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Study of new users of internal coating for Food and beverage cans

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Abstract

For the development of standard Iraqi Specification private examined the quality of coating materials for cans of soft drinks, canned food according to the latest global screening methods and knowledge of the type of material that coated the lost models collected from the local market for cans of soft drinks, canned food spread over a number of local, and Arab productive companies and up to 35 cans. It was checking analyzes infrared metals (FTIR) to determine the type of material that coated the containers and measuring the thickness of the coating in a manner magnetic induction and eddy currents, and checking the quality of the internal coating. Turns out that most of the FTIR turns out that all the paint is epoxy (bis-phenol) and phenol and vinyl in check analyzes infrared also shows that coating thickness ranging from (11-24) Micron also checks the quality of the internal coating showed that 71% of the packages tested failed in this examination.

Keywords: Food cans, internal coating, FTIR, epoxy (bis-phenol).

1. Introduction

Cans for food and drinks may be manufactured in tin, plate, tin-free steel, or aluminum. Depending on the material to be used and on the type of can, difference production methods may also be used to manufacture cans [1]. Metals cans for foods and drinks are usually classified in three-piece cans are composed of a welded body and two-piece cans are made in tinplate, aluminum, or tin-free steel and produced by the Draw-Redraw (DRD) process or by the Draw-Wall-Ironing (DWI) process. These cans have a very thin wall, thus lacking mechanical resistance [2, 3].

Metal food and beverage cans have a thin coating on the interior surface, which is essential to prevent corrosion of the can and contamination of food and beverages with dissolved metals. In addition, the coating helps to prevent canned foods from becoming tainted or spoiled by bacterial contamination. The major types of interior can coating are made from epoxy resins, which have achieved wide acceptance for use as protective coatings because of their exceptional combination of toughness, adhesion, formability and chemical resistance. Such coatings are essentially inert and have been used safely for over 40 years. In addition to protecting contents from spoilage, these coatings make it possible for food products to maintain their quality and taste, while extending shelf life [4, 5].

Bisphenol A (BPA) is a key building block of epoxy resins. BPA is a chemical used worldwide in making thousands of materials, including some plastics, coatings, and adhesives. Virtually all metal cans used for food and beverage products are lined on the inside with a coating that uses BPA as a starting material. This coating guards against contamination and extends the shelf life of foods and beverages. BPA is also used in the manufacture of shatter-resistant bottles, medical devices (including dental sealants), sports safety equipment and compact disc covers. It has been used for more than 50 years. Aluminum can liners that use BPA are the industry standard and have been used safely for more than 50 years. In fact, they have improved food and beverage safety by providing protection against food-borne diseases [6].

2. Experimental

2.1 Materials and devices used

- 35 number of cans used in food preservation, juices and soft drinks.
- Equipment Analysis infrared type FTIR (JASCO-FTIR-4200) Japanese made.
- Equipment for checking the quality of the internal coating of metal cans type (WACO-10788) USA-made.

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2.2 Testing and Equipment

2.2.2.1 Screening Analyzes Infrared FTIR

The analysis used to detect the type of coating materials for metal cans using FTIR device depends style to put a small slice of metal cans painted on the crystal surface is then the sensor on top of them to achieve full contact with the crystal surface to generate the absorption spectrum and is of high quality spectral data collection in minutes or 3 minutes.

2.2 Checking the quality of internal coatings for metal cans

It checked using a device (WACO-Enamel Tester-RaterII USA) made one of the latest specialized in this field equipment and depends style to put Ketroliti solution concentration of 1% and then measure the amount of electrical current DC passing through the solution through the wall of the enclosure. In the case of the quality of the internal coating

layer and they are free of defects and cracks they will work as a class buffer to prevent the passage of electric current and the opposite, the electrical current will pass through it and shows it on the screen in mA and measure the quality metal coating measurement according to the Indian standard BIS 14407, BIS 14235 [7, 8].

3. Results and Discussion

3.1 Examination of FTIR

Examination showed that the results of all samples examined coated (Epoxy-Diglycidylether of bisphenol A (DGEBA)) or Phenolic (Epoxy (BPA or + Vinyl Epoxy (bisphenol A) As shown in Table (1) and figures (1,2,3) It represents the curves of some samples and analysis of the device through which and through compare with standard curves were identified type coating material

