydrocarbons originating from jute and/or sisal bags in food may range between 20 and 400 mg/kg.

The use of certain paraffin oils for food packaging is authorized. According to the SCF opinion (SCF, 1995), the oils must have a carbon number of not less than 25 at the 5 % boiling point and an average molecular weight of at least 480 Dalton.

Specific responses to the terms of reference:

1. *Is it safe for human health to use as batching oil in the processing of jute bags for food contact mineral oils fulfilling the criteria of the IJO? Is it necessary to set other/further purity criteria and if yes, which?*

The IJO currently recommends that batching oil shall only contain non-toxic ingredients and it shall not contain compounds that produce off-flavours or off-tastes in food. The IJO also specifies limits for the presence of unsaponifiable material in the bags. The IJO specifications limit the content of unsaponifiable matter to enable control in the countries of origin with simple laboratory equipment. Residual material in the bags resulting from the treatment with batching oils should be less than 1250 mg unsaponifiables/kg fibres.

The limit for unsaponifiable material applied, 1250 mg/kg fibres, corresponds to about 25000 mg unsaponifiables/kg batching oil (based on the application of 50 g oil to 1 kg of fibres, i.e. 5 % batching oil w/w in bags which after airing is reduced to 1-3% w/w). The limit implies that less than 2.5 % of the batching oil may consist of mineral hydrocarbons arising from carryover. The application of the specifications would effectively rule out contamination from mineral hydrocarbons.

In the past, the use of mineral hydrocarbon batching oils could give rise to a transfer of semivolatile mineral hydrocarbons of approximately 100 mg/kg food. The new specification would reduce by a factor of 40 at least the mineral hydrocarbon fraction in the batching oil, present as such or resulting from carry over. This could result in mineral hydrocarbon concentrations in the food of approximately 2.5 mg/kg. Based on this calculation, human exposure to mineral hydrocarbons from food packaged in jute and sisal bags will be below 0.05 mg/kg bw/day and thus below the temporary ADI (SCF, 1995) even if one kg of such contaminated food is consumed per day. The SCF set a temporary ADI of 0-4 mg/kg b.w. for mineral oils containing no more than 5% w/w low molecular weight mineral hydrocarbons with a chain length of less than 25 carbon atoms and with an average molecular weight above 480 Dalton. This would correspond to a toxicologically safe intake of 0.2 mg/kg bw/day for semivolatile mineral hydrocarbons with less than 25 carbon atoms. Thus, it is safe to apply the criteria of the IJO since residues of semivolatile mineral hydrocarbons will be low and further purity criteria are not necessary.

2. *Is it safe for human health to use as batching oil in the processing of jute bags for food contact rice bran oil fulfilling the criteria of the IJO?*

In their technical summary, the IJO mentions the use of good manufacturing practice compliance and use of oils acceptable for human consumption. The Panel is aware that both rice-bran oil and palm oil are recommended by the IJO and ICCO (International Cocoa Organisation) for the manufacture of jute and sisal bags. Rice bran or palm oil or any other vegetable oil in compliance with the Codex standard for vegetable oils (CODEX STAN 210) do not contain semivolatile mineral hydrocarbons. Since evaporation and recondensation of semivolatile mineral hydrocarbons is the route of contamination that can reasonably be expected, food contamination is ruled out if edible rice bran or palm oil is used.

However, the IJO only proposes to use a batching oil said to be “based on” palm- or rice-bran oil without further specifications and both palm and rice bran oil need to be applied as suspensions in water. This process may require the use of detergents and other additives. Due to the low volatility, the transfer of the additives to food may be low or may not occur, but a more detailed specification of the batching oil and other chemicals used in the process are needed for full assessment of potential human health effects.

CONCLUSION

The introduction of the IJO specifications will result in a major reduction of human exposure to mineral hydrocarbons from food packaged in jute and sisal bags and in this aspect no further purity criteria are necessary.

The use of edible rice bran oil, palm oil or any other vegetable oil would not result in food contamination with mineral hydrocarbons. However, more detailed specifications on batching oils said to be “based on” rice-bran oil or palm oil are needed for a full assessment of potential effects of such oils on human health.

DOCUMENTATION PROVIDED TO EFSA

1. Letter from the European Commission requesting an opinion on mineral oils in jute bags, CS/PM/4146 on 16 September 2003
2. Letter dated 28.05.2003 from Dr. K. Rieger, Lebensmitteluntersuchungsanstalt Vorarlberg to Dr. Franz Vojir, Bundesministerium für Gesundheit und Frauen, Wien; concerning mineral oils in jute bags.
3. Summary report on the IJO workshop on jute bags held in Calcutta, India, 9 & 10 February 1998.
4. Letter from Filtisac, 6. June 2000
5. Summary report of the IJO workshop on jute bags, Calcutta, Feb. 1998

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