

EBU Technical Recommendation R74-2001

The vinegar syndrome and storage of cinefilm material

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Introduction

The “vinegar syndrome” began to be noticed in broadcasters’ archives during the early 1980s [1, 2, 3]. Nowadays, the vinegar syndrome is a well-known degradation, which is found in most broadcast archives.

Most archived film material (film and sepomag) has an acetate-based plastic support. The acetate material reacts chemically with moisture over time to produce acetic acid (vinegar). This chemical reaction is slow in fresh film but will gradually build up, at a rate depending on the storage conditions. Humid and hot storage conditions are unfavourable. After the acid level has increased to a certain level, the reaction rate increases, and suddenly becoming very rapid. At this onset, called the autocatalytic point, the reaction will feed on itself and the more advanced the reaction becomes, the more the reaction rate is accelerated by the presence of acetic acid.

The reaction can also be accelerated by the presence of a catalyst, which may be rust from a film can, the oxide on magnetic tape or other affected rolls of film. Sepmag is known to develop acidity twice the rate of film material. The reaction is also enhanced if film is stored in tightly sealed containers (e.g. air-tight bags) and storage in contact with certain types of paper or plastic material.

The vinegar syndrome is typically discovered by the smell of vinegar, which indicates that the acetic acid has come to the surface of the film and has an acidity level close to the autocatalytic point. Tools are available to detect and measure the acidity level. Several methods, both destructive and non-destructive, have been described for the early detection of vinegar syndrome [4,7,8]

Affected film material loses its plastic properties and dimensional stability. The film becomes dry and shrinks. The diffusing acid will affect neighbouring rolls or cans.

Once started, the chemical reaction cannot be stopped or reversed but it can be slowed down significantly by storage in cold and dry conditions.

Recommendations

The EBU recommends that:

- a) Broadcasters should inspect their film collections for active chemical degradation.
- b) Broadcasters should establish a preservation programme and action plan when vinegar syndrome is discovered.
- c) Suspected films should be checked at regular intervals (about every 2-3 years) to determine whether they show signs of advanced degradation
- d) Affected material should be segregated to avoid spread of acid
- e) Magnetic film or tape should NOT be stored in the same cans as film [6]
- f) Film collections should be stored in cold and dry conditions according to recommendation EBU R101 [10]
- g) Programme content of affected films should be preserved for future use before irreparable damage occurs, either by copying onto a film material with a polyester base or by transferring to a video or data file format, preferably as an uncompressed component signal for future proof reuse.
- h) Affected SEPOMAG should be copied onto a polyester based material.

EBU Tech. 3289 gives further information on understanding and handling film degradation. [11]

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