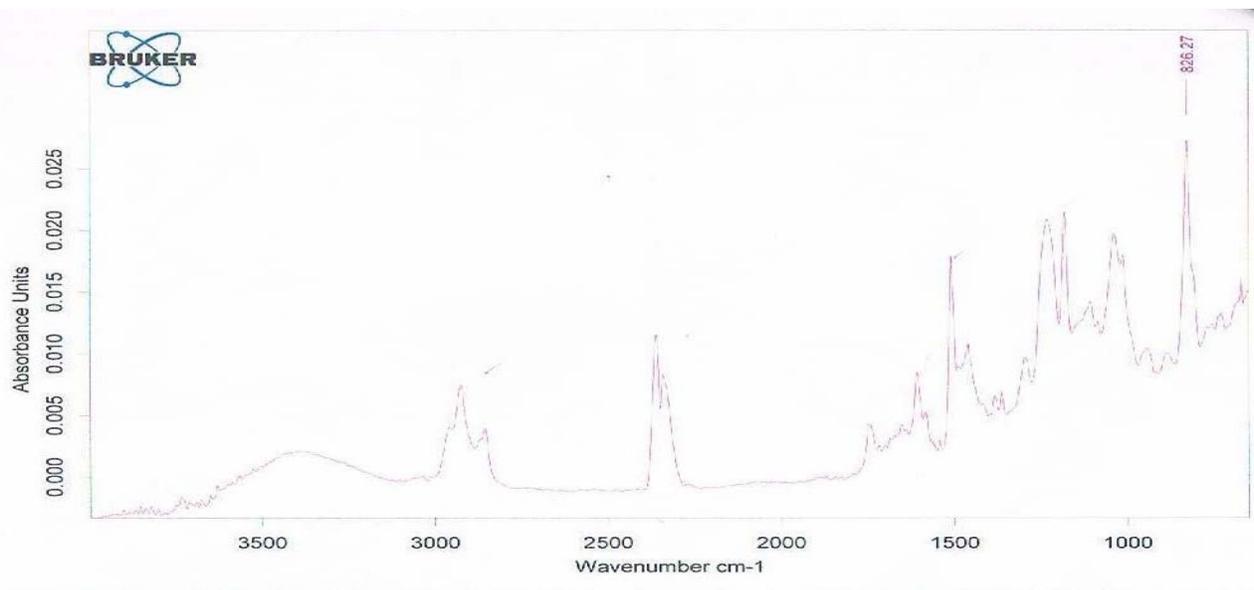


Fig 1: shows the absorption spectrum of a substance Vinyl + Epoxy bisphenol A

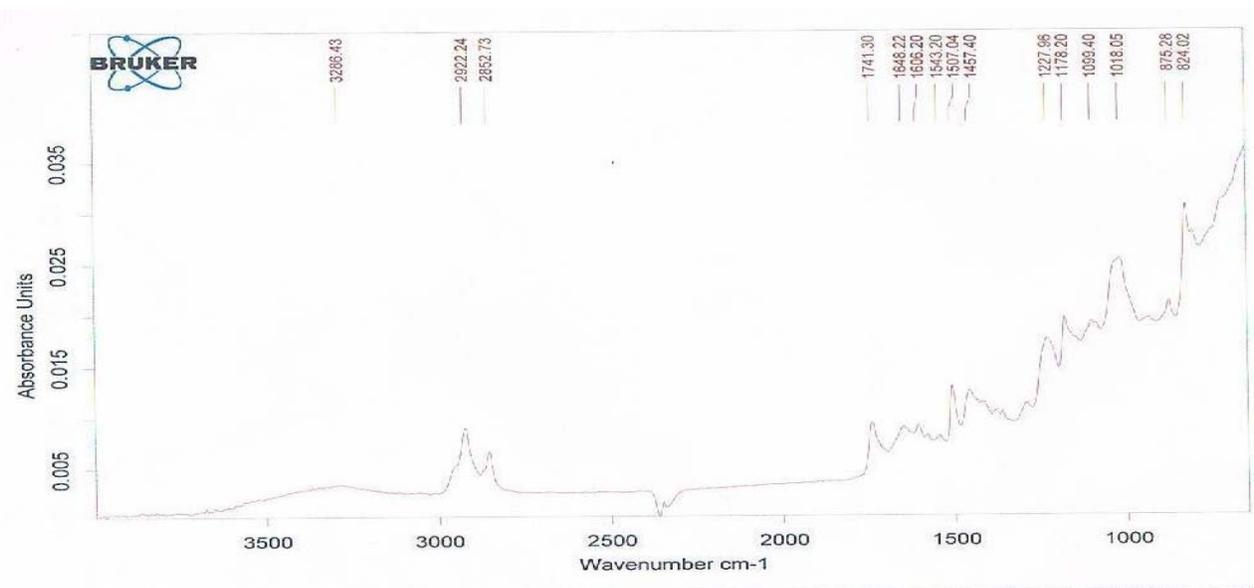


Fig 2: shows the absorption spectrum of a substance DGEBA Epoxy Diglycidylether of bisphenol A

3.2 Checking the quality of the internal coating: Test results showed that the amount of electric current passing through the coating layer and for all examined samples ranging from (0-

240) and mA as shown in Table (1). Compared with the standard rate (5) mA installed in the standard (BIS-14407) shows that the gain of 71% came out of specification.

Table 1: shows the results of examination of coating material for metal cans

quality of internal coating (mA)	FTIR screening Type of coating	subject	The cans subject name
1.9 0.9 1.5	Epoxy(BPA)+ Phenolic	A1 A2 A3	Black Olives
1.5 13.1 2	Epoxy (DGEBA)	A4 A5 A6	Fava Beans large grain
203 91.8 90.5	Epoxy(BPA)+ Phenolic	A7 A8 A9	Mushroom
106 33.4	Epoxy(BPA)+ Phenolic	A10 A11	Green peas
143	Epoxy(BPA)+ Phenolic	A12	peas
46 47.7 48.6	Epoxy(BPA)+ Phenolic	A13 A14 A15	Bake
4.9 13.2 188.9	Epoxy(BPA)+ Phenolic	A16 A17 A18	Tomato paste
147.7 105.5 104.7	Epoxy (DGEBA)	A22 A23 A24	Sour big box
40.8 42.5 47.6	Epoxy (DGEBA)	A28 A29 A30	Beef
0 0 0	Epoxy (DGEBA)	A42 A43 A44	cheese
16.1	Epoxy(bisphenol A)+Vinyl	A60	Pepsi
1.9	Epoxy(bisphenol A)+Vinyl	A61	Sprite
21 12.5	Epoxy(bisphenol A)+Vinyl	A63 A64	7-up
32.6 16.9	Epoxy(bisphenol A)+Vinyl	A65 A66	Sinalco
8.2 9.7	Epoxy(bisphenol A)+Vinyl	A67 A68	Mirinda Orange

4. Conclusion

1. Result of FTIR show that all the paint is epoxy (bisphenol) and phenol and vinyl
2. Results of the internal coating thickness ranging from (11-24) Micron also checks the quality of the internal coating showed that 71% of the packages tested failed in this examination.

5. References

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